



High frequency microphone measurements for transition detection on airfoils. Risø C2-18 appendix report

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Publication date:
2008

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):

Døssing, M. (2008). High frequency microphone measurements for transition detection on airfoils. Risø C2-18 appendix report. Roskilde: Danmarks Tekniske Universitet, Risø Nationallaboratoriet for Bæredygtig Energi. (Denmark. Forskningscenter Risoe. Risoe-R; No. 1645(App.2)(EN)).

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High Frequency Microphone
Measurements for Transition Detection
on Airfoils
Risø C2-18 Appendix Report

Mads Døssing

Risø-R-1645(App.2)(EN)

Author: Mads Døssing

Title: High Frequency Microphone Measurements for Transition Detection on Airfoils - Risø C2-18 Appendix Report

Department: Aeroelastic Design - Wind Energy Department

Abstract:

This report is an appendix to [1]. A comprehensive set of results are presented which allows the transition on airfoils to be detected. Results for the Risø C2-18 profile are presented.

Risø-R-1645(App.2)(EN)

May 2008

ISSN 0106-2840

ISBN 978-87-550-3676-5

Contract no.:

ENS 033001/33033-0055

Group's own reg. no.:

1110060-04

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Contents

List of symbols 5

1 Introduction 5

2 Table of data 6

3 Table of XFOIL data 7

3.1 Suction side 7

3.1.1 C16 Clean - 7

3.1.2 C3 Clean - 10

3.1.3 C4 Clean - 12

3.1.4 C5 Clean - 14

3.1.5 C6 Clean - 17

3.1.6 Z16 ZZ90 x/c=5% suc. x/c=10% press. - 19

3.1.7 Z3 ZZ90 x/c=5% suc. x/c=10% press. - 21

3.1.8 Z6 ZZ90 x/c=5% suc. x/c=10% press. - 24

3.1.9 L16 LM standard LER - 26

3.1.10 L3 LM standard LER - 28

3.1.11 L6 LM standard LER - 31

3.1.12 T16 Trip wire. Bump tape 2% - 33

3.1.13 T3 Trip wire. Bump tape 2% - 35

3.1.14 T6 Trip wire. Bump tape 2% - 38

3.1.15 C16a Clean 200x200 40

3.1.16 C3a Clean 200x200 42

3.1.17 C6a Clean 200x200 45

3.1.18 Z16a ZZ90 x/c=5% suc. x/c=10% press. 200x200 47

3.1.19 Z3a ZZ90 x/c=5% suc. x/c=10% press. 200x200 49

3.1.20 Z6a ZZ90 x/c=5% suc. x/c=10% press. 200x200 52

3.1.21 L16a LM standard LER 200x200 54

3.1.22 L3a LM standard LER 200x200 56

3.1.23 L6a LM standard LER 200x200 58

3.1.24 T16a Trip wire. Bump tape 2% 200x200 60

3.1.25	T3a Trip wire. Bump tape 2% 200x200	63
3.1.26	T6a Trip wire. Bump tape 2% 200x200	65
3.1.27	C16b Clean 100x100	67
3.1.28	C3b Clean 100x100	69
3.1.29	C6b Clean 100x100	71
3.1.30	Z16b ZZ90 x/c=5% suc. x/c=10% press. 100x100	73
3.1.31	Z3b ZZ90 x/c=5% suc. x/c=10% press. 100x100	75
3.1.32	Z6b ZZ90 x/c=5% suc. x/c=10% press. 100x100	77
3.1.33	L16b LM standard LER 100x100	79
3.1.34	L3b LM standard LER 100x100	81
3.1.35	L6b LM standard LER 100x100	83
3.1.36	T16b Trip wire. Bump tape 2% 100x100	85
3.1.37	T3b Trip wire. Bump tape 2% 100x100	87
3.1.38	T6b Trip wire. Bump tape 2% 100x100	89
3.2	Pressure side	91
3.2.1	C16 Clean -	91
3.2.2	C3 Clean -	94
3.2.3	C4 Clean -	96
3.2.4	C5 Clean -	98
3.2.5	C6 Clean -	101
3.2.6	Z16 ZZ90 x/c=5% suc. x/c=10% press. -	103
3.2.7	Z3 ZZ90 x/c=5% suc. x/c=10% press. -	105
3.2.8	Z6 ZZ90 x/c=5% suc. x/c=10% press. -	108
3.2.9	L16 LM standard LER -	110
3.2.10	L3 LM standard LER -	112
3.2.11	L6 LM standard LER -	115
3.2.12	T16 Trip wire. Bump tape 2% -	117
3.2.13	T3 Trip wire. Bump tape 2% -	119
3.2.14	T6 Trip wire. Bump tape 2% -	122
3.2.15	C16a Clean 200x200	124
3.2.16	C3a Clean 200x200	126
3.2.17	C6a Clean 200x200	129
3.2.18	Z16a ZZ90 x/c=5% suc. x/c=10% press. 200x200	131
3.2.19	Z3a ZZ90 x/c=5% suc. x/c=10% press. 200x200	133
3.2.20	Z6a ZZ90 x/c=5% suc. x/c=10% press. 200x200	136
3.2.21	L16a LM standard LER 200x200	138

3.2.22	L3a LM standard LER 200x200	140
3.2.23	L6a LM standard LER 200x200	142
3.2.24	T16a Trip wire. Bump tape 2% 200x200	144
3.2.25	T3a Trip wire. Bump tape 2% 200x200	147
3.2.26	T6a Trip wire. Bump tape 2% 200x200	149
3.2.27	C16b Clean 100x100	151
3.2.28	C3b Clean 100x100	153
3.2.29	C6b Clean 100x100	155
3.2.30	Z16b ZZ90 x/c=5% suc. x/c=10% press. 100x100	157
3.2.31	Z3b ZZ90 x/c=5% suc. x/c=10% press. 100x100	159
3.2.32	Z6b ZZ90 x/c=5% suc. x/c=10% press. 100x100	161
3.2.33	L16b LM standard LER 100x100	163
3.2.34	L3b LM standard LER 100x100	165
3.2.35	L6b LM standard LER 100x100	167
3.2.36	T16b Trip wire. Bump tape 2% 100x100	169
3.2.37	T3b Trip wire. Bump tape 2% 100x100	171
3.2.38	T6b Trip wire. Bump tape 2% 100x100	173

List of symbols

- σ Sample standard deviation [Pa]
- α Angle of attack [deg]
- x Chordwise position [m]
- $Re \frac{cU}{\nu}$ Reynolds number [-]
- P_s Power spectrum of Y [Pa]
- f_1, f_2 High and lower bound of filtered σ [Hz]
- μ_n Statistical moments of P_s of order n [Hz]
- x Chordwise coordinate (positive from leading edge to trailing edge) [m]
- x_{tr} Transition point [m]
- c Chord length [m]
- $0.5\rho U^2$ Dynamic pressure [Pa]
- U Incoming velocity (in windtunnel) [m/s]
- ν Kinematic viscosity [m²/s]

1 Introduction

For a full introduction refer to [1].

Important information !

In figures where XFoil data is presented the filenames are also given and the corresponding simulation parameters can be found in section 3. In XFoil the transition point is calculated at the same Reynolds and Mach number as the experiment it is compared to, but in most cases a free transition is specified (corresponding to a clean profile) even though roughness etc. is used in the experiment.

If the following is specified, it means that the standard deviation of pressure fluctuations σ is calculated as the sample standard deviation

$$f_1 = 0\text{Hz}, f_2 = 25000\text{Hz}$$

If the following is specified, σ is calculated using Fourier data and the values are lower than the physical data. Refer to [1] for details.

$$f_1 = 2000\text{Hz}, f_2 = 25000\text{Hz}$$

2 Table of data

<i>Re</i>	Tag	Description	Grid[mm]	Log-file*
1.60e6	C16	Clean	-	
3.00e6	C3	Clean	-	
4.00e6	C4	Clean	-	
5.00e6	C5	Clean	-	
6.00e6	C6	Clean	-	
1.60e6	Z16	ZZ90 x/c=5% suc. x/c=10% press.	-	
3.00e6	Z3	ZZ90 x/c=5% suc. x/c=10% press.	-	
6.00e6	Z6	ZZ90 x/c=5% suc. x/c=10% press.	-	
1.60e6	L16	LM standard LER	-	
3.00e6	L3	LM standard LER	-	
6.00e6	L6	LM standard LER	-	
1.60e6	T16	Trip wire. Bump tape 2%	-	
3.00e6	T3	Trip wire. Bump tape 2%	-	
6.00e6	T6	Trip wire. Bump tape 2%	-	
1.60e6	C16a	Clean	200x200	
3.00e6	C3a	Clean	200x200	
6.00e6	C6a	Clean	200x200	
1.60e6	Z16a	ZZ90 x/c=5% suc. x/c=10% press.	200x200	
3.00e6	Z3a	ZZ90 x/c=5% suc. x/c=10% press.	200x200	
6.00e6	Z6a	ZZ90 x/c=5% suc. x/c=10% press.	200x200	
1.60e6	L16a	LM standard LER	200x200	
3.00e6	L3a	LM standard LER	200x200	
6.00e6	L6a	LM standard LER	200x200	
1.60e6	T16a	Trip wire. Bump tape 2%	200x200	
3.00e6	T3a	Trip wire. Bump tape 2%	200x200	
6.00e6	T6a	Trip wire. Bump tape 2%	200x200	
1.60e6	C16b	Clean	100x100	
3.00e6	C3b	Clean	100x100	
6.00e6	C6b	Clean	100x100	
1.60e6	Z16b	ZZ90 x/c=5% suc. x/c=10% press.	100x100	
3.00e6	Z3b	ZZ90 x/c=5% suc. x/c=10% press.	100x100	
6.00e6	Z6b	ZZ90 x/c=5% suc. x/c=10% press.	100x100	
1.60e6	L16b	LM standard LER	100x100	
3.00e6	L3b	LM standard LER	100x100	
6.00e6	L6b	LM standard LER	100x100	
1.60e6	T16b	Trip wire. Bump tape 2%	100x100	
3.00e6	T3b	Trip wire. Bump tape 2%	100x100	
6.00e6	T6b	Trip wire. Bump tape 2%	100x100	

*All the data is in the same log file: "LM Wind Tunnel Log 2007-11.pdf"

3 Table of XFOIL data

Re	M	file	N_{crit}	Forced x_{tr}
1.60e6	0.08	C218Re16M08Ncr9.pol	9	-
		C218Re16M08Ncr8.pol	8	-
		C218Re16M08Ncr6.pol	6	-
		C218Re16M08Ncr4.pol	4	-
		C218R16N8Tr0510.pol	8	$x_{tr}/c=5\%$ suc. 10% press.
3.00e6	0.15	C218R16N4Tr0510.pol	4	$x_{tr}/c=5\%$ suc. 10% press.
		C218Re30M15Ncr9.pol	9	-
		C218Re30M15Ncr8.pol	8	-
		C218Re30M15Ncr6.pol	6	-
		C218Re30M15Ncr4.pol	4	-
4.00e6	0.20	C218R30N8Tr0510.pol	8	$x_{tr}/c=5\%$ suc. 10% press.
		C218R30N4Tr0510.pol	4	$x_{tr}/c=5\%$ suc. 10% press.
		C218Re40M20Ncr9.pol	9	-
		C218Re40M20Ncr8.pol	8	-
		C218Re40M20Ncr6.pol	6	-
5.00e6	0.25	C218Re40M20Ncr4.pol	4	-
		C218Re50M25Ncr9.pol	9	-
		C218Re50M25Ncr8.pol	8	-
		C218Re50M25Ncr6.pol	6	-
		C218Re50M25Ncr4.pol	4	-
6.00e6	0.30	C218Re60M30Ncr9.pol	9	-
		C218Re60M30Ncr8.pol	8	-
		C218Re60M30Ncr6.pol	6	-
		C218Re60M30Ncr4.pol	4	-
		C218R60N8Tr0510.pol	8	$x_{tr}/c=5\%$ suc. 10% press.
		C218R60N4Tr0510.pol	4	$x_{tr}/c=5\%$ suc. 10% press.

Table 1: XFOIL datafiles

If not otherwise stated the following boundary layer parameters have been used.

Vacc	0.0100
Klag	5.6000
Uxwt	1.00
A	6.7000
B	0.7500
KCt	0.01485
CtiniK	1.8000
CtiniX	3.3000

Table 2: XFOIL parameters

3.1 Suction side

3.1.1 C16 Clean -

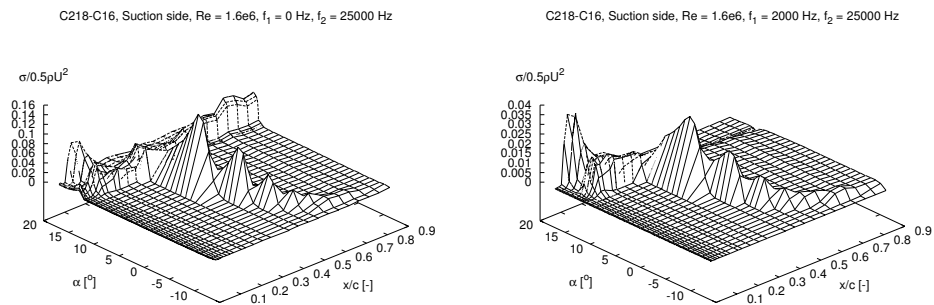
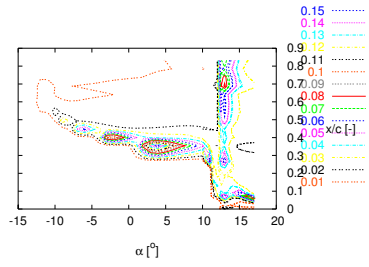


Figure 1: Pressure standard deviations, σ

C218-C16, Suction side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16, Suction side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

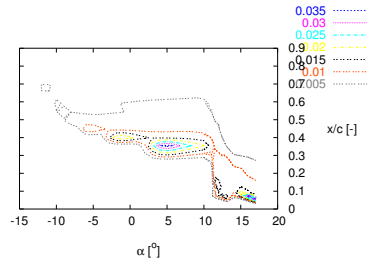
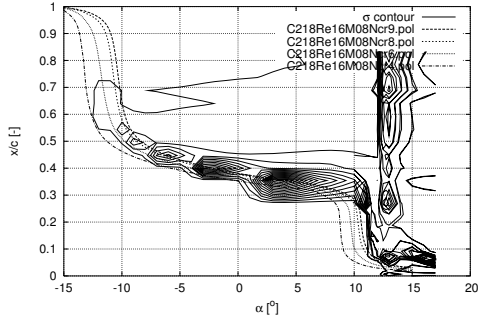


Figure 2: Contours of σ

C218-C16, Suction side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16, Suction side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

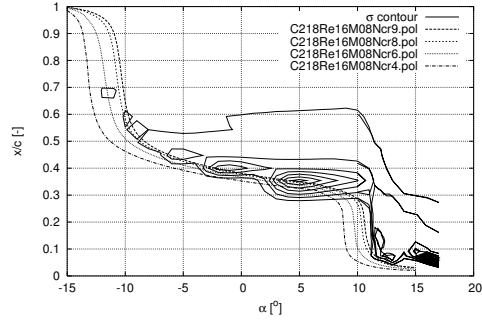
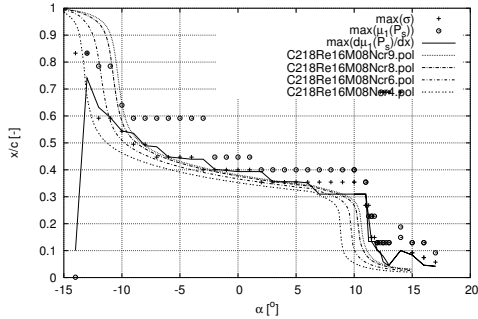


Figure 3: Contours of σ and Xfoil data

C218-C16, Suction side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16, Suction side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

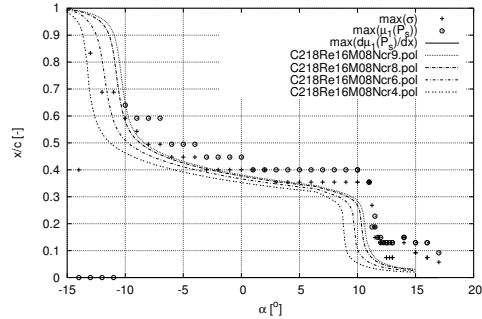
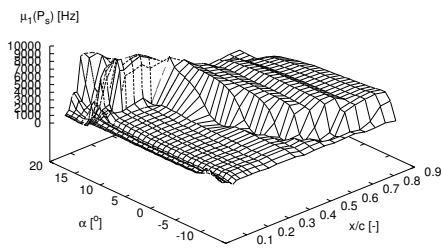


Figure 4: Transition detection

C218-C16, Suction side, $Re = 1.6e6$



C218-C16, Suction side, $Re = 1.6e6$

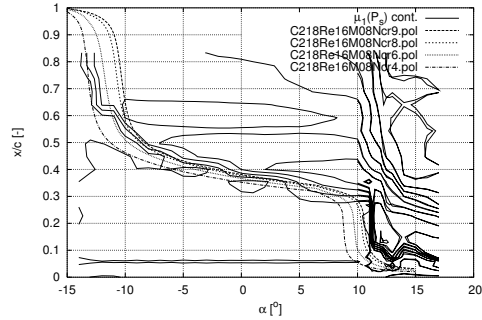


Figure 5: Fourier transform mean, $\mu_1(P_s)$

C218-C16, Suction side, Re = 1.6e6

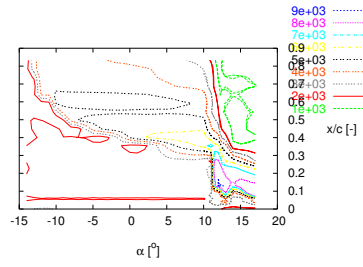


Figure 6: Contours of $\mu_1(P_s)$

C218-C16
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.3098	44110.3	6690.1
11.00	0.3098	61199.8	7348.1
11.25	0.1339	48068.1	7771.2
11.50	0.1339	57199.9	8644.0
11.75	0.1339	62122.4	8875.3
12.00	0.1005	62914.6	9051.2
12.25	0.0963	61129.7	9065.0
12.50	0.0586	59481.8	9211.2
12.75	0.0502	66917.2	8874.3
13.00	0.0460	70261.0	8761.1
14.00	0.1005	58653.0	7953.3
15.00	0.0837	70383.9	8805.1
16.00	0.0460	75968.7	8876.4
17.00	0.0419	79652.8	8944.4
16.00	0.0460	76010.5	8858.6
15.00	0.0837	70116.6	8863.3
14.00	0.1005	59367.8	7964.7
13.00	0.0460	70416.0	8666.8
12.50	0.0795	59587.8	8796.1
12.00	0.1005	63546.8	9172.7
11.50	0.1339	58390.0	8717.0
11.00	0.3098	58362.4	7476.0
10.00	0.3098	46454.3	6882.0
9.00	0.3098	38197.6	6738.0
8.00	0.3098	34001.4	6582.9
7.00	0.3098	31981.9	6485.2
6.00	0.3516	30137.0	6468.4
5.00	0.3558	33392.2	6403.0
4.00	0.3558	38818.3	6338.2
3.00	0.3558	43633.2	6209.2
2.00	0.3935	44306.1	5988.2
1.00	0.3935	45833.0	5714.7
0.00	0.3935	43571.4	5654.2
-1.00	0.3977	39154.7	5588.7
-2.00	0.4018	35463.3	5455.1
-3.00	0.4395	38958.7	5369.6
-4.00	0.4395	42973.5	5372.5
-5.00	0.4437	40135.4	5355.0
-6.00	0.4479	35032.8	5357.3
-7.00	0.4856	38146.7	5351.1
-8.00	0.4897	37304.3	5330.0
-9.00	0.5358	37184.2	5269.3
-10.00	0.5442	40137.6	5285.4
-11.00	0.5944	32720.1	4833.0
-12.00	0.6321	33739.5	4838.2
-13.00	0.7409	21789.3	3708.0
-14.00	0.1005	4283.9	2660.3

3.1.2 C3 Clean -

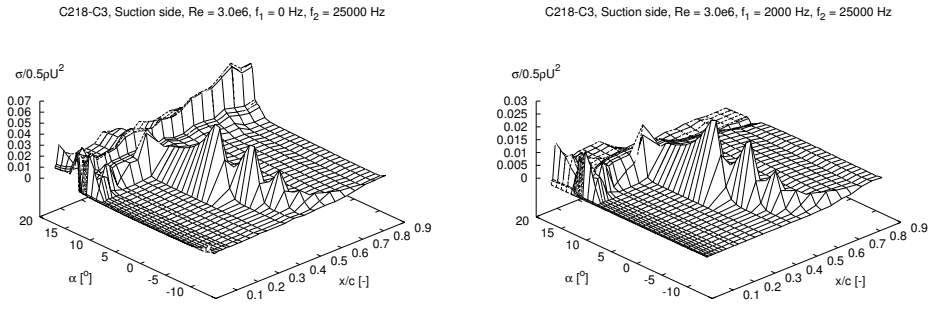


Figure 7: Pressure standard deviations, σ

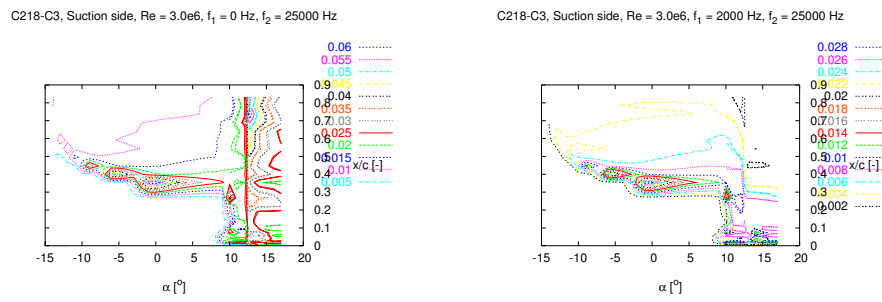


Figure 8: Contours of σ

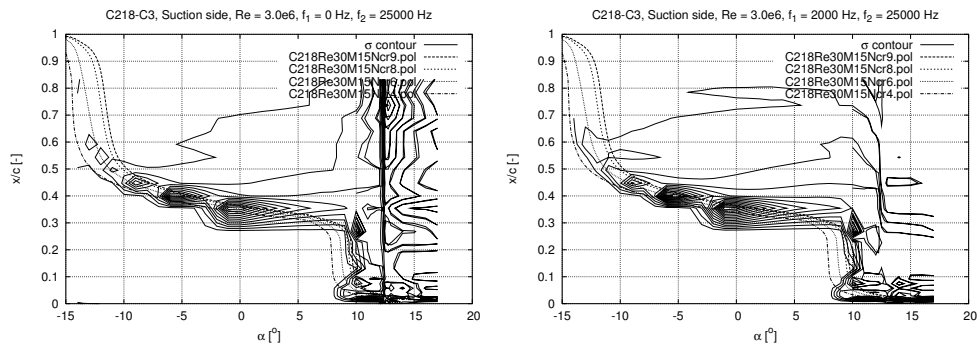


Figure 9: Contours of σ and XFOIL data

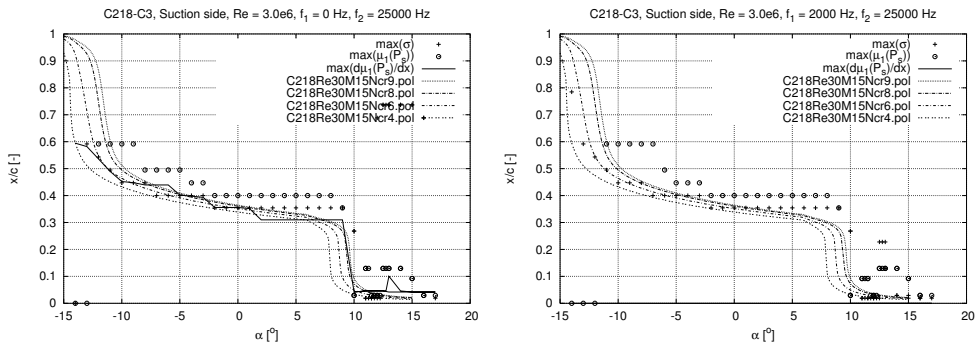


Figure 10: Transition detection

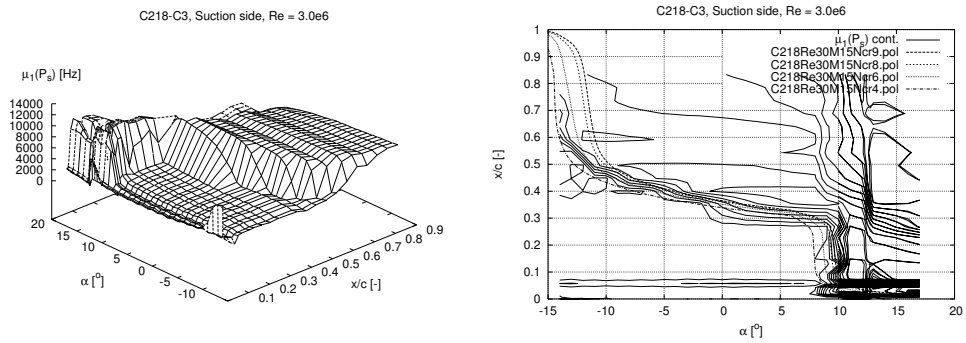


Figure 11: Fourier transform mean, $\mu_1(P_s)$

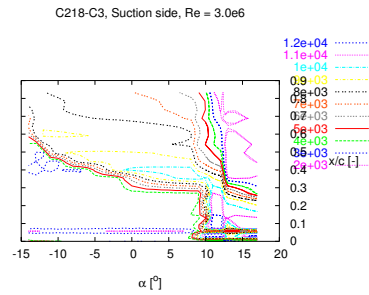


Figure 12: Contours of $\mu_1(P_s)$

C218-C3

alpha [degrees] angle of attack

xtr* [-] transition point (x=x/c) predicted by max[d(mu1(Ps))/dx*]

d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])

max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	78020.3	12566.8
11.00	0.0460	98664.8	12626.3
11.25	0.0460	98301.7	12621.8
11.50	0.0460	99152.9	12649.2
11.75	0.0460	98833.9	12676.3
12.00	0.0460	99909.8	12747.3
12.25	0.0460	98977.4	12744.3
12.50	0.0460	100277.0	11606.0
12.75	0.0460	77424.9	10980.9
13.00	0.1005	69405.4	11020.4
14.00	0.0460	86369.2	11647.5
15.00	0.0419	97937.2	11763.8
16.00	0.0419	96419.5	12104.8
17.00	0.0419	92052.5	12125.3
16.00	0.0419	97474.7	12111.7
15.00	0.0419	98638.3	11753.0
14.00	0.0419	86959.2	11685.7
13.00	0.0419	73900.9	11056.4
12.50	0.0460	86199.5	11339.2

12.00	0.0460	99826.8	12769.6
11.50	0.0460	99396.0	12652.6
11.00	0.0460	98834.6	12677.6
10.00	0.0419	81811.9	12644.1
9.00	0.3098	74811.9	10514.2
8.00	0.3098	73670.0	10412.4
7.00	0.3098	74105.1	10401.1
6.00	0.3098	70722.8	10441.7
5.00	0.3098	70027.1	10433.9
4.00	0.3098	65914.8	10406.6
3.00	0.3098	62545.1	10406.4
2.00	0.3098	55158.7	10375.7
1.00	0.3516	54349.3	10331.7
0.00	0.3558	57842.1	10234.8
-1.00	0.3558	64000.5	10013.3
-2.00	0.3558	68725.5	9627.2
-3.00	0.3935	67210.7	9215.1
-4.00	0.3977	63278.6	9170.4
-5.00	0.4018	62815.5	9142.9
-6.00	0.4395	62263.9	9135.9
-7.00	0.4395	70314.5	9142.2
-8.00	0.4395	66911.6	9088.9
-9.00	0.4479	65029.3	9096.0
-10.00	0.4521	65356.4	9109.7
-11.00	0.4897	59809.9	9094.4
-12.00	0.5358	68468.2	9072.9
-13.00	0.5818	60421.8	9670.0
-14.00	0.5944	34278.6	9484.2

3.1.3 C4 Clean -

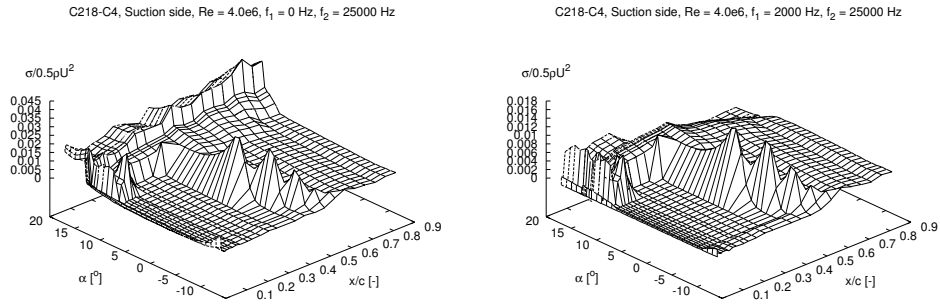


Figure 13: Pressure standard deviations, σ

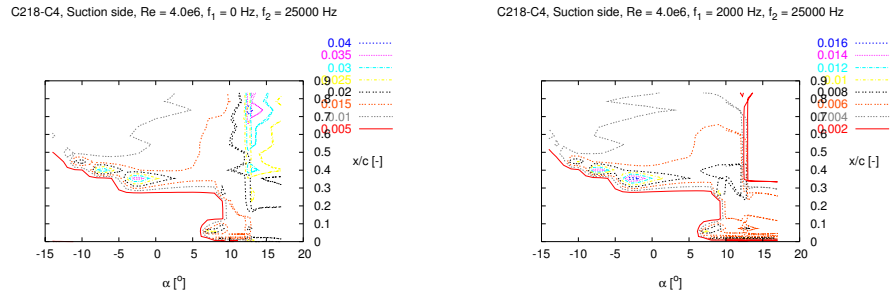


Figure 14: Contours of σ

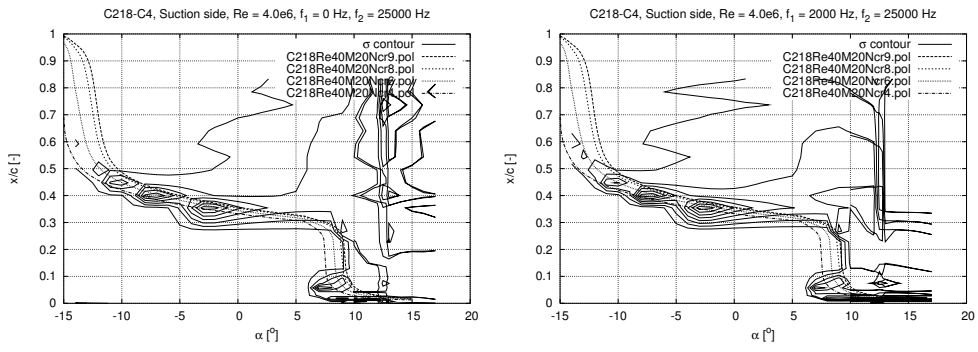


Figure 15: Contours of σ and Xfoil data

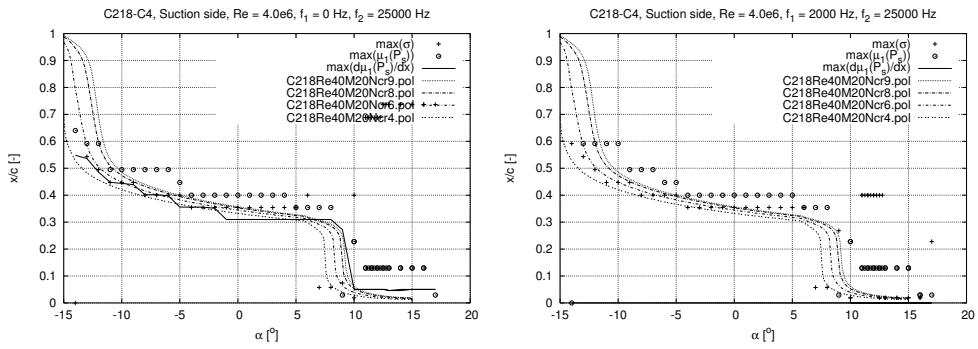


Figure 16: Transition detection

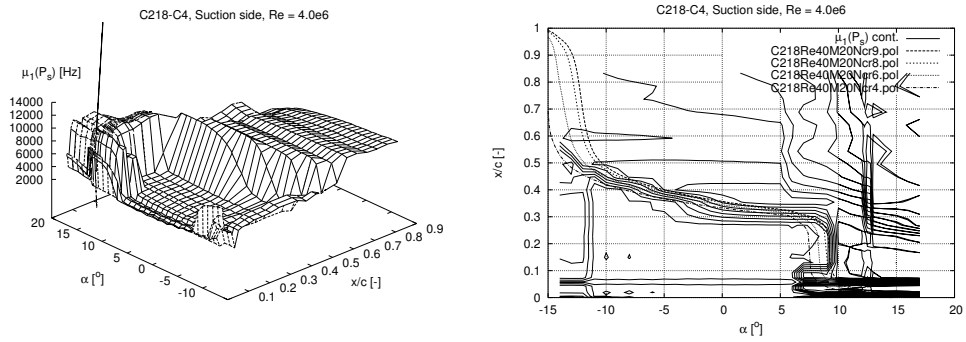


Figure 17: Fourier transform mean, $\mu_1(P_s)$

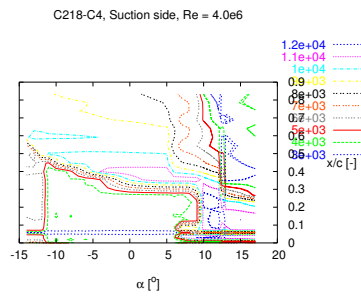


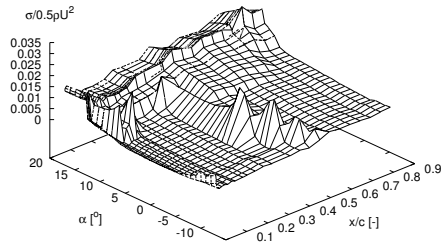
Figure 18: Contours of $\mu_1(P_s)$

C218-C4
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (-max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0502	75276.4	12284.2
11.00	0.0502	82059.8	12408.3
11.25	0.0502	82433.4	12404.9
11.50	0.0502	82782.8	12435.5
11.75	0.0502	82709.8	12434.8
12.00	0.0502	83134.1	12437.9
12.25	0.0502	83111.7	12430.6
12.50	0.0502	63074.3	12481.5
12.75	0.0502	63365.7	12453.4
13.00	0.0460	64406.1	11759.0
14.00	0.0460	68638.9	11914.8
15.00	0.0502	68112.0	12000.7
16.00	0.0502	68234.5	11981.1
17.00	0.0502	67874.5	11972.0
16.00	0.0502	67488.5	11948.2
15.00	0.0502	67546.9	11966.5
14.00	0.0502	68027.0	11926.6
13.00	0.0460	64392.7	11710.1
12.50	0.0502	59094.3	11416.1
12.00	0.0502	82883.3	12416.4
11.50	0.0502	82665.5	12431.9
11.00	0.0502	82637.2	12426.8
10.00	0.0502	76490.7	12293.7
9.00	0.2721	60459.8	12047.5
8.00	0.3098	85315.1	11700.8
7.00	0.3098	87679.9	11729.1
6.00	0.3098	86500.4	11714.2
5.00	0.3098	88636.8	11692.0
4.00	0.3098	87645.1	11614.2
3.00	0.3098	86509.3	11644.9
2.00	0.3098	83238.4	11625.0
1.00	0.3098	80094.4	11642.7
0.00	0.3098	72788.8	11628.0
-1.00	0.3098	63468.0	11621.3
-2.00	0.3516	64923.2	11570.2
-3.00	0.3558	70650.6	11456.3
-4.00	0.3558	74261.6	11009.8
-5.00	0.3558	69181.2	10267.3
-6.00	0.3977	66939.8	10262.2
-7.00	0.4018	68606.7	10234.9
-8.00	0.4018	68422.2	10215.9
-9.00	0.4395	73157.4	10184.6
-10.00	0.4437	71369.9	10133.3
-11.00	0.4479	75814.0	10130.5
-12.00	0.4856	47140.2	10127.4
-13.00	0.5358	53029.0	10159.0
-14.00	0.5483	40952.7	9963.3

3.1.4 C5 Clean -

C218-C5, Suction side, Re = 5.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C5, Suction side, Re = 5.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

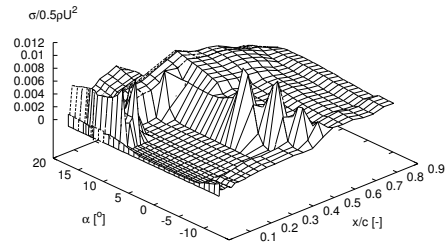
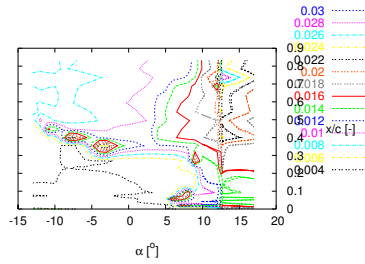


Figure 19: Pressure standard deviations, σ

C218-C5, Suction side, Re = 5.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C5, Suction side, Re = 5.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

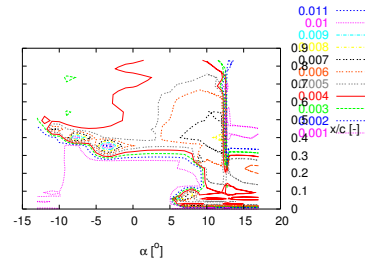


Figure 20: Contours of σ

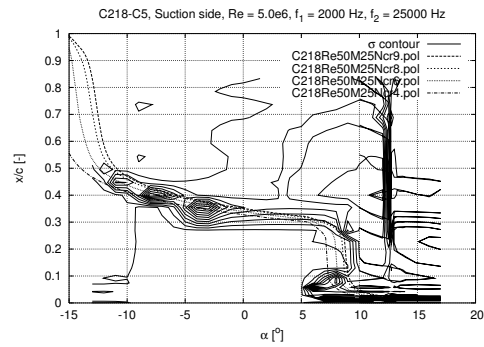
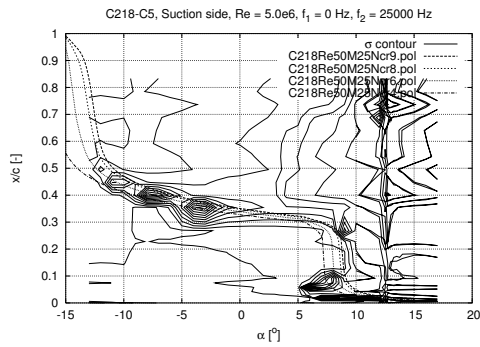


Figure 21: Contours of σ and Xfoil data

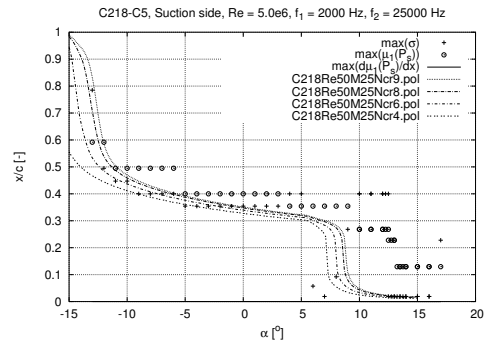
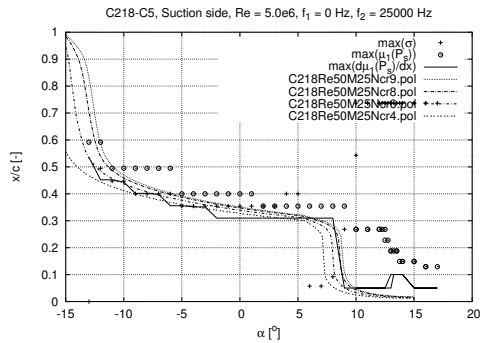


Figure 22: Transition detection

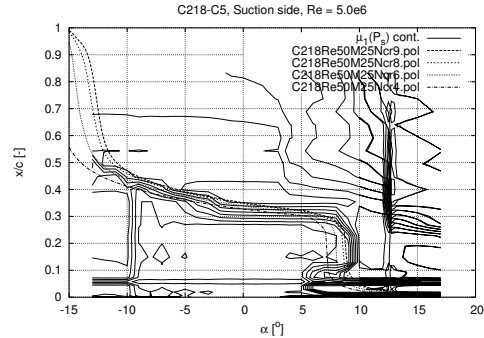
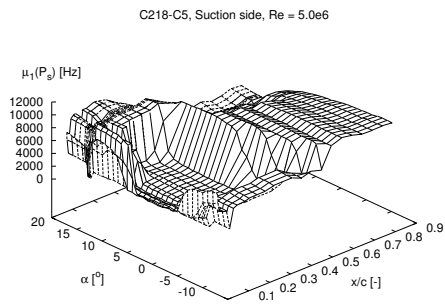


Figure 23: Fourier transform mean, $\mu_1(P_s)$

C218-C5, Suction side, Re = 5.0e6

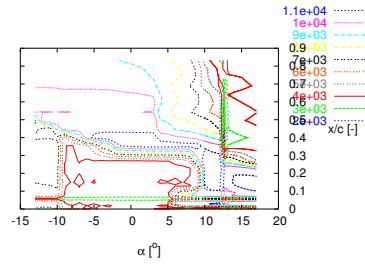


Figure 24: Contours of $\mu_1(P_s)$

C218-C5
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0502	67916.6	11835.2
11.00	0.0502	69226.3	11784.7
12.00	0.0502	68742.0	11739.4
12.25	0.0502	69087.0	11733.7
12.50	0.0502	68699.4	11718.6
12.75	0.0502	64090.7	10757.8
13.00	0.0502	64122.2	10665.9
13.25	0.1005	55217.8	10964.6
13.50	0.1005	55254.2	10987.2
13.75	0.1005	55133.6	10999.3
14.00	0.1005	55332.8	11058.1
15.00	0.0502	55801.2	11189.8
16.00	0.0502	57312.4	11292.2
17.00	0.0502	58233.6	11384.6
16.00	0.0502	57459.1	11318.0
15.00	0.0502	56492.7	11167.1
14.00	0.1005	55665.2	11048.2
13.50	0.1005	55251.8	10971.3
13.00	0.1005	55338.2	10920.1
12.50	0.0502	62136.8	10726.9
12.00	0.0502	68537.3	11727.6
11.00	0.0502	69817.2	11804.8
10.00	0.0502	69067.1	11887.5
9.00	0.0502	60495.4	11399.7
8.00	0.3098	70993.9	11451.2
7.00	0.3098	80676.0	11461.3
6.00	0.3098	83669.8	11534.8
5.00	0.3098	86028.8	11587.6
4.00	0.3098	86185.7	11614.6
3.00	0.3098	88360.3	11647.3
2.00	0.3098	87126.9	11590.8
1.00	0.3098	87230.7	11519.8
0.00	0.3098	84437.5	11527.2
-1.00	0.3098	84032.8	11565.1
-2.00	0.3098	78916.2	11595.1
-3.00	0.3516	62097.4	11644.2
-4.00	0.3516	65672.4	11587.2
-5.00	0.3558	71906.5	11308.5
-6.00	0.3558	69295.5	10845.6
-7.00	0.3977	67701.6	10813.3
-8.00	0.4018	71705.8	10797.0
-9.00	0.4018	71877.1	10716.5
-10.00	0.4437	43298.2	10719.4
-11.00	0.4521	45318.0	10806.3
-12.00	0.4521	42103.4	10617.6
-13.00	0.5358	41556.7	10626.3

3.1.5 C6 Clean -

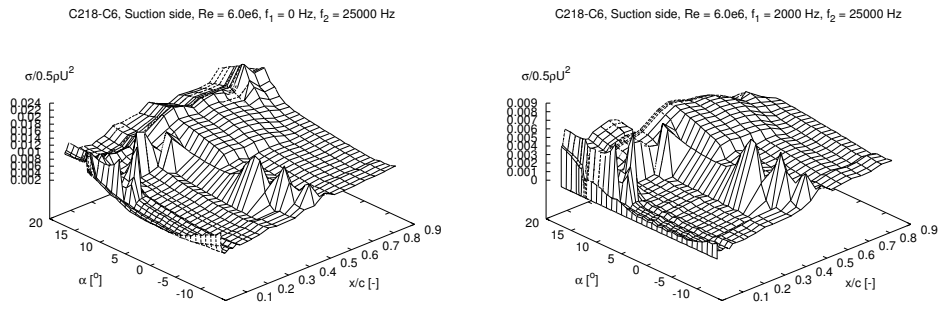


Figure 25: Pressure standard deviations, σ

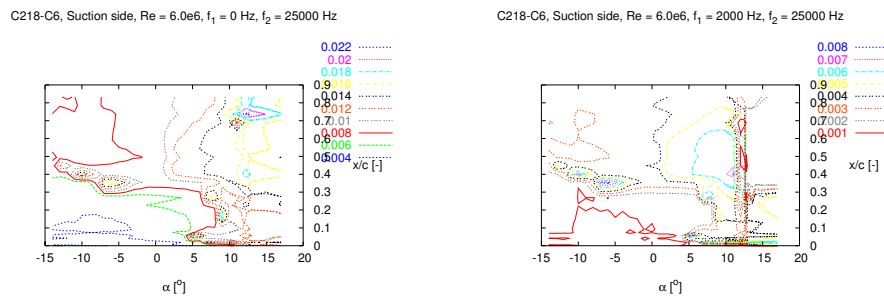


Figure 26: Contours of σ

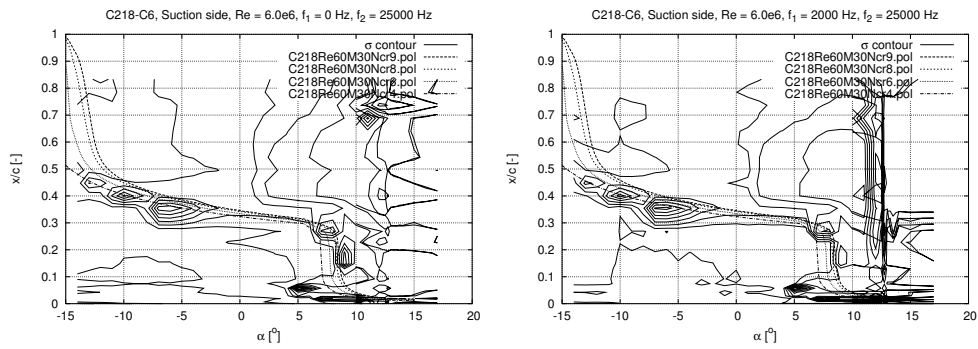


Figure 27: Contours of σ and XFOIL data

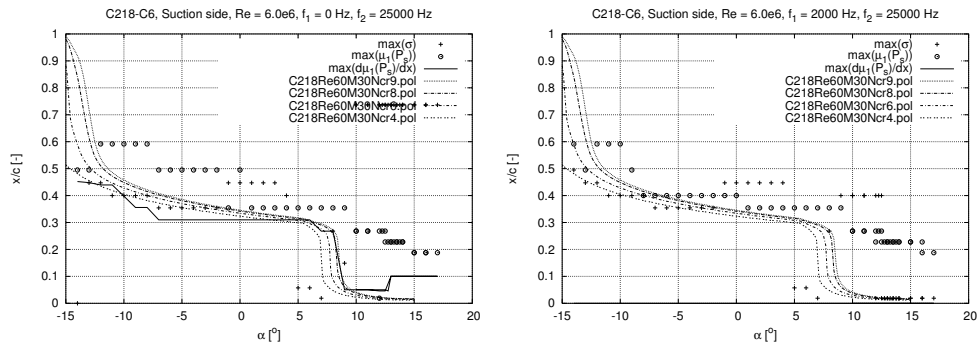


Figure 28: Transition detection

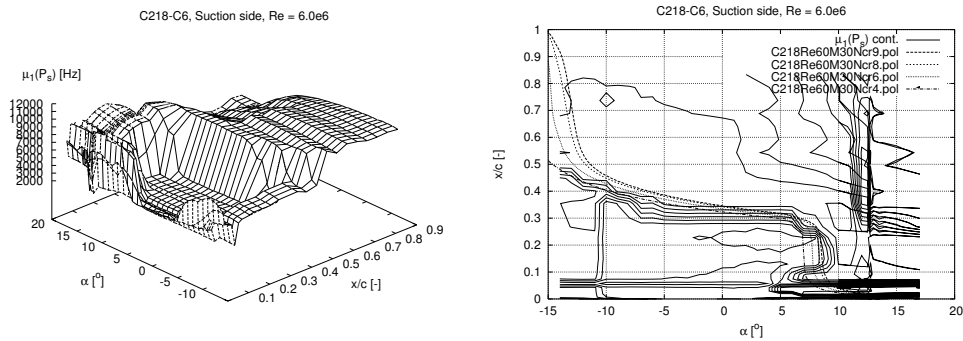


Figure 29: Fourier transform mean, $\mu_1(P_s)$

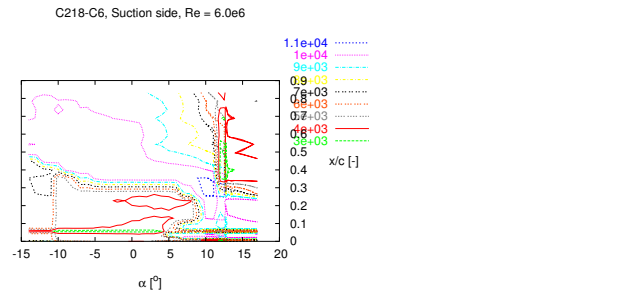


Figure 30: Contours of $\mu_1(P_s)$

C218-C6

alpha [degrees] angle of attack

xtr* [-] transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]

d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])

max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0502	51161.0	11302.0
11.00	0.0502	51301.4	11327.9
12.00	0.0502	52816.4	11422.5
12.25	0.0502	53225.9	11422.1
12.50	0.0502	53155.6	11455.2
12.75	0.0460	56638.1	10328.8
13.00	0.1005	46610.5	10481.8
13.25	0.1005	46977.4	10549.5
13.50	0.1005	47594.6	10578.6
13.75	0.1005	47870.2	10584.0
14.00	0.1005	48415.0	10643.7
15.00	0.1005	49858.4	10698.8
16.00	0.1005	51142.7	10792.4
17.00	0.1005	51942.6	10845.6
16.00	0.1005	51065.2	10793.4
15.00	0.1005	49966.1	10699.0
14.00	0.1005	48330.3	10616.5
13.50	0.1005	47437.4	10601.1
13.00	0.1005	46234.7	10406.0

12.50	0.0460	53438.9	9927.0
12.00	0.0460	57635.7	9869.3
11.00	0.0502	51474.7	11345.9
10.00	0.0502	51208.3	11317.8
9.00	0.0502	46665.0	11013.9
8.00	0.2679	69113.1	10835.8
7.00	0.2679	67993.5	10827.6
6.00	0.3098	71395.3	10841.9
5.00	0.3098	76383.3	10817.3
4.00	0.3098	77269.5	10868.4
3.00	0.3098	77979.2	10877.0
2.00	0.3098	77799.4	10915.2
1.00	0.3098	77454.5	10880.2
0.00	0.3098	76786.6	10849.0
-1.00	0.3098	76748.6	10833.1
-2.00	0.3098	75822.0	10898.6
-3.00	0.3098	75772.7	10882.3
-4.00	0.3098	74069.7	10910.8
-5.00	0.3098	68764.6	10864.4
-6.00	0.3098	53853.3	10879.0
-7.00	0.3098	54468.8	10808.7
-8.00	0.3558	61659.1	10798.9
-9.00	0.3558	63781.7	10793.4
-10.00	0.3977	64910.7	10738.0
-11.00	0.4395	42242.9	10735.0
-12.00	0.4395	44886.5	10715.2
-13.00	0.4479	45522.5	10758.1
-14.00	0.4521	46939.5	10696.0

3.1.6 Z16 ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. -

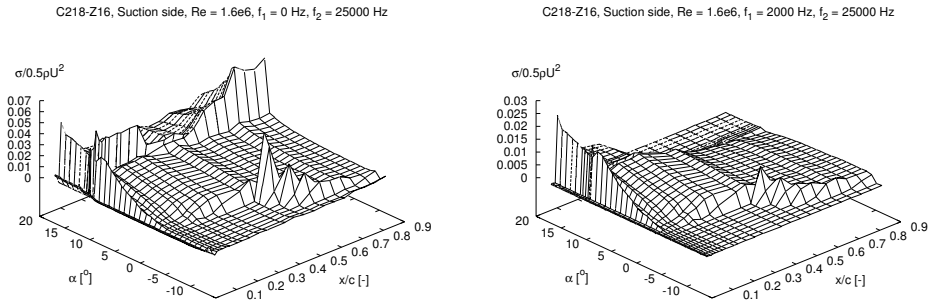


Figure 31: Pressure standard deviations, σ

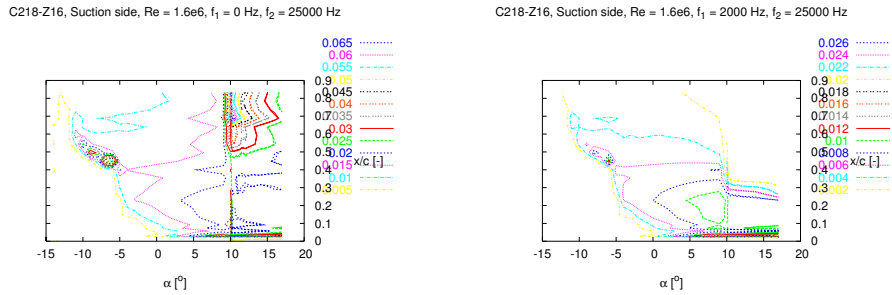


Figure 32: Contours of σ

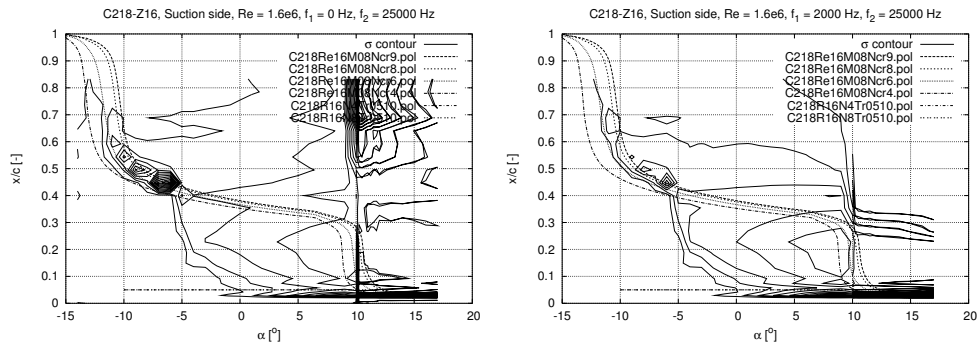


Figure 33: Contours of σ and XFOIL data

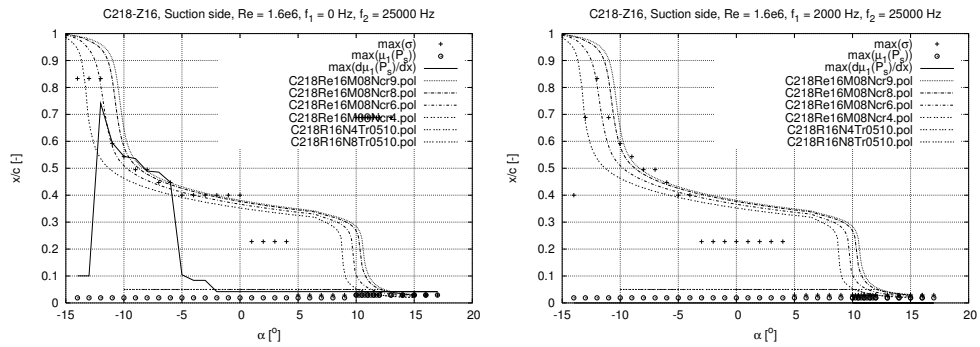


Figure 34: Transition detection

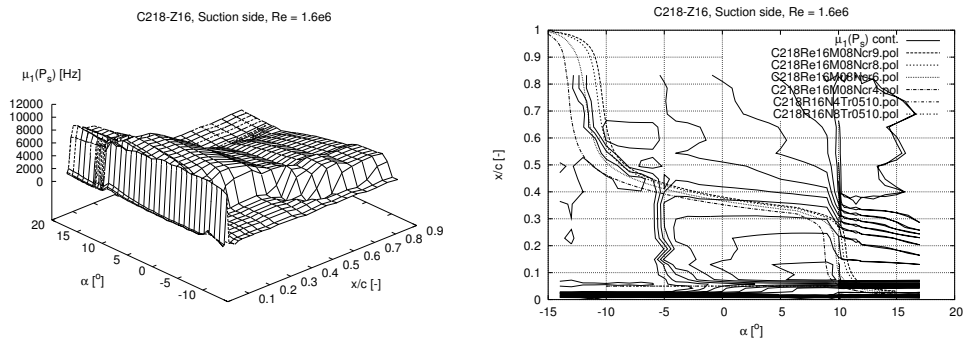


Figure 35: Fourier transform mean, $\mu_1(P_s)$

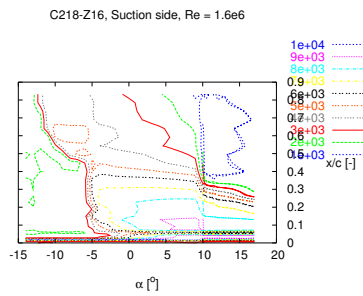


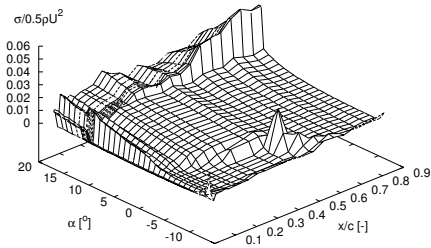
Figure 36: Contours of $\mu_1(P_s)$

C218-Z16
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	73426.9	9711.2
10.25	0.0419	73805.8	9136.4
10.50	0.0419	73246.7	9150.9
10.75	0.0419	74510.1	9179.8
11.00	0.0419	73155.7	9228.5
11.25	0.0419	74121.6	9263.4
11.50	0.0419	73066.6	9253.5
11.75	0.0419	73861.6	9277.7
12.00	0.0419	73460.4	9245.0
13.00	0.0419	72779.8	9363.2
14.00	0.0419	71927.5	9430.1
15.00	0.0419	70698.2	9553.9
16.00	0.0419	69005.1	9711.3
17.00	0.0419	68682.7	9421.8
16.00	0.0419	69116.3	9687.7
15.00	0.0419	70032.5	9551.7
14.00	0.0419	71666.6	9479.6
13.00	0.0419	72687.0	9429.9
12.00	0.0419	73099.1	9262.3
11.50	0.0419	74266.9	9330.9
11.00	0.0419	73703.4	9245.8
10.50	0.0419	74429.8	9216.2
10.00	0.0419	74569.3	9204.9
9.00	0.0419	73726.7	9929.0
8.00	0.0419	73153.0	9601.8
7.00	0.0419	73905.1	9921.8
6.00	0.0419	73582.7	9690.3
5.00	0.0419	73111.8	9961.6
4.00	0.0419	71514.5	10218.7
3.00	0.0419	69985.6	10249.2
2.00	0.0419	67160.7	10261.2
1.00	0.0419	65102.9	10156.5
0.00	0.0419	59878.5	10529.5
-1.00	0.0419	54892.5	10791.4
-2.00	0.0419	48149.0	10786.2
-3.00	0.0837	48521.0	10687.0
-4.00	0.0837	48692.8	10857.3
-5.00	0.1046	37737.2	10886.3
-6.00	0.4479	35476.6	10743.1
-7.00	0.4856	38480.0	10657.9
-8.00	0.4897	38099.9	10778.8
-9.00	0.5358	37653.6	10820.2
-10.00	0.5442	40619.4	10901.2
-11.00	0.5944	33614.9	10757.0
-12.00	0.7409	21598.3	10636.3
-13.00	0.1005	4397.4	10498.8
-14.00	0.1005	4079.2	9972.8

3.1.7 Z3 ZZ90 x/c=5% suc. x/c=10% press. -

C218-Z3. Suction side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-Z3. Suction side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

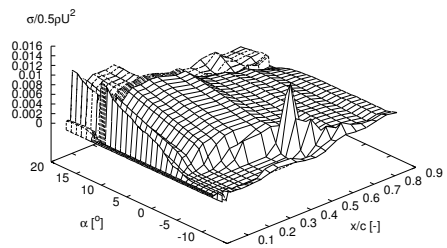
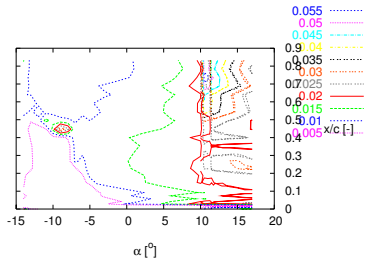


Figure 37: Pressure standard deviations, σ

C218-Z3, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

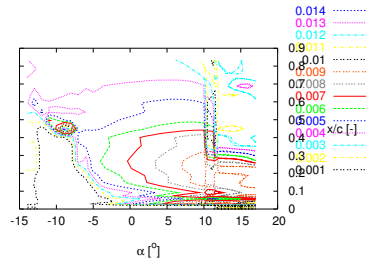


Figure 38: Contours of σ

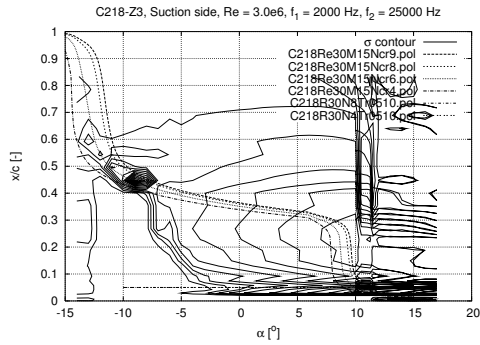
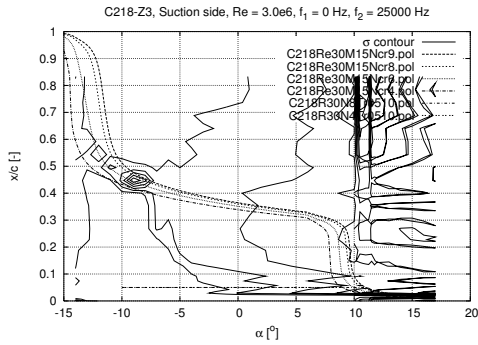


Figure 39: Contours of σ and Xfoil data

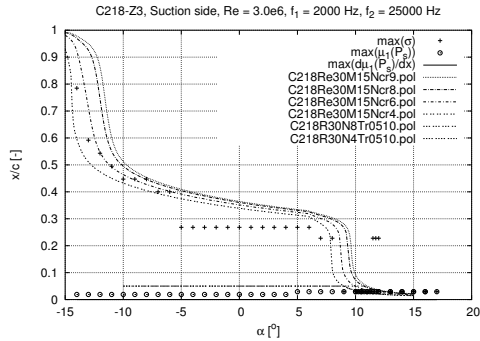
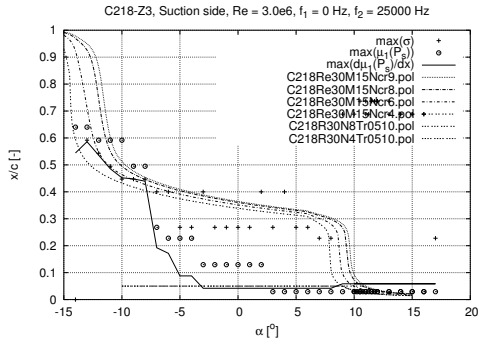


Figure 40: Transition detection

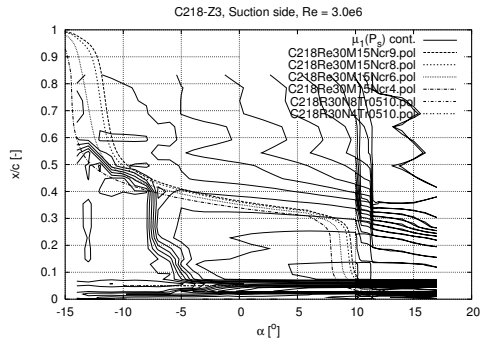
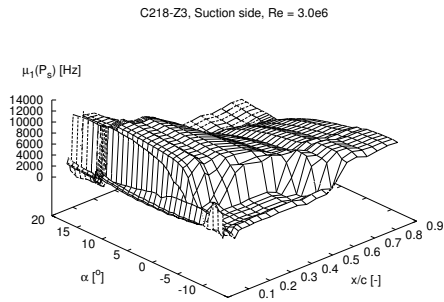


Figure 41: Fourier transform mean, $\mu_1(P_s)$

C218-Z3, Suction side, Re = 3.0e6

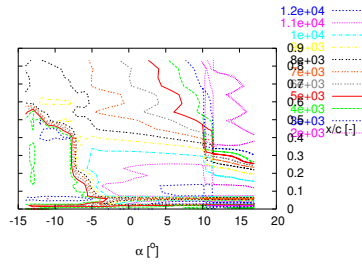


Figure 42: Contours of $\mu_1(P_s)$

C218-Z3
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0586	97330.2	12869.2
10.25	0.0586	101440.5	12760.8
10.50	0.0586	101048.0	12657.0
10.75	0.0586	99832.4	12668.3
11.00	0.0586	98134.0	12678.5
11.25	0.0586	98757.8	12642.8
11.50	0.0586	101283.1	12396.3
11.75	0.0586	102471.7	12394.0
12.00	0.0586	102084.8	12422.1
13.00	0.0586	102877.1	12462.8
14.00	0.0586	100678.1	12536.1
15.00	0.0586	103124.7	12492.2
16.00	0.0586	104245.2	12299.3
17.00	0.0586	97332.7	12178.2
18.00	0.0586	104291.1	12274.1
15.00	0.0586	104238.4	12483.2
14.00	0.0586	102471.0	12548.1
13.00	0.0586	101684.8	12524.1
12.00	0.0586	102399.8	12431.5
11.50	0.0586	105770.7	12465.7
11.00	0.0586	106129.2	12459.4
10.50	0.0586	105942.9	12457.6
10.00	0.0586	101559.2	12961.4
9.00	0.0586	98929.9	12918.9
8.00	0.0419	98770.8	12833.6
7.00	0.0419	100362.3	12732.1
6.00	0.0419	100783.3	12628.7
5.00	0.0419	101456.4	12517.3
4.00	0.0419	99843.4	12252.3
3.00	0.0419	100562.3	12022.5
2.00	0.0419	98024.0	11833.6
1.00	0.0419	98092.8	11780.5
0.00	0.0419	94951.0	11663.1
-1.00	0.0419	94272.4	11569.5
-2.00	0.0419	89889.9	11458.3
-3.00	0.0419	84990.2	11374.1
-4.00	0.0879	76640.7	10858.0
-5.00	0.0879	67479.9	10592.6
-6.00	0.1716	54037.0	9699.3
-7.00	0.1925	54921.4	9607.7
-8.00	0.4395	67312.8	9185.2
-9.00	0.4479	66475.1	9106.6
-10.00	0.4521	67358.5	9084.0
-11.00	0.4856	60384.3	9076.4
-12.00	0.5358	68235.6	9093.1
-13.00	0.5860	58437.1	8778.3
-14.00	0.5442	44565.7	8219.1

3.1.8 Z6 ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. -

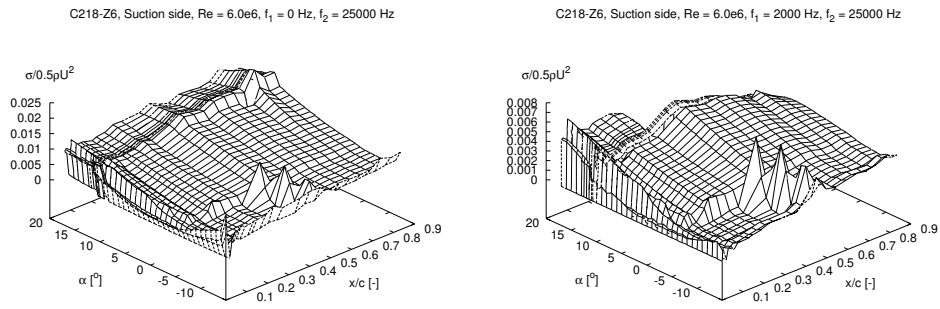


Figure 43: Pressure standard deviations, σ

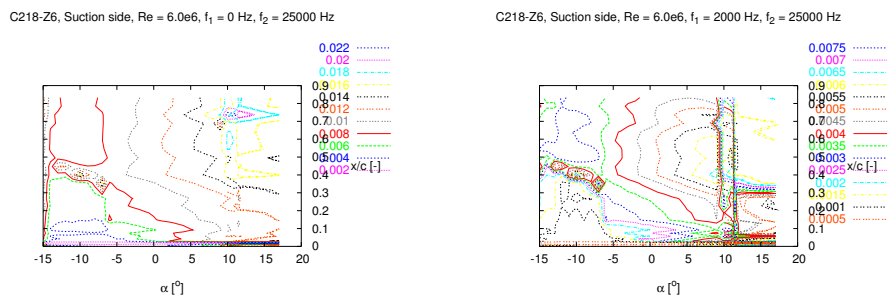


Figure 44: Contours of σ

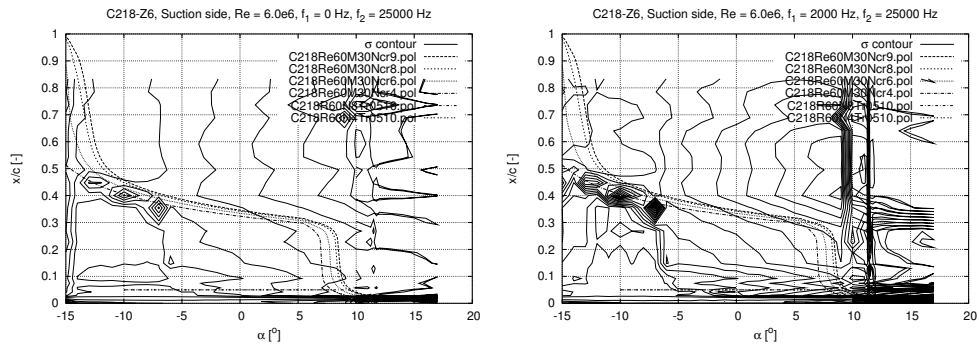


Figure 45: Contours of σ and XFOIL data

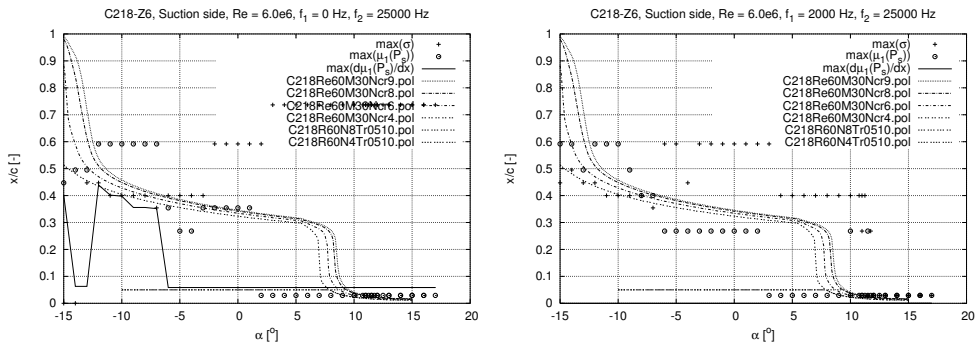


Figure 46: Transition detection

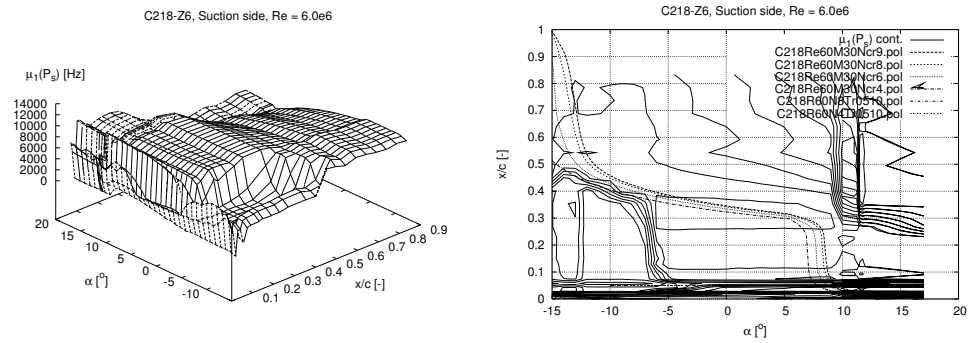


Figure 47: Fourier transform mean, $\mu_1(P_s)$

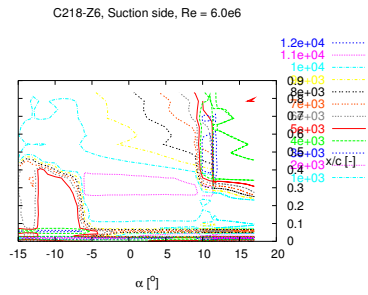


Figure 48: Contours of $\mu_1(P_s)$

```

C218-Z6
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha xtr* d(mu1)/dx* max(mu1)
-----
10.00 0.0586 74959.2 11989.4
10.75 0.0586 74492.6 12010.5
11.00 0.0586 74184.2 12035.1
11.25 0.0586 74135.5 12018.0
11.50 0.0586 85218.7 11189.7
11.75 0.0586 84797.9 11168.9
12.00 0.0586 84399.5 11328.0
13.00 0.0586 85138.9 11427.3
14.00 0.0586 86675.8 11535.0
15.00 0.0586 87137.6 11597.2
16.00 0.0586 88420.3 11684.0
17.00 0.0586 88439.7 11751.7
16.00 0.0586 87776.5 11680.0
15.00 0.0586 87322.0 11564.6
14.00 0.0586 86583.1 11514.4
13.00 0.0586 85014.9 11382.6
12.50 0.0586 83779.0 11330.8
12.00 0.0586 84757.3 11332.4
11.50 0.0586 83696.1 11347.4

```

11.00	0.0586	83200.2	11123.7
10.00	0.0586	83316.8	11022.5
9.00	0.0586	73859.4	11810.2
8.00	0.0586	72781.5	11797.4
7.00	0.0586	73652.7	11679.0
6.00	0.0586	74222.6	11604.9
5.00	0.0586	75237.4	11386.6
4.00	0.0586	76617.9	11598.0
3.00	0.0586	78252.3	11405.1
2.00	0.0586	80336.7	11180.0
1.00	0.0586	81869.8	11153.8
0.00	0.0586	83958.0	11180.3
-1.00	0.0586	87094.6	11210.5
-2.00	0.0586	85950.8	11204.8
-3.00	0.0586	88829.6	11209.2
-4.00	0.0586	89745.0	11227.6
-5.00	0.0586	89985.8	11227.4
-6.00	0.0586	63800.9	11218.2
-7.00	0.3516	34270.4	10778.2
-8.00	0.3558	60207.1	10809.6
-9.00	0.3558	64090.7	10789.3
-10.00	0.3977	65124.6	10740.9
-11.00	0.4018	68959.3	10687.7
-12.00	0.4395	71288.1	10628.5
-13.00	0.0628	48555.5	10740.2
-14.00	0.0628	48025.1	10720.1
-15.00	0.4018	47017.5	10064.5

3.1.9 L16 LM standard LER -

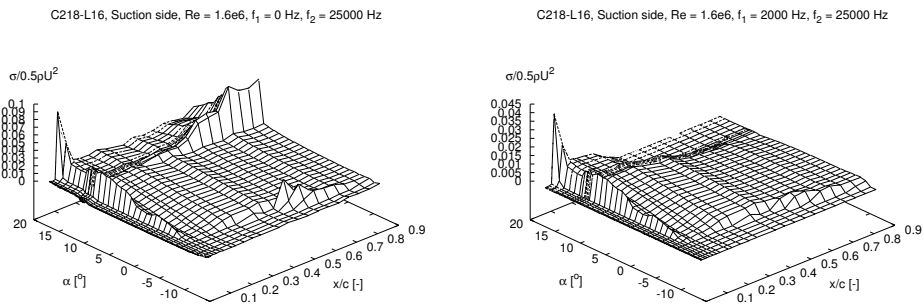


Figure 49: Pressure standard deviations, σ

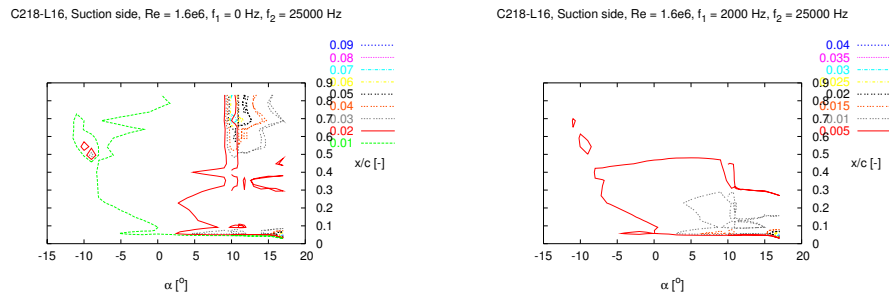


Figure 50: Contours of σ

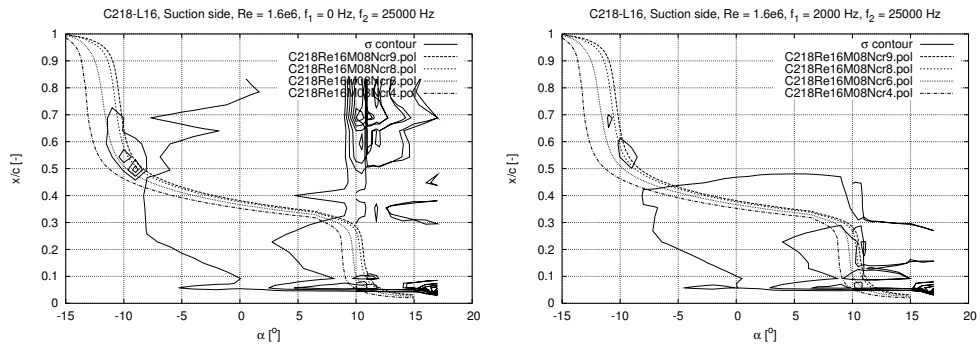


Figure 51: Contours of σ and XFOIL data

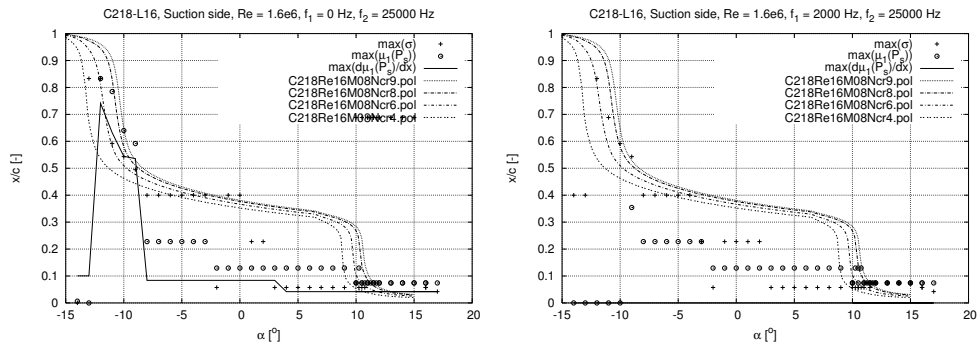


Figure 52: Transition detection

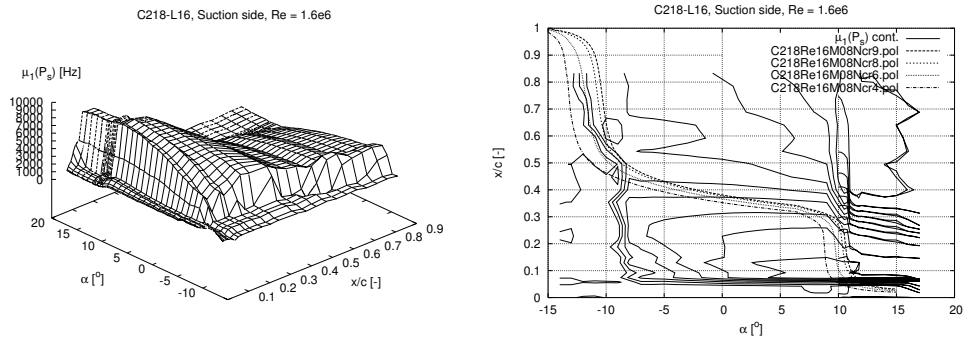


Figure 53: Fourier transform mean, $\mu_1(P_s)$

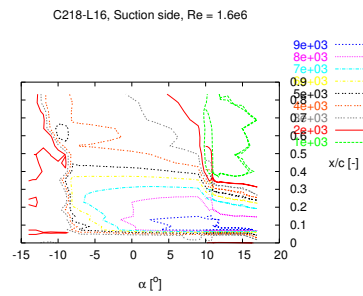


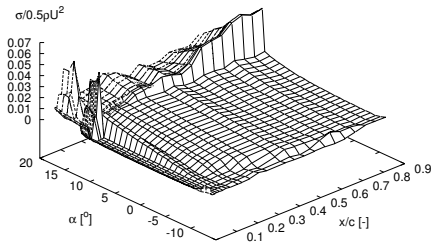
Figure 54: Contours of $\mu_1(P_s)$

C218-L16
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (-max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	81202.9	9606.4
10.25	0.0419	82366.6	9687.7
10.50	0.0419	82815.9	9744.5
10.75	0.0419	83533.4	9746.3
11.00	0.0419	80593.8	9273.1
11.25	0.0419	81836.2	9343.7
11.50	0.0419	81203.9	9328.8
11.75	0.0419	81538.9	9306.7
12.00	0.0419	79559.7	9209.8
13.00	0.0419	79961.6	9228.0
14.00	0.0419	79665.9	9224.0
15.00	0.0419	79525.3	9140.7
16.00	0.0419	78804.6	9067.4
17.00	0.0419	76563.6	8903.4
16.00	0.0419	78495.6	9071.4
15.00	0.0419	78918.8	9091.3
14.00	0.0419	79544.8	9211.4
13.00	0.0419	79671.0	9197.2
12.00	0.0419	79703.2	9191.0
11.50	0.0419	81490.0	9283.0
11.00	0.0419	80825.8	9333.4
10.50	0.0419	81212.4	9306.1
10.00	0.0419	81501.1	9416.5
9.00	0.0419	82367.9	9728.2
8.00	0.0419	80438.2	9644.3
7.00	0.0419	79521.1	9566.9
6.00	0.0419	77645.4	9486.5
5.00	0.0419	76105.9	9350.2
4.00	0.0419	74196.0	9195.2
3.00	0.0837	73082.8	9085.8
2.00	0.0837	71251.5	8876.9
1.00	0.0837	70262.8	8724.0
0.00	0.0837	67358.8	8433.7
-1.00	0.0837	65354.8	8170.5
-2.00	0.0837	61205.2	7845.7
-3.00	0.0837	57506.1	7651.6
-4.00	0.0837	51830.1	7530.2
-5.00	0.0837	47235.5	7387.5
-6.00	0.0837	38845.6	7130.4
-7.00	0.0837	35699.8	6877.1
-8.00	0.0837	34615.8	6601.9
-9.00	0.5358	35991.0	5370.5
-10.00	0.5442	40981.6	5370.0
-11.00	0.6321	33802.4	4926.9
-12.00	0.7409	20082.0	3685.8
-13.00	0.1005	4298.6	2796.0
-14.00	0.1005	3702.7	2307.2

3.1.10 L3 LM standard LER -

C218-L3, Suction side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-L3, Suction side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

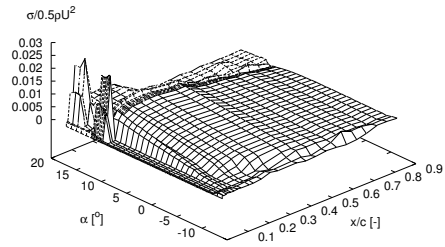
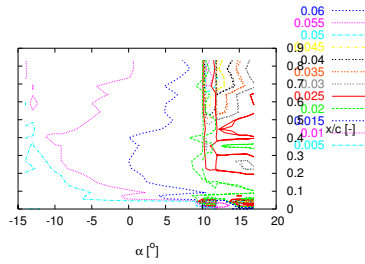


Figure 55: Pressure standard deviations, σ

C218-L3, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

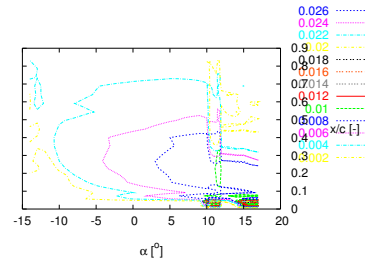


Figure 56: Contours of σ

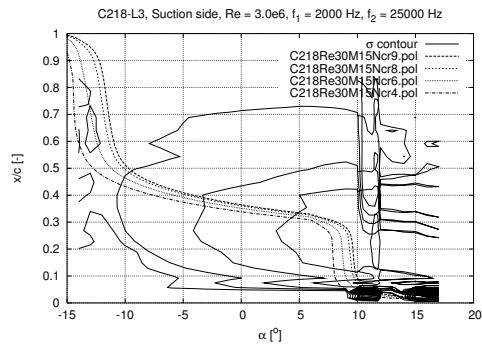
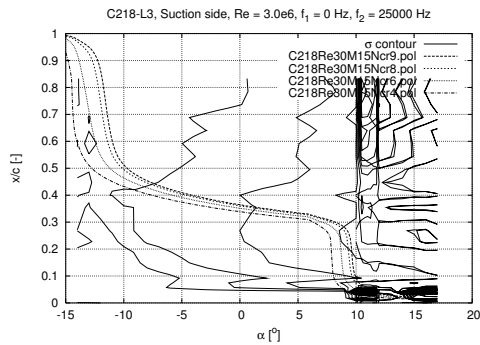


Figure 57: Contours of σ and Xfoil data

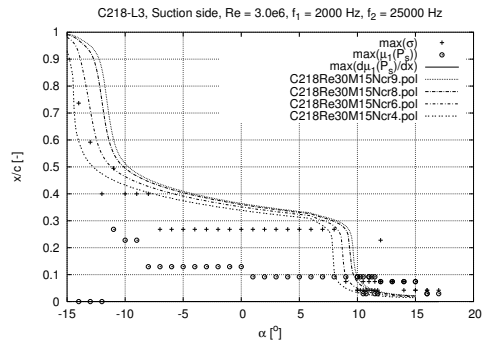
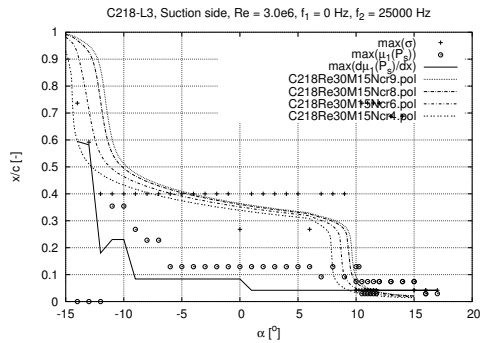
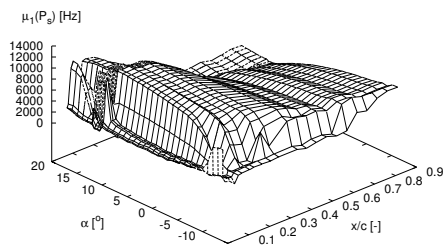


Figure 58: Transition detection

C218-L3, Suction side, Re = 3.0e6



C218-L3, Suction side, Re = 3.0e6

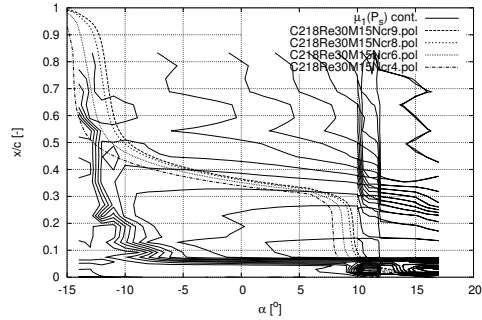


Figure 59: Fourier transform mean, $\mu_1(P_s)$

C218-L3, Suction side, Re = 3.0e6

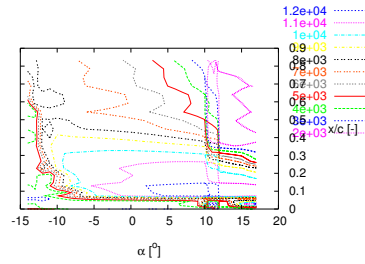


Figure 60: Contours of $\mu_1(P_s)$

C218-L3
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	102949.0	12501.4
10.25	0.0419	102465.9	12505.3
10.50	0.0419	101352.6	12595.4
10.75	0.0419	97317.0	12502.9
11.00	0.0460	89641.8	12530.8
11.25	0.0460	86337.5	12544.4
11.50	0.0460	77174.2	12487.7
11.75	0.0460	74776.1	12542.1
12.00	0.0419	97588.3	11873.8
13.00	0.0419	97138.8	11895.4
14.00	0.0419	96745.2	11870.1
15.00	0.0419	94405.5	11797.4
16.00	0.0419	89020.1	11806.2
17.00	0.0419	84619.7	12097.7
16.00	0.0419	87784.3	11904.7
15.00	0.0419	94556.1	11860.8
14.00	0.0419	97383.5	11930.6
13.00	0.0419	98052.5	11940.6
12.00	0.0419	98141.7	11952.7
11.50	0.0419	107078.1	11996.6
11.00	0.0419	105676.8	11965.5
10.50	0.0419	107781.1	12053.8
10.00	0.0419	102556.0	12574.0
9.00	0.0419	105697.4	12518.0
8.00	0.0419	105218.4	12474.7
7.00	0.0419	106096.5	12420.2
6.00	0.0419	105087.0	12359.5
5.00	0.0419	105724.9	12288.1
4.00	0.0419	102592.1	12198.6
3.00	0.0419	102696.5	12116.3
2.00	0.0419	99691.0	11988.4
1.00	0.0419	97222.2	11893.8
0.00	0.0837	96650.1	11764.4
-1.00	0.0837	96694.6	11650.1
-2.00	0.0837	93919.6	11523.5
-3.00	0.0837	93977.6	11409.6
-4.00	0.0837	90640.1	11272.5
-5.00	0.0837	89851.2	11094.4
-6.00	0.0837	85064.9	10864.7
-7.00	0.0837	82247.6	10568.0
-8.00	0.0837	76411.8	10499.2
-9.00	0.0837	60937.6	10230.7
-10.00	0.2302	38803.5	9717.6
-11.00	0.2302	56369.9	8902.0
-12.00	0.1800	53413.4	9112.7
-13.00	0.5818	57198.3	9493.2
-14.00	0.5944	31117.3	9539.7

3.1.11 L6 LM standard LER -

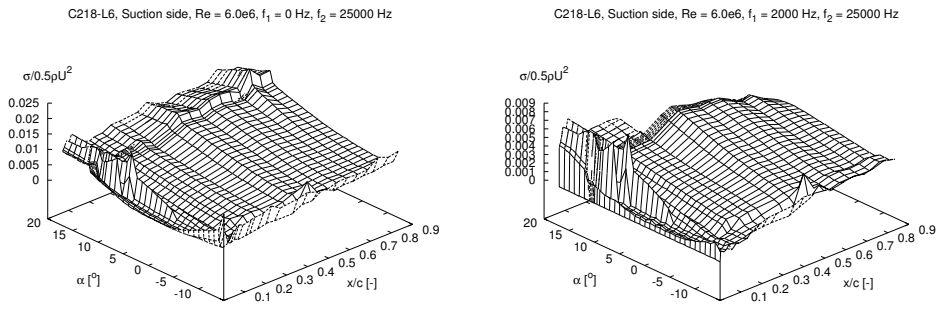


Figure 61: Pressure standard deviations, σ

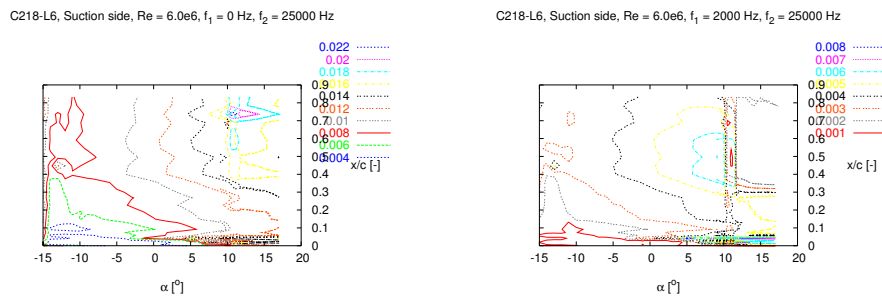


Figure 62: Contours of σ

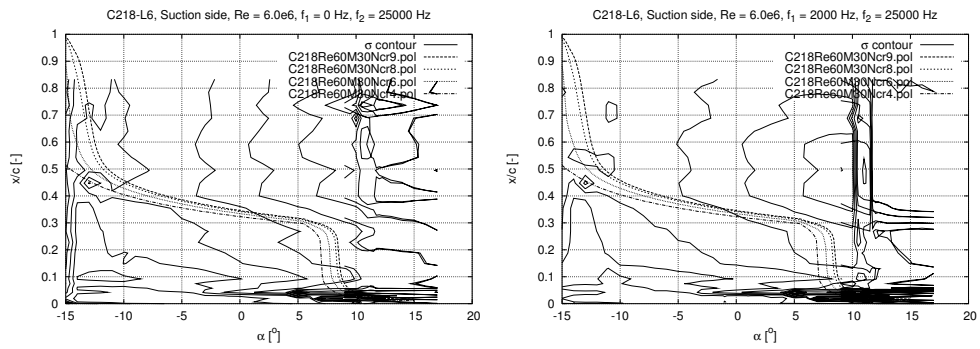


Figure 63: Contours of σ and XFOIL data

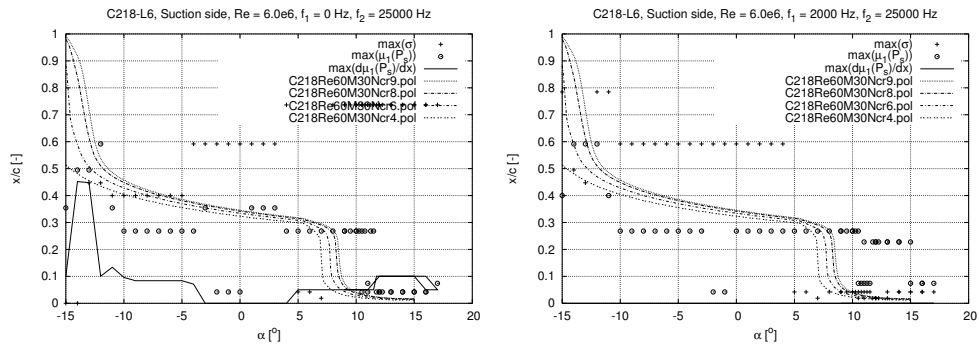


Figure 64: Transition detection

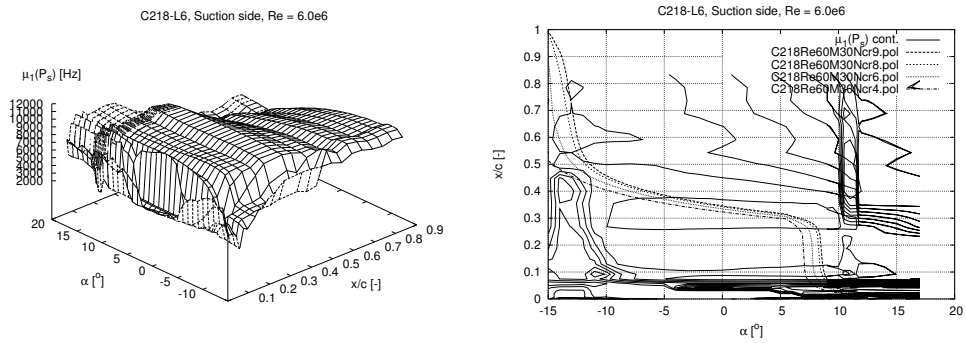


Figure 65: Fourier transform mean, $\mu_1(P_s)$

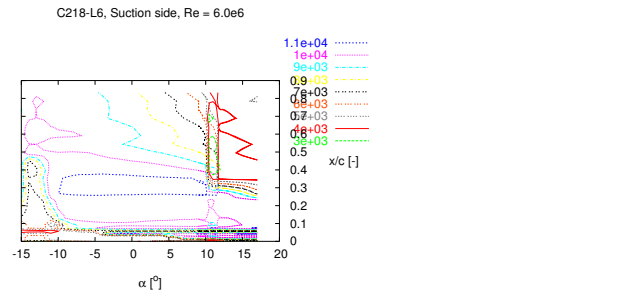


Figure 66: Contours of $\mu_1(P_s)$

```

C218-L6
alpha [degrees] angle of attack
xtr* [-] transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha xtr* d(mu1)/dx* max(mu1)
-----
9.00 0.0502 49700.7 11201.9
10.00 0.0502 43914.9 11191.3
10.25 0.0502 47053.1 11182.6
10.50 0.0502 51035.7 11184.8
10.75 0.0502 52743.5 11192.0
11.00 0.0502 54625.3 11242.7
11.25 0.0502 55448.7 11214.9
11.50 0.0502 55823.9 11228.0
11.75 0.1005 39394.8 10811.8
12.00 0.1005 39627.2 10808.0
12.25 0.1005 39213.8 10842.5
13.00 0.1005 38828.6 10894.5
14.00 0.1005 38006.5 10987.8
15.00 0.1005 37916.1 11061.8
16.00 0.0502 38853.9 11064.9
17.00 0.0502 40316.5 11094.8
16.00 0.1005 38950.5 11064.7
15.00 0.1005 37974.8 11063.6
14.00 0.1005 37546.2 11023.3

```

13.00	0.1005	38530.8	10908.1
12.00	0.1005	38920.3	10844.8
11.00	0.0502	50859.3	10777.7
10.50	0.0502	50901.3	10751.9
10.00	0.0502	43974.7	11148.1
9.50	0.0502	40196.1	11200.1
9.00	0.0502	47906.5	11181.7
8.00	0.0502	50135.8	11166.2
7.00	0.0502	49488.6	11124.5
6.00	0.0502	59732.3	11114.6
5.00	0.0502	61083.2	11086.6
4.00	0.0000	77817.6	11082.8
3.00	0.0000	82681.6	11097.4
2.00	0.0000	86855.6	11120.7
1.00	0.0000	91097.6	11144.6
0.00	0.0000	93056.0	11275.5
-1.00	0.0000	93803.7	11375.1
-2.00	0.0000	90579.9	11221.3
-3.00	0.0000	82663.4	11201.0
-4.00	0.0712	67728.2	11210.1
-5.00	0.0837	74238.1	11210.0
-6.00	0.0837	73449.6	11204.9
-7.00	0.0837	72768.4	11170.3
-8.00	0.0837	70131.7	11146.1
-9.00	0.0837	67234.2	11078.7
-10.00	0.0963	58552.5	10994.7
-11.00	0.1339	44280.4	10873.7
-12.00	0.1005	35076.1	10547.1
-13.00	0.4479	43515.6	10696.9
-14.00	0.4521	47464.8	10775.7
-15.00	0.1005	43615.3	9813.0

3.1.12 T16 Trip wire. Bump tape 2% -

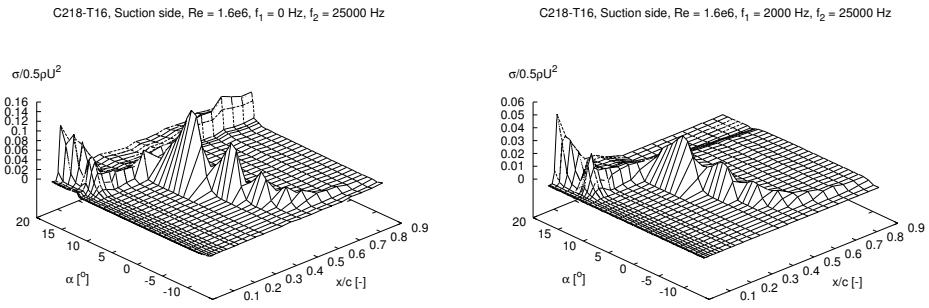


Figure 67: Pressure standard deviations, σ

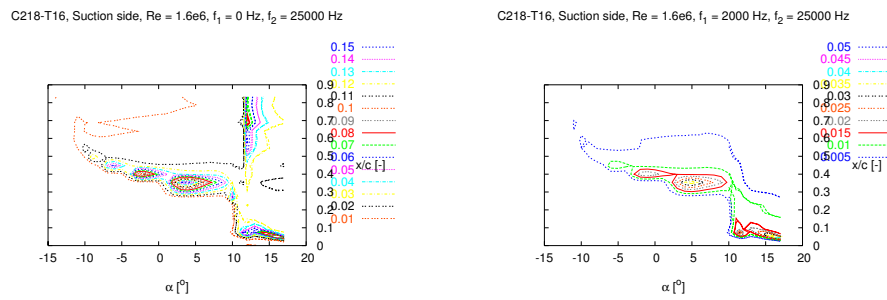


Figure 68: Contours of σ

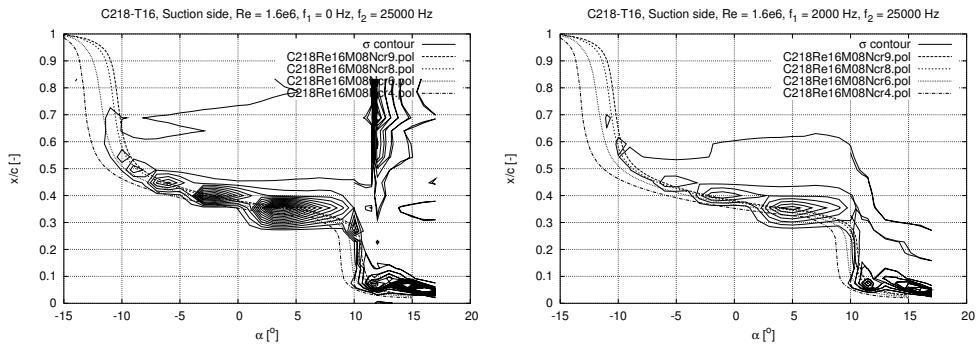


Figure 69: Contours of σ and XFOIL data

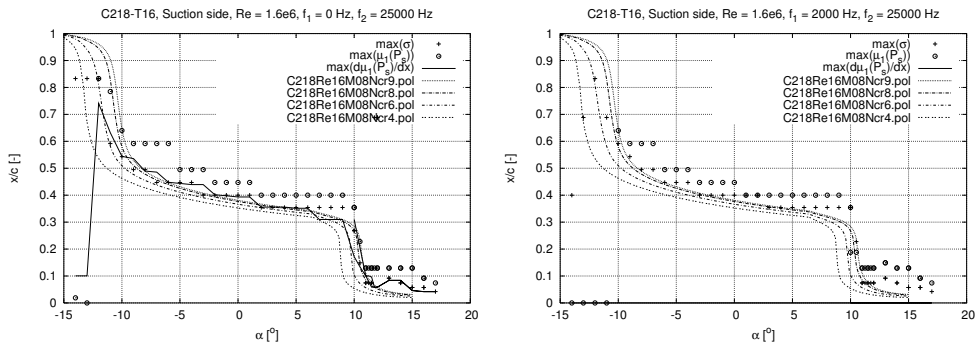


Figure 70: Transition detection

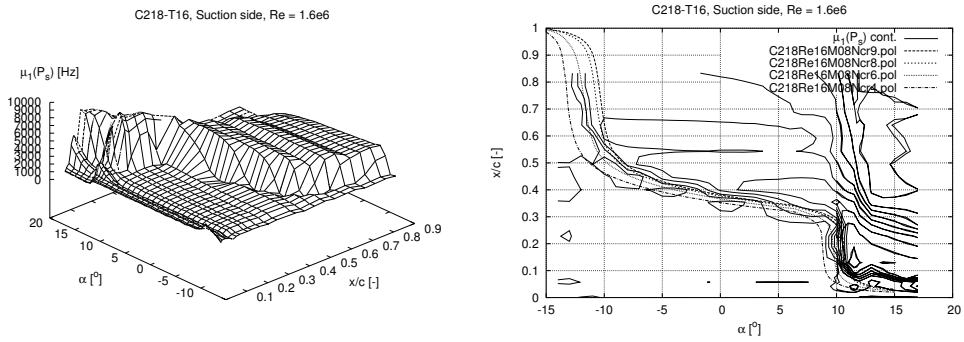


Figure 71: Fourier transform mean, $\mu_1(P_s)$

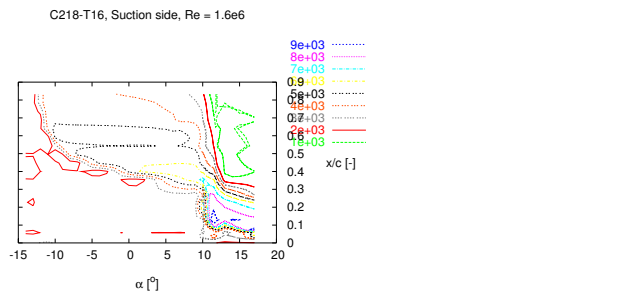


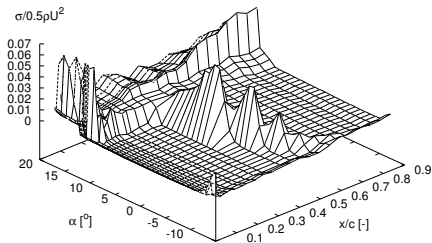
Figure 72: Contours of $\mu_1(P_s)$

C218-T16
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.3098	55347.6	7297.2
11.00	0.1005	58419.5	8802.2
11.25	0.1005	63928.3	9474.2
11.50	0.0963	65051.9	9789.5
11.75	0.0586	66981.5	9645.5
12.00	0.0586	64913.3	9016.1
13.00	0.0837	64691.5	8577.0
14.00	0.0837	66858.7	9050.3
15.00	0.0460	75911.8	8944.8
16.00	0.0419	80293.1	8993.3
17.00	0.0419	79592.2	9164.1
16.00	0.0419	80053.8	8966.8
15.00	0.0460	76554.9	9009.6
14.00	0.0837	67332.5	9109.9
13.00	0.0837	64994.2	8602.1
12.00	0.0586	65994.4	9077.2
11.50	0.0586	66736.4	9869.7
11.00	0.1005	60161.6	9059.4
10.50	0.1339	51966.3	8293.0
10.00	0.1716	44564.8	7376.9
9.00	0.3098	47774.0	6741.9
8.00	0.3098	39676.6	6576.1
7.00	0.3098	35374.1	6594.0
6.00	0.3516	31175.8	6696.3
5.00	0.3516	34446.0	6612.0
4.00	0.3558	38837.9	6548.8
3.00	0.3558	44400.7	6396.3
2.00	0.3558	45549.6	6214.1
1.00	0.3935	46899.3	5854.1
0.00	0.3935	45251.6	5823.1
-1.00	0.3977	40512.4	5736.7
-2.00	0.4018	37617.6	5659.5
-3.00	0.4395	41400.3	5586.4
-4.00	0.4395	45100.4	5578.9
-5.00	0.4437	42150.6	5534.6
-6.00	0.4479	37306.1	5461.7
-7.00	0.4856	38972.7	5452.1
-8.00	0.4897	38475.9	5426.3
-9.00	0.5358	37915.1	5393.7
-10.00	0.5442	41119.9	5385.8
-11.00	0.6321	33826.8	4903.6
-12.00	0.7409	20156.3	3625.4
-13.00	0.1005	3023.2	2718.3
-14.00	0.1005	2987.7	2405.0

3.1.13 T3 Trip wire. Bump tape 2% -

C218-T3, Suction side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-T3, Suction side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

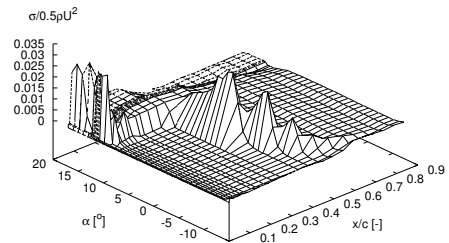
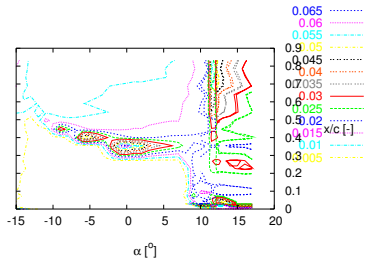


Figure 73: Pressure standard deviations, σ

C218-T3, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

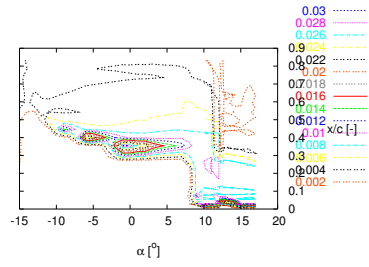


Figure 74: Contours of σ

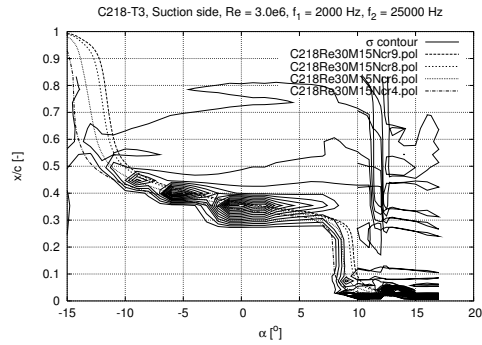
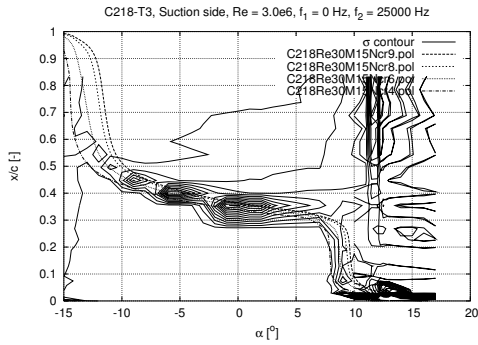


Figure 75: Contours of σ and Xfoil data

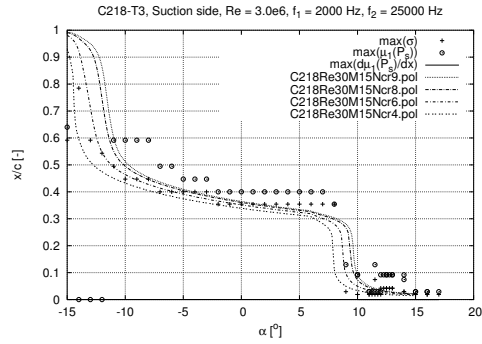
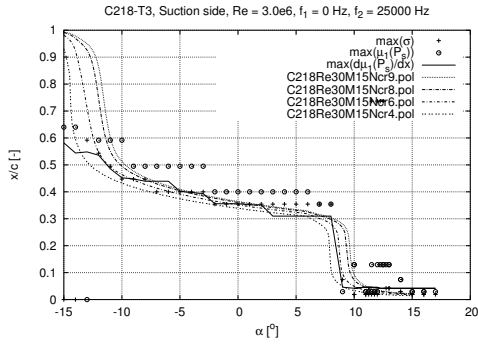


Figure 76: Transition detection

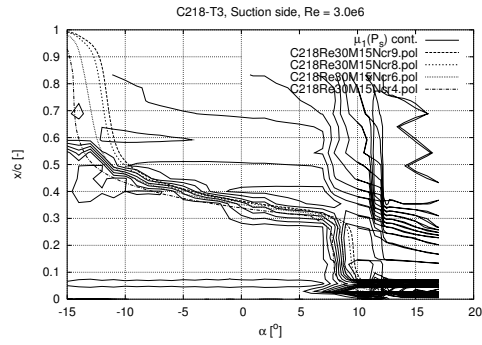
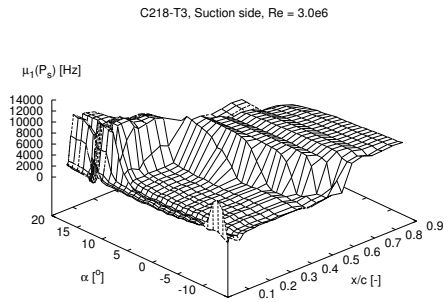


Figure 77: Fourier transform mean, $\mu_1(P_s)$

C218-T3, Suction side, Re = 3.0e6

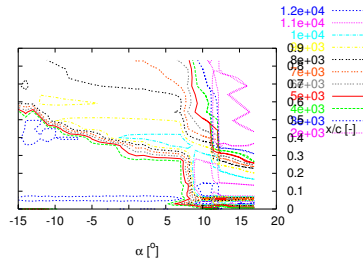


Figure 78: Contours of $\mu_1(P_s)$

C218-T3
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	103747.1	12509.4
11.00	0.0460	94814.8	12724.7
11.25	0.0460	94335.2	12713.0
11.50	0.0460	94322.2	12805.4
11.75	0.0460	93672.8	12774.1
12.00	0.0460	93915.9	12832.1
12.25	0.0419	100690.9	11777.7
12.50	0.0419	100955.2	11631.6
12.75	0.0419	94676.9	11547.3
13.00	0.0419	95195.2	11558.2
14.00	0.0419	96613.6	11650.9
15.00	0.0419	96384.0	12114.7
16.00	0.0419	95857.5	11914.4
17.00	0.0419	90026.8	12225.8
16.00	0.0419	96012.8	11971.1
15.00	0.0419	97214.2	12147.7
14.00	0.0419	97882.9	11723.5
13.00	0.0419	96193.7	11627.1
12.50	0.0419	94166.2	11589.8
12.00	0.0419	95581.3	11671.8
11.50	0.0460	91018.8	11763.0
11.00	0.0460	95473.3	12746.0
10.00	0.0419	104279.6	12594.0
9.00	0.0460	72602.5	12343.9
8.00	0.3098	45270.8	10681.8
7.00	0.3098	73690.2	10463.8
6.00	0.3098	71750.4	10479.2
5.00	0.3098	70977.5	10491.0
4.00	0.3098	66848.4	10472.6
3.00	0.3098	63488.1	10472.3
2.00	0.3516	54838.8	10400.7
1.00	0.3516	53323.0	10378.5
0.00	0.3558	58889.7	10300.2
-1.00	0.3558	65025.3	10093.8
-2.00	0.3558	69351.8	9704.6
-3.00	0.3935	68034.2	9310.4
-4.00	0.3977	64340.1	9295.0
-5.00	0.4018	64041.8	9290.3
-6.00	0.4395	63275.4	9282.2
-7.00	0.4395	71531.6	9283.3
-8.00	0.4395	68779.3	9245.1
-9.00	0.4479	66869.9	9143.8
-10.00	0.4521	67850.4	9153.9
-11.00	0.4856	61426.2	9132.0
-12.00	0.5358	68276.8	9115.7
-13.00	0.5483	60370.2	9742.5
-14.00	0.5442	52975.7	8399.3
-15.00	0.5818	57352.4	8752.7

3.1.14 T6 Trip wire. Bump tape 2% -

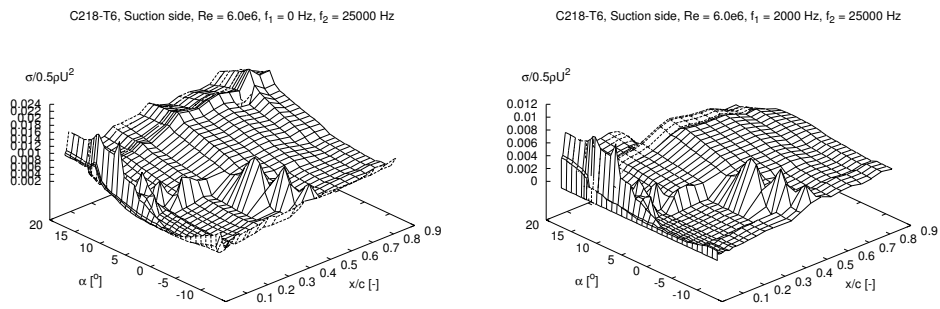


Figure 79: Pressure standard deviations, σ

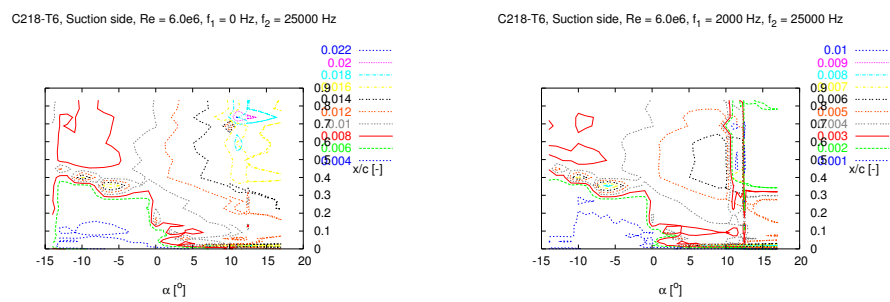


Figure 80: Contours of σ

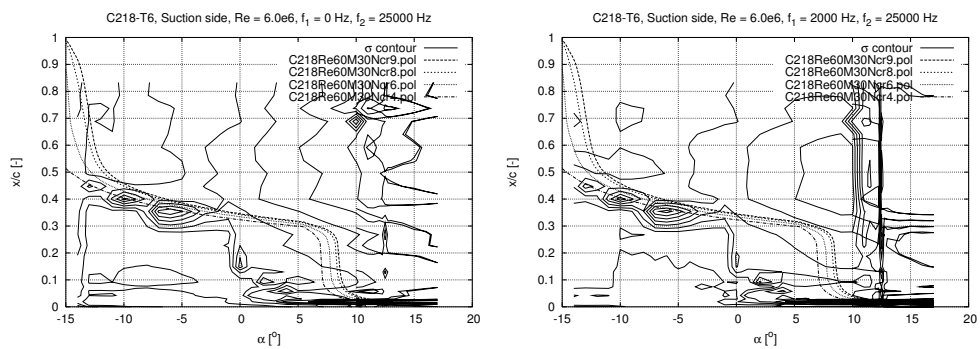


Figure 81: Contours of σ and XFOIL data

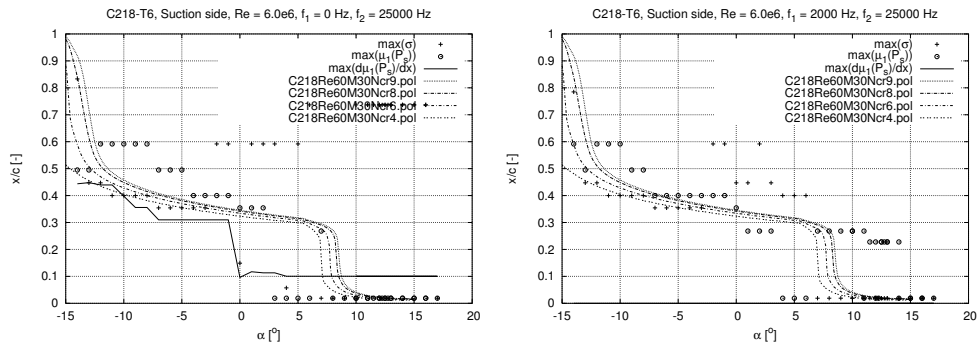


Figure 82: Transition detection

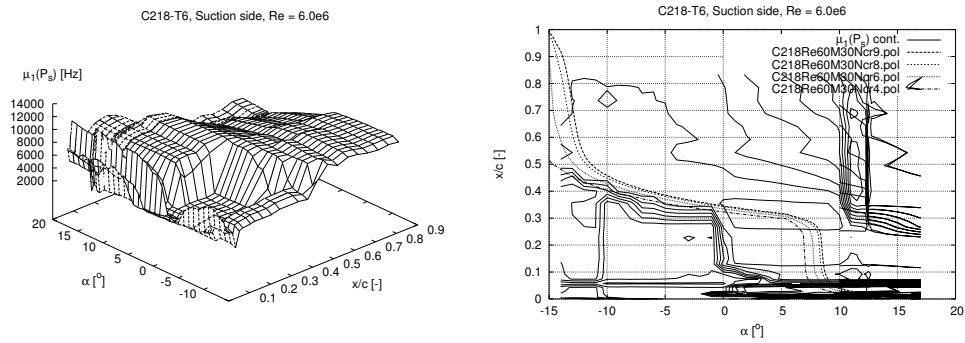


Figure 83: Fourier transform mean, $\mu_1(P_s)$

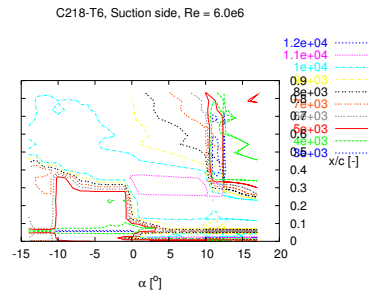


Figure 84: Contours of $\mu_1(P_s)$

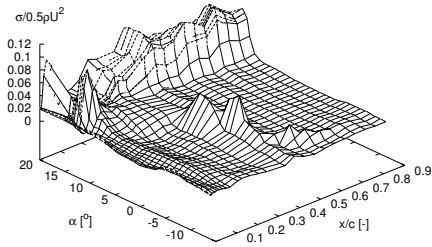
C218-T6
alpha [degrees] angle of attack
xtr* [-] transition point ($x=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr* ($=\max[d(\mu_1(P_s))/dx^*]$)
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	$d(\mu_1)/dx^*$	max(mu1)
10.00	0.1005	47549.0	12076.5
11.00	0.1005	47494.1	12491.5
12.00	0.1005	47780.8	12666.4
12.25	0.1005	47694.3	12693.6
12.50	0.1005	51049.1	11541.6
12.75	0.1005	47633.2	11443.0
13.00	0.1005	47335.4	11476.4
14.00	0.1005	48218.2	11599.2
15.00	0.1005	48717.3	11755.0
16.00	0.1005	49274.4	11961.0
17.00	0.1005	49668.4	12174.5
16.00	0.1005	49256.3	11968.0
15.00	0.1005	48666.6	11799.6
14.00	0.1005	47885.5	11659.4
13.00	0.1005	47419.1	11553.4
12.50	0.1005	47019.4	11534.4
12.00	0.1005	46935.1	11387.7
11.50	0.1005	47260.1	11175.8
11.00	0.1005	47082.2	10893.7

10.00	0.1005	46774.5	12055.2
9.00	0.1005	46349.2	11944.4
8.00	0.1005	46692.1	11965.8
7.00	0.1005	46124.1	11202.7
6.00	0.1005	46234.7	11892.3
5.00	0.1005	47097.4	11802.2
4.00	0.1005	54429.1	11766.9
3.00	0.1130	70846.2	11273.6
2.00	0.1130	71971.8	11178.0
1.00	0.1172	74053.2	11180.0
0.00	0.0963	57570.9	11091.7
-1.00	0.3098	75671.1	10905.1
-2.00	0.3098	75065.3	10893.0
-3.00	0.3098	76381.1	10883.9
-4.00	0.3098	74191.7	10895.5
-5.00	0.3098	67931.2	10858.8
-6.00	0.3098	54642.9	10859.9
-7.00	0.3098	53180.4	10814.3
-8.00	0.3558	60181.7	10792.9
-9.00	0.3558	63024.5	10787.7
-10.00	0.3977	65126.7	10730.5
-11.00	0.4395	41489.7	10700.9
-12.00	0.4395	45172.6	10672.4
-13.00	0.4479	45639.9	10744.4
-14.00	0.4437	44929.8	10393.9

3.1.15 C16a Clean 200x200

C218-C16a, Suction side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16a, Suction side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

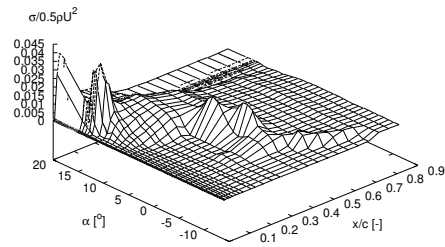
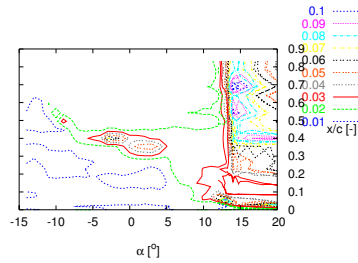


Figure 85: Pressure standard deviations, σ

C218-C16a, Suction side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16a, Suction side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

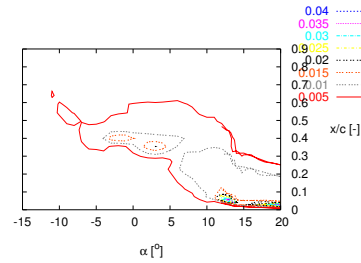


Figure 86: Contours of σ

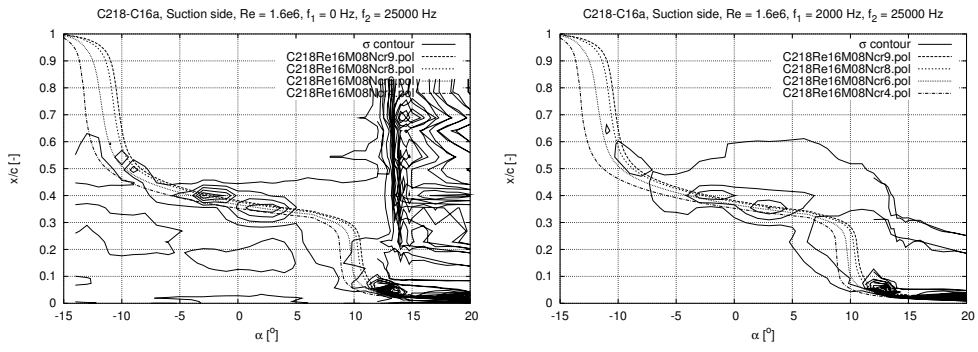


Figure 87: Contours of σ and Xfoil data

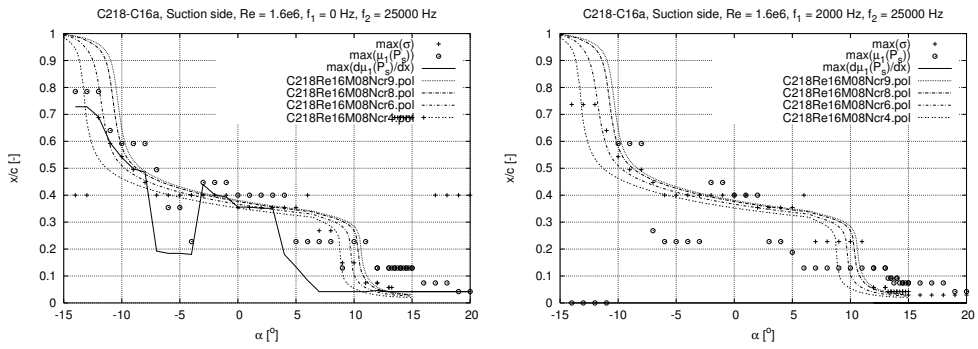


Figure 88: Transition detection

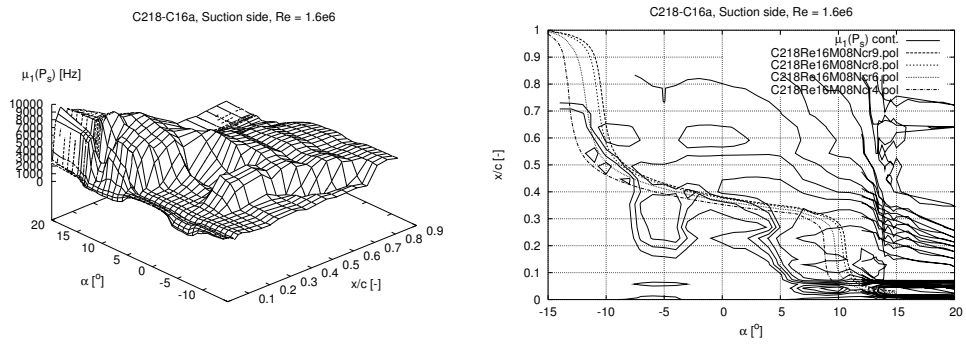


Figure 89: Fourier transform mean, $\mu_1(P_s)$

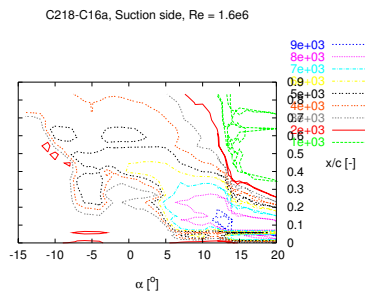


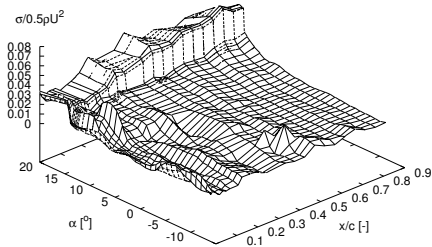
Figure 90: Contours of $\mu_1(P_s)$

C218-C16a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (-max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0460	72544.5	9371.9
13.00	0.0419	90993.4	9670.6
13.25	0.0419	93501.4	9679.1
13.50	0.0419	91775.1	9469.0
13.75	0.0419	91414.4	9442.5
14.00	0.0419	80968.7	8885.0
14.25	0.0419	81720.4	8933.0
14.50	0.0419	77776.6	8820.6
14.75	0.0419	76313.5	8713.8
15.00	0.0419	75192.0	8769.8
16.00	0.0419	71624.1	8808.3
17.00	0.0419	71539.2	8796.0
18.00	0.0419	68239.0	8819.6
19.00	0.0419	67766.3	8775.4
20.00	0.0419	62430.3	9185.9
15.00	0.0419	77077.4	8885.5
14.50	0.0419	75447.7	8907.8
14.00	0.0419	82273.8	9032.9
13.50	0.0419	81649.6	9115.2
13.00	0.0419	92390.6	9762.5
12.00	0.0460	74865.5	9712.0
11.00	0.0419	62569.5	8867.1
10.00	0.0419	74883.6	8715.7
9.00	0.0419	73350.4	8626.9
8.00	0.0419	69427.7	8218.1
7.00	0.0419	66425.7	8124.8
6.00	0.0837	51672.4	7913.2
5.00	0.1339	45907.4	7450.4
4.00	0.1800	35072.5	6904.9
3.00	0.3516	33912.5	6862.8
2.00	0.3516	36044.5	6735.4
1.00	0.3558	38299.3	6589.4
0.00	0.3558	38794.7	6384.2
-1.00	0.3935	29960.3	5878.1
-2.00	0.4018	25748.4	5795.8
-3.00	0.4395	23056.0	5677.9
-4.00	0.1800	32402.3	5567.9
-5.00	0.1842	29535.3	5476.6
-6.00	0.1842	29208.3	5519.5
-7.00	0.1925	21478.7	5224.0
-8.00	0.4856	33094.8	5233.0
-9.00	0.4981	28069.8	5254.4
-10.00	0.5400	39461.6	5221.5
-11.00	0.5944	36889.4	4903.9
-12.00	0.6907	25234.8	4479.4
-13.00	0.7283	27062.1	4519.3
-14.00	0.7283	26229.2	4500.7

3.1.16 C3a Clean 200x200

C218-C3a, Suction side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C3a, Suction side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

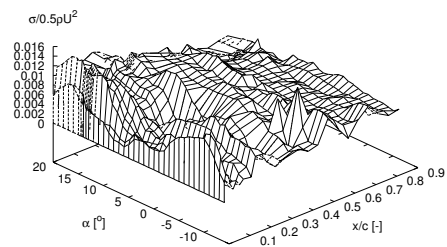
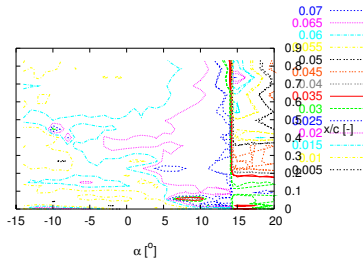


Figure 9I: Pressure standard deviations, σ

C218-C3a, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C3a, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

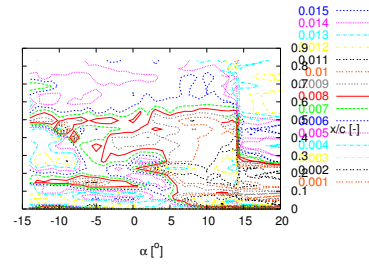


Figure 92: Contours of σ

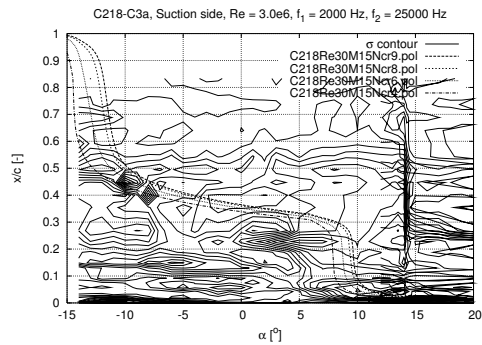
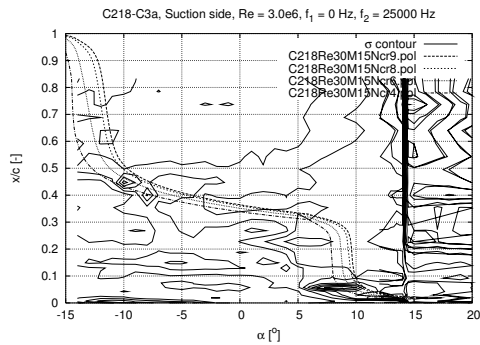


Figure 93: Contours of σ and Xfoil data

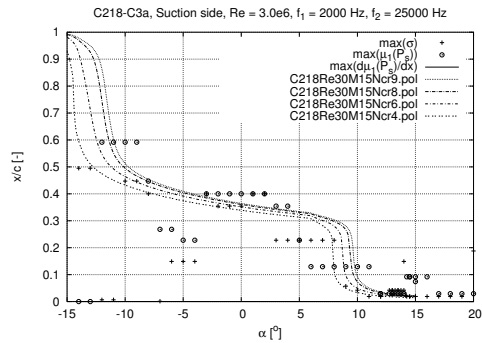
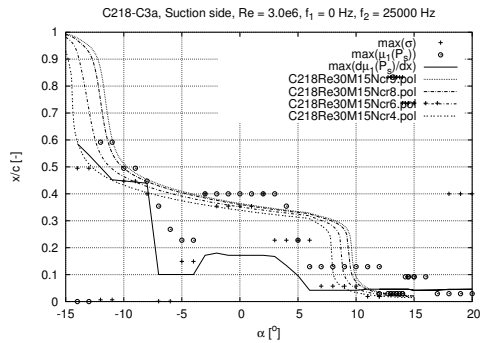


Figure 94: Transition detection

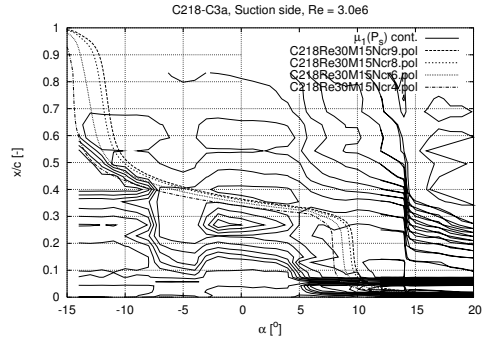
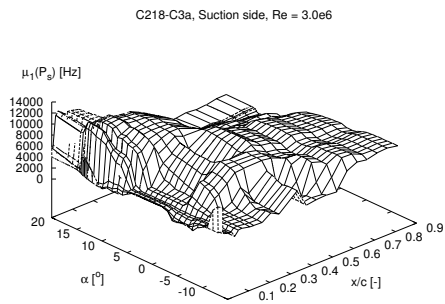


Figure 95: Fourier transform mean, $\mu_1(P_s)$

C218-C3a, Suction side, Re = 3.0e6

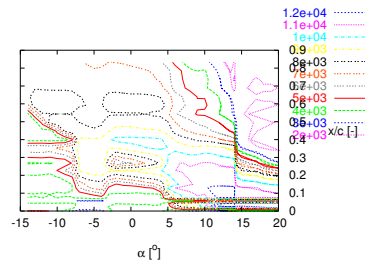


Figure 96: Contours of $\mu_1(P_s)$

C218-C3a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0460	103977.3	12338.6
12.75	0.0460	102830.1	12332.7
13.00	0.0460	102443.7	12362.5
13.25	0.0460	102261.0	12333.8
13.50	0.0460	102128.1	12361.4
13.75	0.0460	101394.1	12357.7
14.00	0.0460	101611.5	12367.0
14.25	0.0460	83189.1	11384.3
14.50	0.0460	80820.5	11342.2
15.00	0.0419	80498.9	11282.1
16.00	0.0419	76845.3	11258.8
17.00	0.0419	72993.6	11452.7
18.00	0.0460	71672.3	11661.0
19.00	0.0460	70259.5	11848.7
20.00	0.0460	67131.5	11925.2
15.00	0.0419	78946.2	11285.1
14.50	0.0460	81284.3	11361.7
14.00	0.0460	96571.8	12431.6
13.50	0.0460	100771.3	12475.1
13.00	0.0460	103075.7	12411.9
12.00	0.0460	104975.9	12319.3
11.00	0.0460	103626.5	12312.7
10.00	0.0419	96155.9	11731.2
9.00	0.0419	91362.9	11915.5
8.00	0.0419	86672.8	11691.9
7.00	0.0419	78864.1	11356.7
6.00	0.0419	74184.9	11000.1
5.00	0.0963	63799.4	10628.4
4.00	0.1339	50100.8	10201.9
3.00	0.1674	48026.6	10216.2
2.00	0.1716	48924.2	10263.6
1.00	0.1716	51961.5	10277.3
0.00	0.1716	51786.2	10330.1
-1.00	0.1716	49524.0	10320.6
-2.00	0.1800	51173.7	10303.5
-3.00	0.1716	47062.3	9822.5
-4.00	0.1005	51535.3	9892.8
-5.00	0.1005	49128.4	9706.1
-6.00	0.1005	46498.0	9575.1
-7.00	0.1005	37695.2	9379.2
-8.00	0.4395	43639.1	8820.4
-9.00	0.4437	58495.5	8782.1
-10.00	0.4479	56022.6	8791.2
-11.00	0.4521	57359.1	8863.9
-12.00	0.4981	44925.0	8919.9
-13.00	0.5442	54026.2	8924.4
-14.00	0.5860	41623.8	9170.0

3.1.17 C6a Clean 200x200

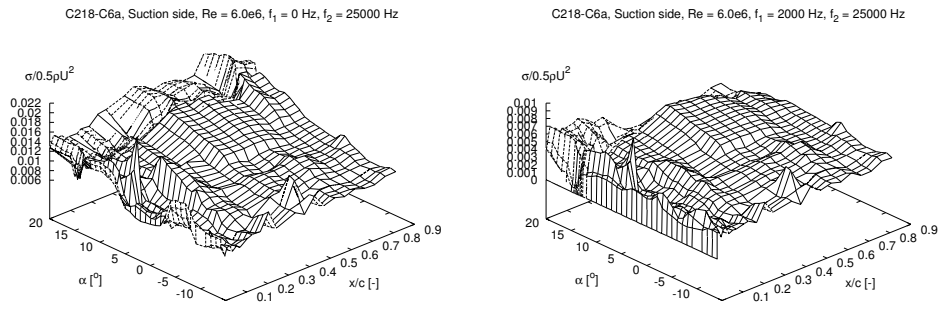


Figure 97: Pressure standard deviations, σ

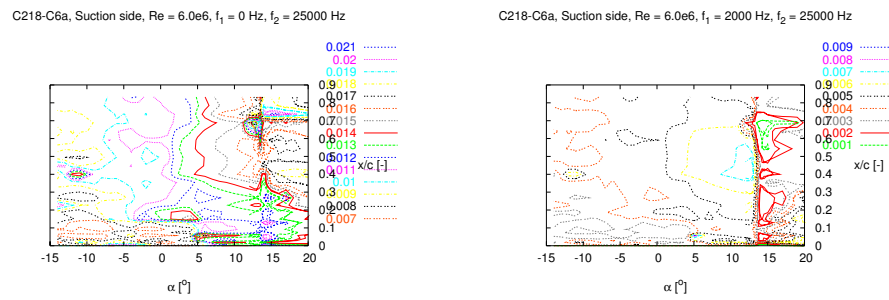


Figure 98: Contours of σ

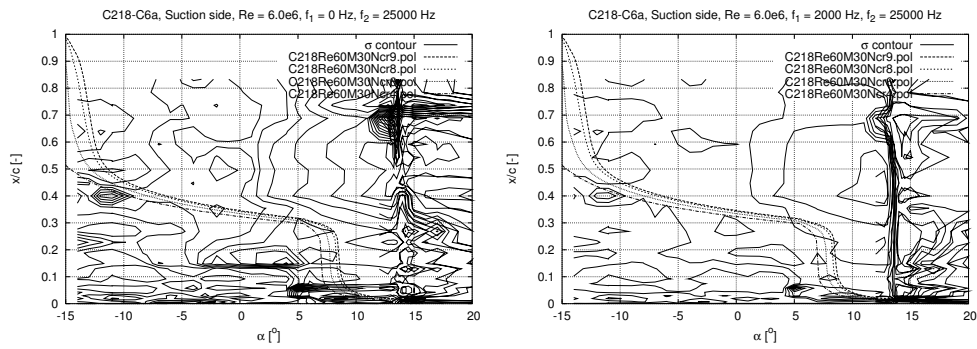


Figure 99: Contours of σ and XFOIL data

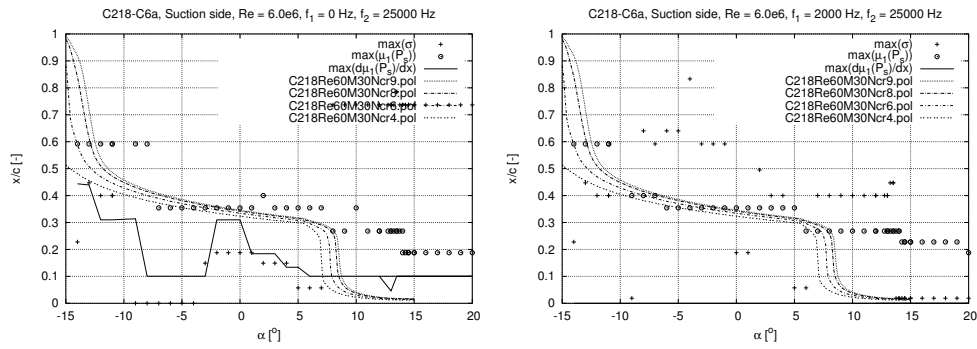


Figure 100: Transition detection

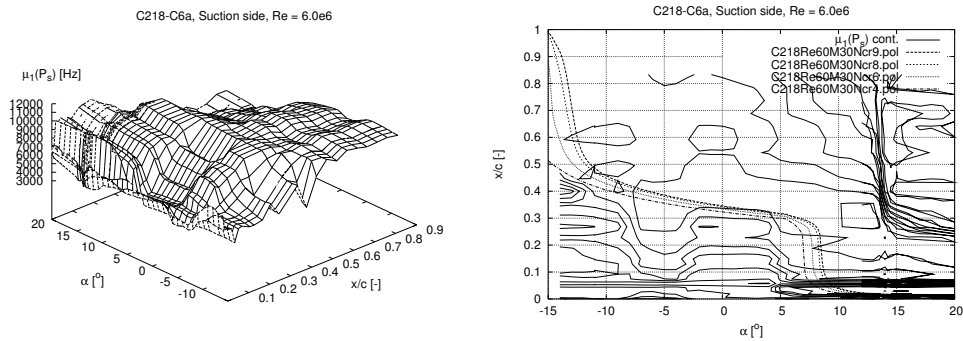


Figure 101: Fourier transform mean, $\mu_1(P_s)$

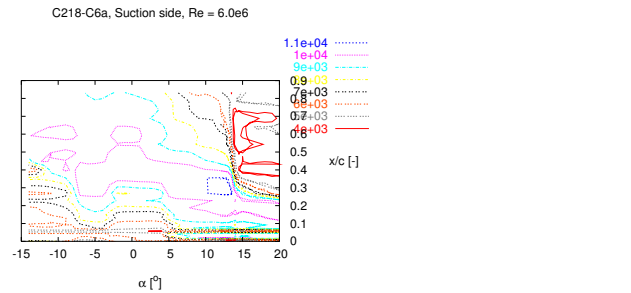


Figure 102: Contours of $\mu_1(P_s)$

C218-C6a

alpha	[degrees]	angle of attack
xtr*	-	transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx*	[Hz/-]	d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1)	[Hz]	max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.1005	44505.5	11149.9
12.75	0.1005	45376.4	11195.4
13.00	0.1005	45810.5	11192.8
13.25	0.1005	46347.2	11185.5
13.50	0.1005	46774.0	11138.3
13.75	0.1005	48610.4	10700.7
14.00	0.1005	49565.7	10323.1
14.25	0.1005	51154.2	10612.4
14.50	0.1005	50845.9	10489.5
15.00	0.1005	51061.6	10439.0
16.00	0.1005	46548.8	10233.9
17.00	0.1005	49111.7	10518.0
18.00	0.1005	47971.1	10452.1
19.00	0.1005	47717.7	10578.4
20.00	0.1005	49393.5	10667.6
15.00	0.1005	50242.9	10414.2
14.50	0.1005	51203.8	10675.5
14.00	0.1005	50092.3	10575.8
13.50	0.1005	47114.3	11014.9

13.00	0.0460	46010.9	11187.7
12.00	0.1005	44085.6	11143.4
11.00	0.1005	44337.4	11051.4
10.00	0.1005	45280.3	10990.4
9.00	0.1005	44945.8	10907.8
8.00	0.1005	44607.3	10835.2
7.00	0.1005	43613.6	10831.6
6.00	0.1005	40958.2	10876.6
5.00	0.1339	32791.9	10890.6
4.00	0.1339	30914.0	10731.0
3.00	0.1842	29488.3	10638.8
2.00	0.1842	29360.7	10605.6
1.00	0.1842	28551.5	10565.5
0.00	0.3098	27774.9	10497.3
-1.00	0.3098	28245.2	10441.0
-2.00	0.3098	27954.6	10430.9
-3.00	0.1005	35369.7	10523.3
-4.00	0.1005	48790.2	10440.1
-5.00	0.1005	48601.8	10432.1
-6.00	0.1005	46192.1	10393.4
-7.00	0.1005	41107.7	10421.8
-8.00	0.1005	25843.0	10225.1
-9.00	0.3139	28044.0	10243.2
-11.00	0.3098	27483.9	10155.6
-11.00	0.3098	28170.2	10168.2
-12.00	0.3098	26606.1	10130.0
-13.00	0.4395	46218.2	10049.0
-14.00	0.4437	49925.9	9968.5

3.1.18 Z16a ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 200x200

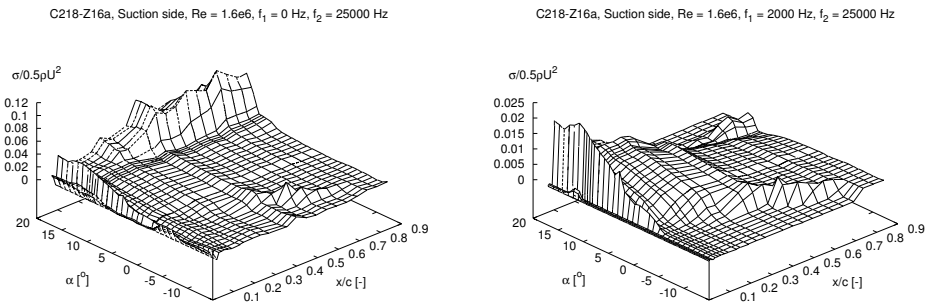


Figure 103: Pressure standard deviations, σ

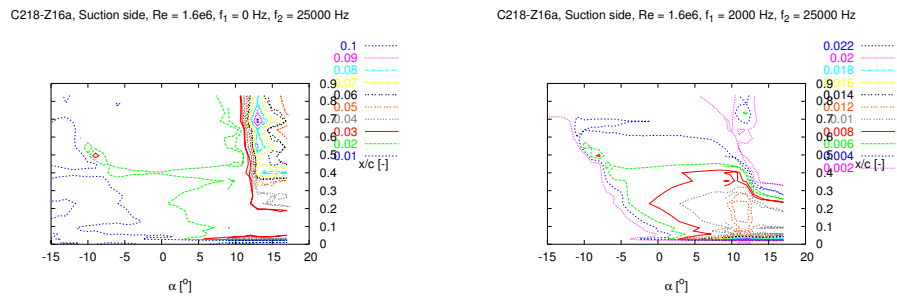


Figure 104: Contours of σ

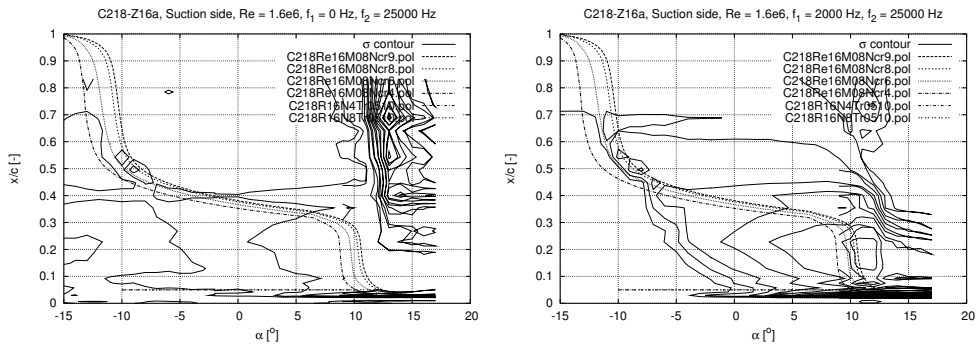


Figure 105: Contours of σ and Xfoil data

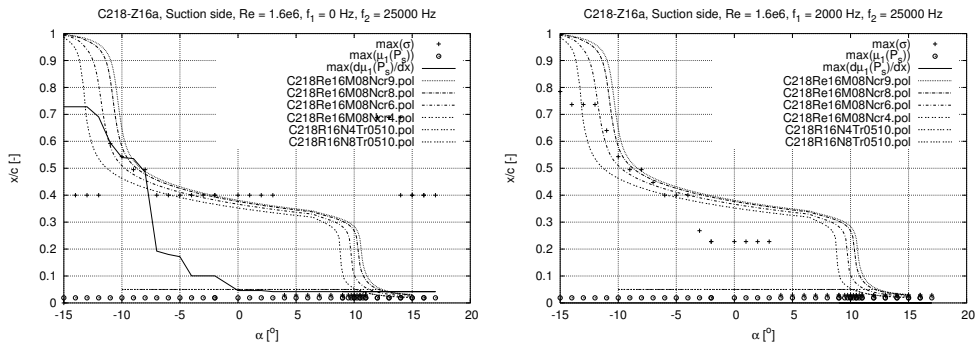


Figure 106: Transition detection

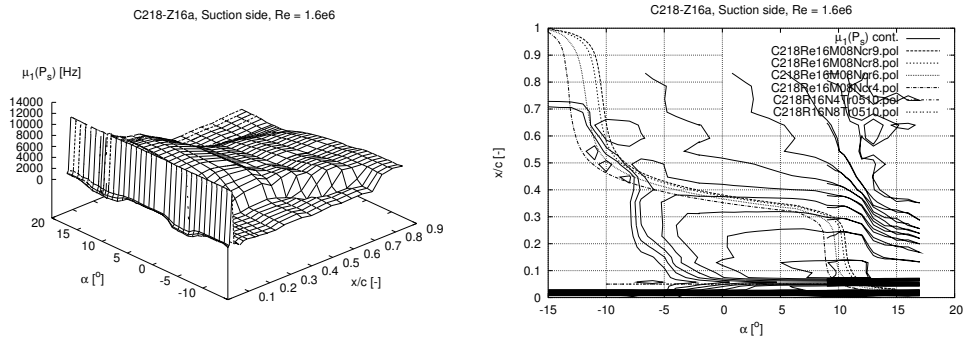


Figure 107: Fourier transform mean, $\mu_1(P_s)$

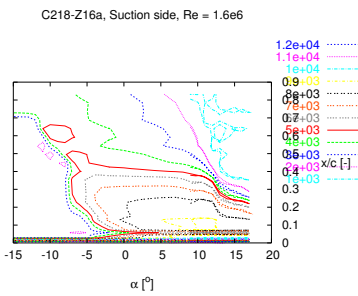


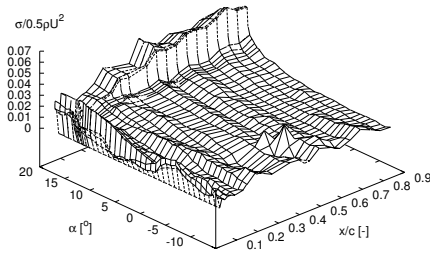
Figure 108: Contours of $\mu_1(P_s)$

C218-Z16a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
9.00	0.0419	87772.9	12811.3
9.75	0.0419	87596.2	12264.7
10.00	0.0419	89006.5	12240.3
10.25	0.0419	89464.8	12228.2
10.50	0.0419	89262.6	12207.0
10.75	0.0419	89995.4	12197.2
11.00	0.0419	89283.6	12201.0
12.00	0.0419	89623.1	12194.9
13.00	0.0419	77836.6	12234.1
14.00	0.0419	71920.3	12255.7
15.00	0.0419	70372.0	12279.8
16.00	0.0419	69958.7	12286.6
17.00	0.0419	68733.1	12322.6
16.00	0.0419	70201.5	12300.0
15.00	0.0419	70981.3	12299.1
14.00	0.0419	74667.6	12263.2
13.00	0.0419	80556.6	12203.8
12.00	0.0419	88579.8	12239.0
11.00	0.0419	89137.2	12246.6
10.50	0.0419	88754.3	12272.3
10.00	0.0419	90103.4	12253.4
9.50	0.0419	89367.5	12239.5
9.00	0.0419	89089.2	12234.4
8.00	0.0419	87009.7	12264.0
7.00	0.0419	84715.4	12296.3
6.00	0.0419	77195.4	12332.7
5.00	0.0419	68315.2	12374.8
4.00	0.0419	65284.4	12387.5
3.00	0.0419	62678.3	12383.0
2.00	0.0460	59976.1	12404.3
1.00	0.0460	56666.9	12421.9
0.00	0.0460	51034.5	12415.0
-2.00	0.1005	44230.9	12443.6
-2.00	0.1005	43991.5	12433.9
-3.00	0.1005	40977.1	12427.0
-4.00	0.1005	35110.6	12358.3
-5.00	0.1716	29141.7	12346.2
-6.00	0.1800	30089.4	12363.7
-7.00	0.1925	22189.3	12347.6
-8.00	0.4856	35143.6	12355.0
-9.00	0.5358	29274.5	12395.0
-10.00	0.5400	39789.6	12384.0
-11.00	0.5944	37817.3	12373.0
-12.00	0.6907	25894.1	12395.7
-13.00	0.7283	27778.2	12385.1
-14.00	0.7283	26681.3	12374.5
-15.00	0.7283	30309.3	12332.4

3.1.19 Z3a ZZ90 x/c=5% suc. x/c=10% press. 200x200

C218-Z3a, Suction side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-Z3a, Suction side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

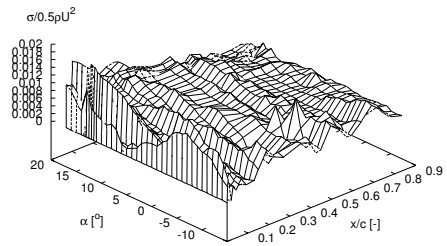
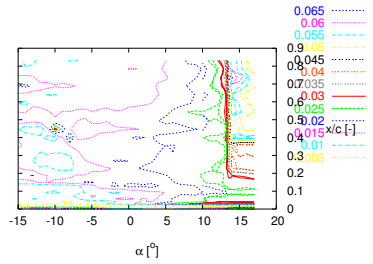


Figure 109: Pressure standard deviations, σ

C218-Z3a, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3a, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

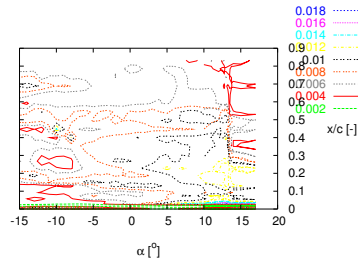


Figure 110: Contours of σ

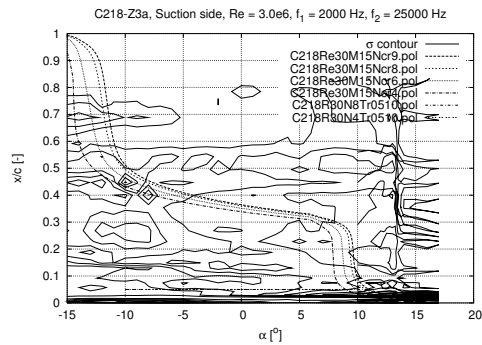
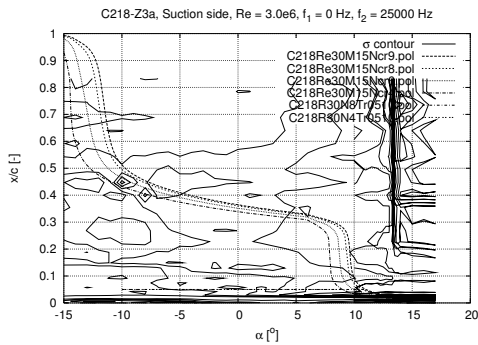


Figure 111: Contours of σ and XFOIL data

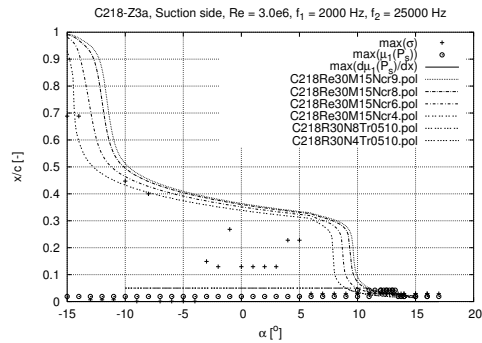
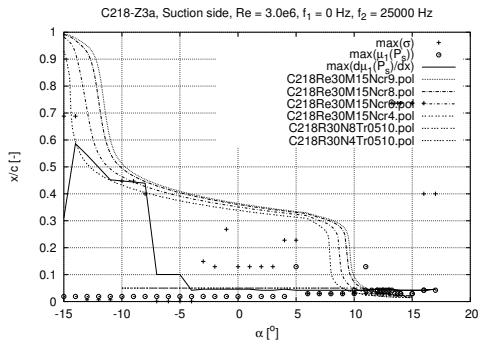


Figure 112: Transition detection

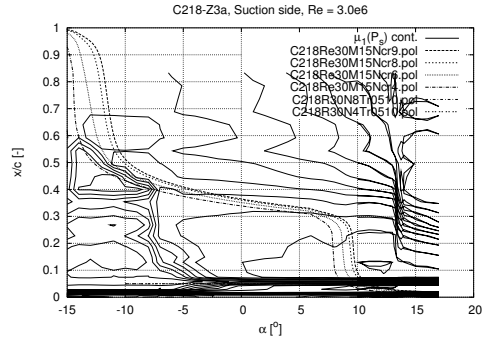
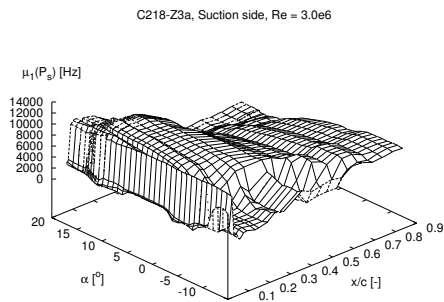


Figure 113: Fourier transform mean, $\mu_1(P_y)$

C218-Z3a, Suction side, Re = 3.0e6

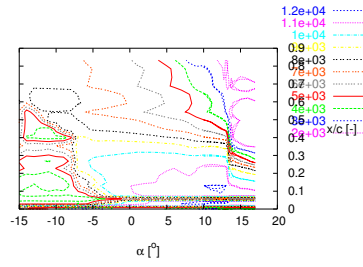


Figure 114: Contours of $\mu_1(P_s)$

C218-Z3a
 alpha [degrees] angle of attack
 xtr* [-] transition point (x*x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	102546.3	12031.0
11.00	0.0419	104642.0	12147.7
12.00	0.0460	95988.8	12155.0
12.25	0.0460	94541.4	12172.6
12.50	0.0460	92440.1	12201.9
12.75	0.0460	90802.6	12189.0
13.00	0.0460	88216.1	12190.4
13.25	0.0460	87747.6	12171.9
13.50	0.0419	83659.2	11693.4
13.75	0.0419	83735.7	11709.0
14.00	0.0419	83237.1	11692.9
15.00	0.0419	83104.4	11618.5
16.00	0.0419	80004.2	11627.2
17.00	0.0460	76972.2	11653.3
18.00	0.0419	79191.1	11576.5
15.00	0.0419	81478.3	11584.5
14.00	0.0419	82884.7	11750.5
13.00	0.0460	85118.9	12311.1
12.50	0.0460	88860.1	12242.1
12.00	0.0460	93708.7	12251.1
11.50	0.0460	96468.1	12234.3
11.00	0.0419	100291.0	12194.8
10.00	0.0419	99658.9	12115.9
9.00	0.0419	99306.3	12194.0
8.00	0.0419	98557.9	12142.0
7.00	0.0419	95134.3	12016.8
6.00	0.0419	96704.2	11841.8
5.00	0.0419	86466.6	11714.3
4.00	0.0460	82970.0	11655.1
3.00	0.0419	81079.2	11762.0
2.00	0.0419	79722.9	11799.3
1.00	0.0460	78711.5	11792.3
0.00	0.0460	76184.9	11782.3
-1.00	0.0460	73855.7	11840.0
-2.00	0.0460	70985.9	11844.0
-3.00	0.0460	69181.9	11784.5
-4.00	0.0419	68896.2	11669.7
-5.00	0.1005	58012.5	11620.1
-6.00	0.1005	51070.7	11676.3
-7.00	0.1005	43457.1	11717.2
-8.00	0.4395	44386.6	11694.7
-9.00	0.4437	58715.7	11698.3
-10.00	0.4479	55832.0	11777.4
-11.00	0.4521	57959.6	11803.9
-12.00	0.4981	43588.3	11773.1
-13.00	0.5442	48339.8	11620.5
-14.00	0.5860	35180.6	11542.2
-15.00	0.3098	26445.4	11355.8

3.1.20 Z6a ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 200x200

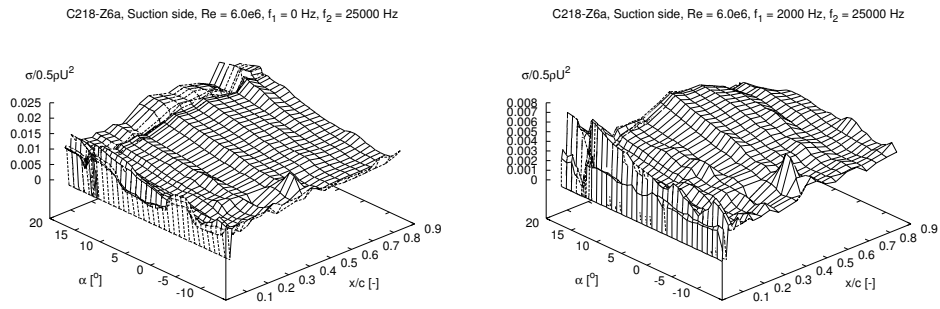


Figure 115: Pressure standard deviations, σ

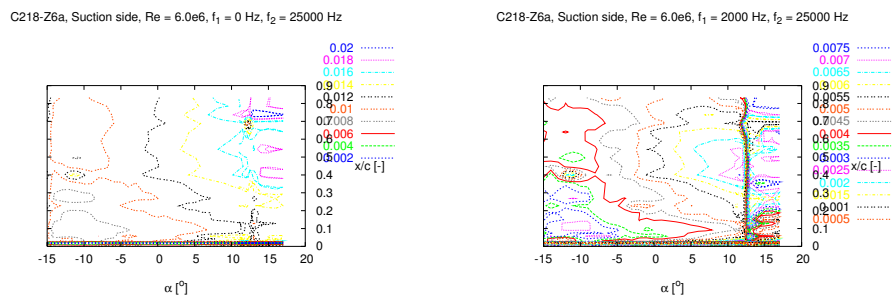


Figure 116: Contours of σ

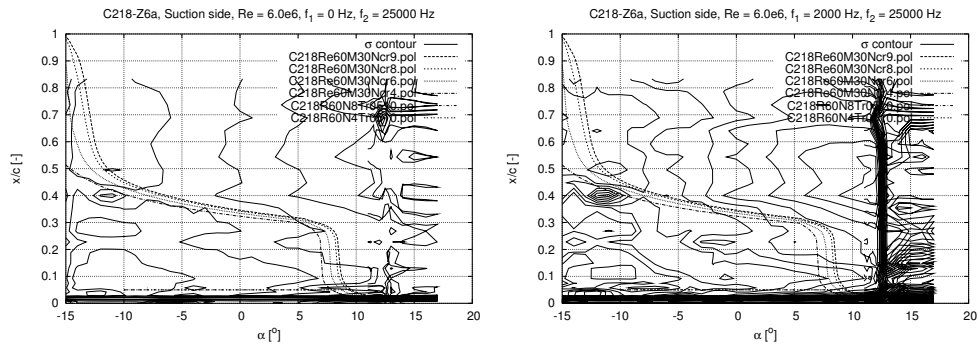


Figure 117: Contours of σ and XFOIL data

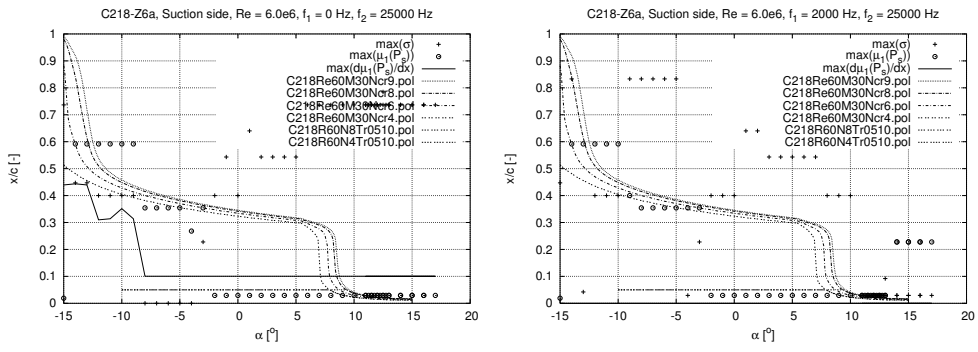


Figure 118: Transition detection

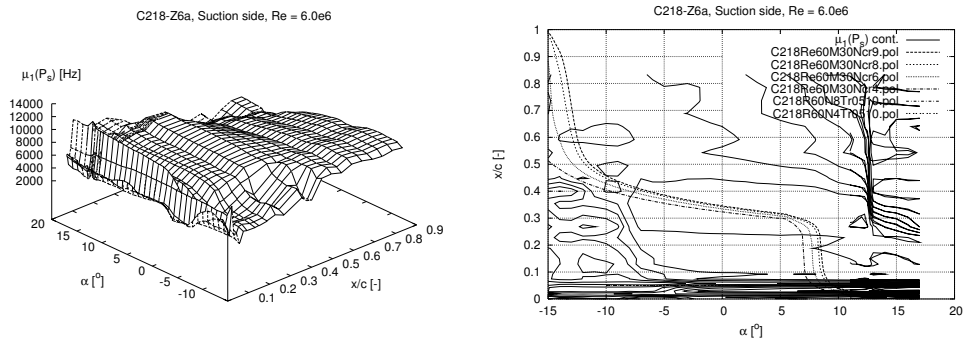


Figure 119: Fourier transform mean, $\mu_1(P_s)$

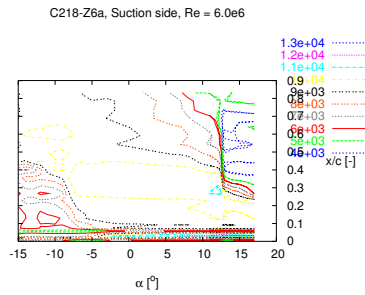


Figure 120: Contours of $\mu_1(P_s)$

C218-Z6a

alpha [degrees] angle of attack

xtr* [-] transition point (x*=x/c) predicted by max[d(mu1(Ps))/dx*]

d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])

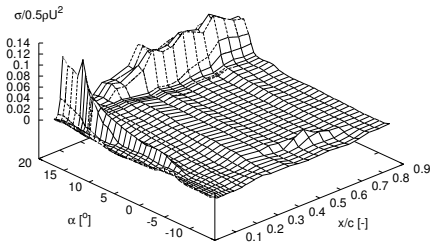
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
11.00	0.1005	45119.0	12263.5
11.25	0.1005	45037.1	12322.4
11.50	0.1005	44854.1	12334.7
11.75	0.1005	44802.2	12389.8
12.00	0.1005	44593.8	12431.0
12.25	0.1005	44328.8	12409.9
12.50	0.1005	45425.4	12675.5
12.75	0.1005	48051.7	13238.9
13.00	0.1005	46233.1	12587.8
14.00	0.1005	43540.4	12239.3
15.00	0.1005	44339.7	12239.4
16.00	0.1005	45620.8	12378.7
17.00	0.1005	45061.2	12223.6
16.00	0.1005	43521.1	12180.9
15.00	0.1005	42368.2	12139.8
14.00	0.1005	45132.4	12367.5
13.00	0.1005	47686.1	13398.4
12.50	0.1005	44797.1	12613.3
12.00	0.1005	44572.5	12399.6

11.50	0.1005	44431.5	12403.8
11.00	0.1005	44630.2	12379.2
10.00	0.1005	44141.4	12268.1
9.00	0.1005	43643.9	12216.6
8.00	0.1005	43414.1	12090.7
7.00	0.1005	43339.6	12049.6
6.00	0.1005	42405.2	11956.6
5.00	0.1005	40454.0	11864.2
4.00	0.1005	39940.4	11897.7
3.00	0.1005	40042.0	11811.6
2.00	0.1005	39963.4	11696.2
1.00	0.1005	40053.3	11613.1
0.00	0.1005	40048.6	11516.1
-1.00	0.1005	40794.8	11408.6
-2.00	0.1005	41657.2	11071.9
-3.00	0.1005	48507.8	10650.9
-4.00	0.1005	54647.0	10461.4
-5.00	0.1005	55672.1	10419.9
-6.00	0.1005	51097.8	10351.0
-7.00	0.1005	45601.6	10459.5
-8.00	0.1005	30827.6	10168.0
-9.00	0.3139	26318.8	10271.6
-10.00	0.3516	30779.8	10275.8
-11.00	0.3139	27543.0	10216.2
-12.00	0.3098	27081.9	10154.3
-13.00	0.4395	40328.9	10137.9
-14.00	0.4437	42057.6	10061.7
-15.00	0.4395	31726.0	10521.8

3.1.21 L16a LM standard LER 200x200

C218-L16a, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16a, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

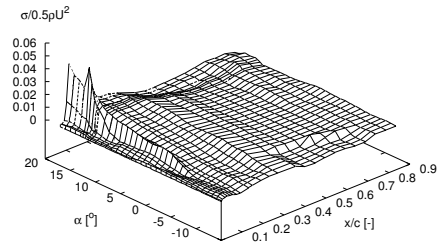
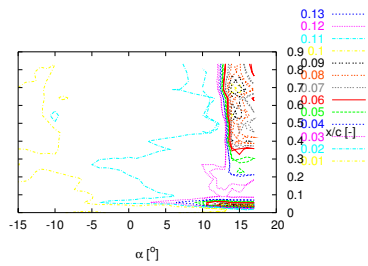


Figure 121: Pressure standard deviations, σ

C218-L16a, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16a, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

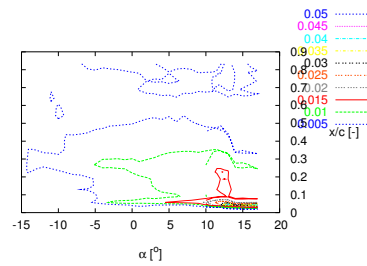


Figure 122: Contours of σ

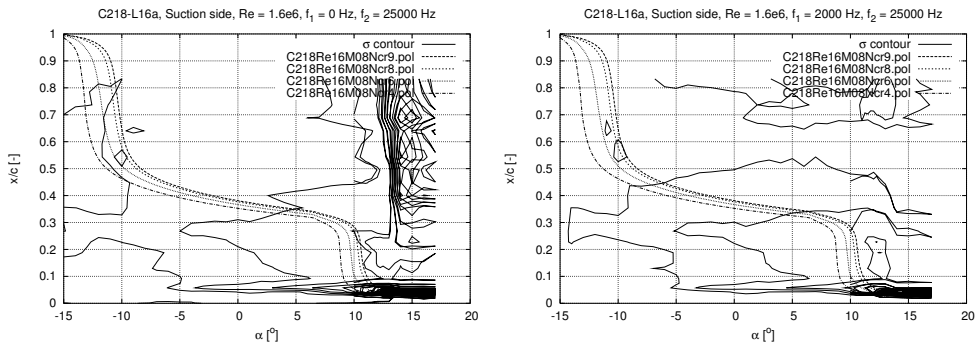


Figure 123: Contours of σ and XFoil data

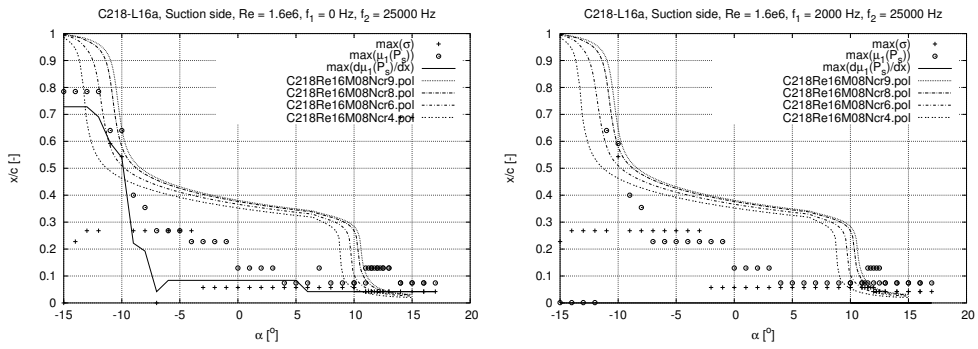


Figure 124: Transition detection

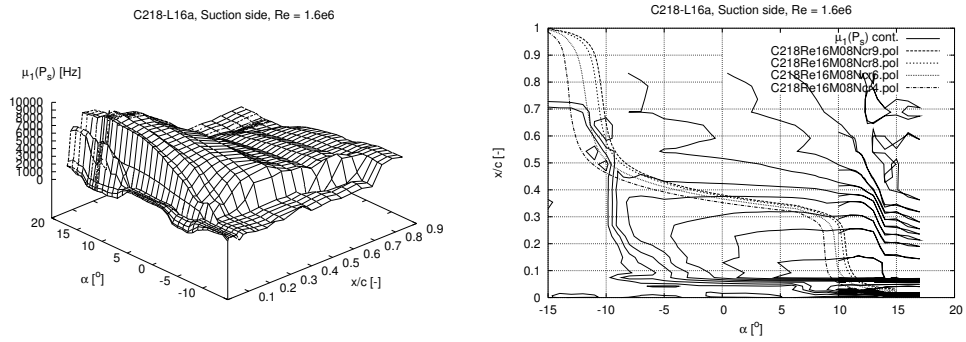


Figure 125: Fourier transform mean, $\mu_1(P_s)$

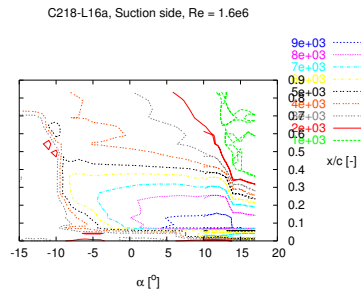


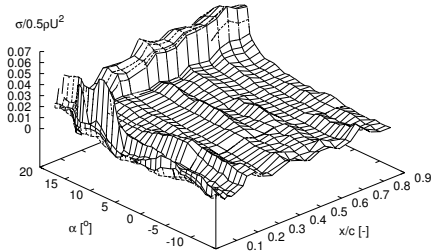
Figure 126: Contours of $\mu_1(P_s)$

C218-L16a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	89169.4	9229.1
11.00	0.0419	94726.3	9628.1
11.25	0.0419	94946.8	9646.8
11.50	0.0419	95410.6	9677.8
11.75	0.0419	95447.0	9687.6
12.00	0.0419	95375.9	9677.5
12.25	0.0419	94628.7	9663.0
12.50	0.0419	94191.0	9634.4
13.00	0.0419	93928.5	9567.6
14.00	0.0419	77261.2	8981.5
15.00	0.0419	73689.4	8908.8
16.00	0.0419	70798.4	8863.4
17.00	0.0419	68034.5	8737.6
16.00	0.0419	71384.6	8859.6
15.00	0.0419	77241.7	9004.2
14.00	0.0419	76655.1	8995.5
13.00	0.0419	93904.1	9549.4
12.50	0.0419	94144.2	9589.8
12.00	0.0419	94724.8	9629.8
11.50	0.0419	95520.2	9638.7
11.00	0.0419	94689.7	9592.8
10.00	0.0419	91789.1	9512.7
9.00	0.0419	91803.5	9398.4
8.00	0.0419	89311.1	9363.9
7.00	0.0419	87566.4	9293.2
6.00	0.0419	79040.3	9252.6
5.00	0.0837	69736.4	9111.8
4.00	0.0837	66917.3	8883.0
3.00	0.0837	65818.9	8701.8
2.00	0.0837	63903.9	8473.4
1.00	0.0837	61960.5	8255.7
0.00	0.0837	58906.5	7981.1
-1.00	0.0837	55257.6	7782.5
-2.00	0.0837	51656.5	7620.7
-3.00	0.0837	52375.5	7434.8
-4.00	0.0837	51686.3	7121.1
-5.00	0.0837	39970.4	6876.7
-6.00	0.0837	30244.4	6609.9
-7.00	0.0419	29290.9	6367.7
-8.00	0.1925	24811.7	6270.1
-9.00	0.2218	29088.3	5457.5
-10.00	0.5400	40177.3	5370.6
-11.00	0.5944	38625.9	5086.4
-12.00	0.6907	26941.6	4672.5
-13.00	0.7283	27235.2	4654.0
-14.00	0.7283	26381.0	4654.6
-15.00	0.7283	28772.7	4701.3

3.1.22 L3a LM standard LER 200x200

C218-L3a, Suction side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-L3a, Suction side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

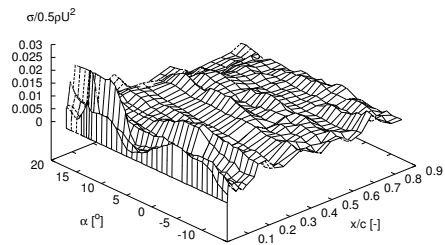
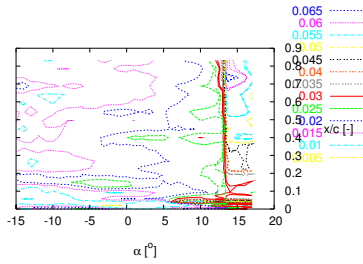


Figure 127: Pressure standard deviations, σ

C218-L3a, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3a, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

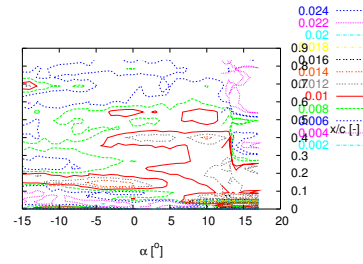


Figure 128: Contours of σ

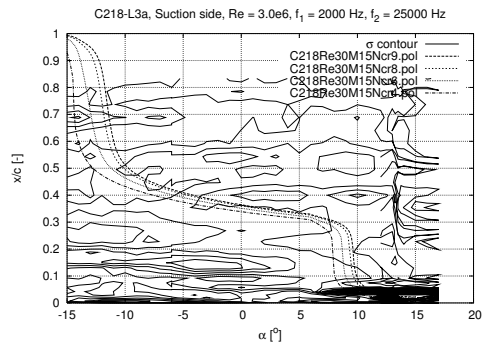
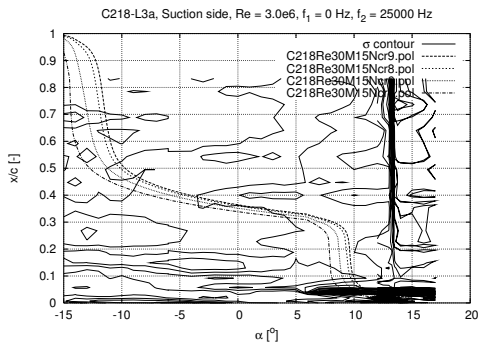


Figure 129: Contours of σ and Xfoil data

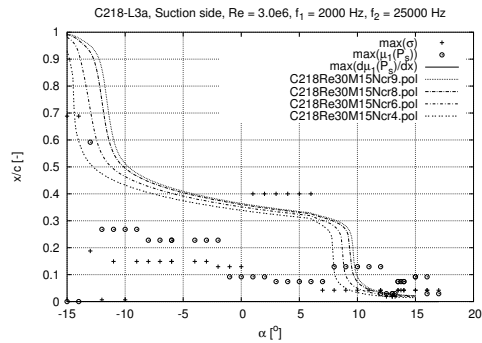
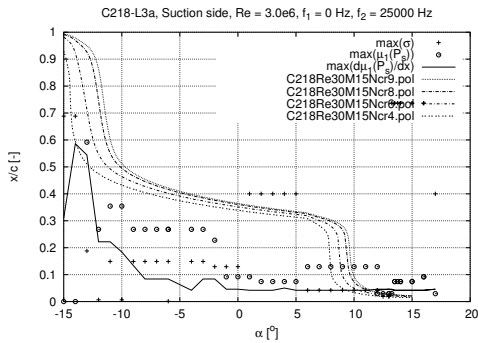


Figure 130: Transition detection

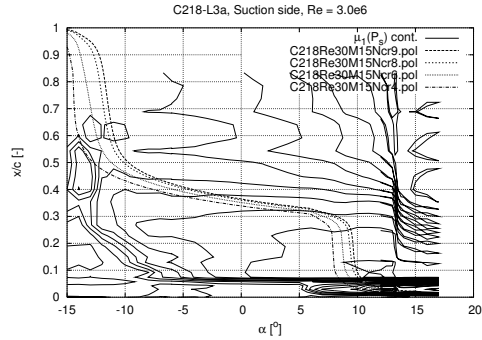
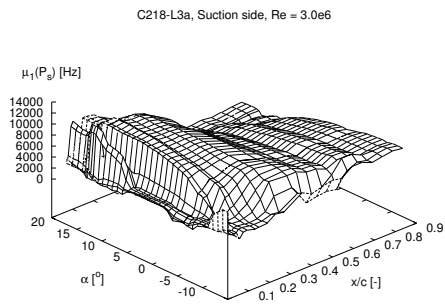


Figure 131: Fourier transform mean, $\mu_1(P_s)$

C218-L3a, Suction side, Re = 3.0e6

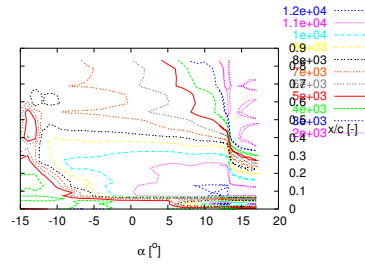


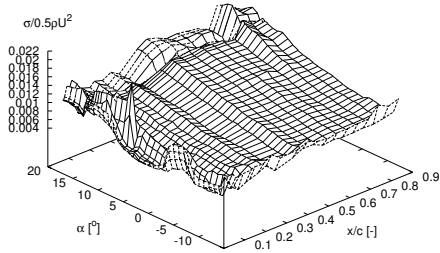
Figure 132: Contours of $\mu_1(P_s)$

C218-L3a
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0419	97489.8	12228.5
13.00	0.0460	96647.0	12347.4
13.25	0.0460	96704.5	12322.0
13.50	0.0419	86663.0	11574.1
13.75	0.0419	83991.0	11394.2
14.00	0.0419	82367.4	11325.5
15.00	0.0419	79161.9	11235.0
16.00	0.0419	75751.5	11253.9
17.00	0.0460	73966.3	11346.6
16.00	0.0419	74231.4	11159.7
15.00	0.0419	77835.4	11215.2
14.00	0.0419	81002.8	11269.8
13.50	0.0419	82760.2	11446.6
13.00	0.0460	92887.8	12443.6
12.50	0.0460	93288.1	12379.8
12.00	0.0460	94320.4	12334.4
11.00	0.0419	102005.6	12165.8
10.00	0.0419	101088.6	12146.6
9.00	0.0419	98074.5	12009.7
8.00	0.0419	100132.6	11956.0
7.00	0.0419	96309.4	11921.4
6.00	0.0419	98360.5	11864.6
5.00	0.0419	87983.1	11831.9
4.00	0.0502	83252.7	11655.5
3.00	0.0419	82138.9	11481.6
2.00	0.0419	80157.1	11282.8
1.00	0.0419	78554.9	11154.1
0.00	0.0460	75214.5	10920.2
-1.00	0.0460	73336.7	10724.6
-2.00	0.0837	69813.5	10593.9
-3.00	0.0837	73125.4	10465.7
-4.00	0.0419	75571.2	10343.3
-6.00	0.0837	62233.4	10246.1
-6.00	0.0837	62934.3	10247.4
-7.00	0.0837	59884.9	10224.6
-8.00	0.0837	47465.2	10134.0
-9.00	0.1339	44901.7	10063.6
-10.00	0.1842	36916.1	9364.2
-11.00	0.2218	37581.1	9092.9
-12.00	0.2218	49247.0	8950.2
-13.00	0.5442	40023.4	8696.1
-14.00	0.5860	37216.0	8846.8
-15.00	0.3098	24101.0	8747.2

3.1.23 L6a LM standard LER 200x200

C218-L6a, Suction side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L6a, Suction side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

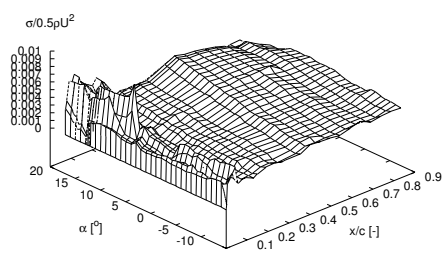
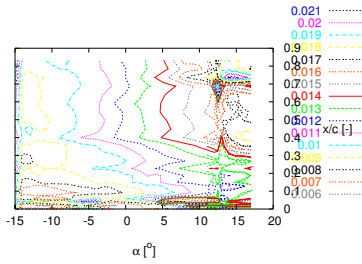


Figure 133: Pressure standard deviations, σ

C218-L6a, Suction side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L6a, Suction side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

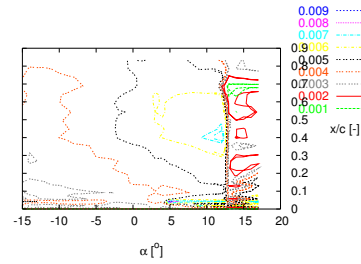


Figure 134: Contours of σ

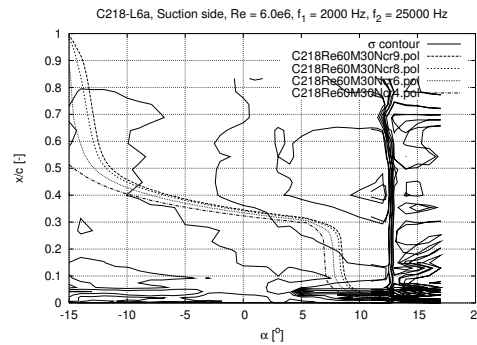
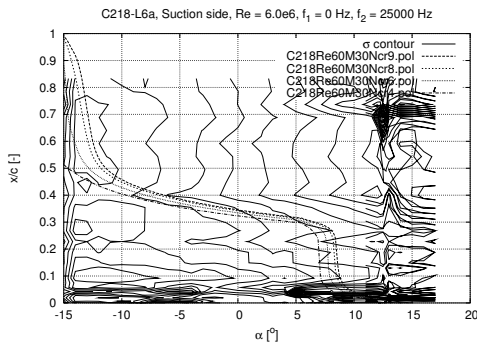


Figure 135: Contours of σ and Xfoil data

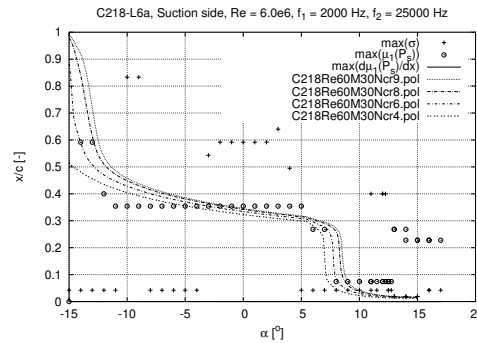
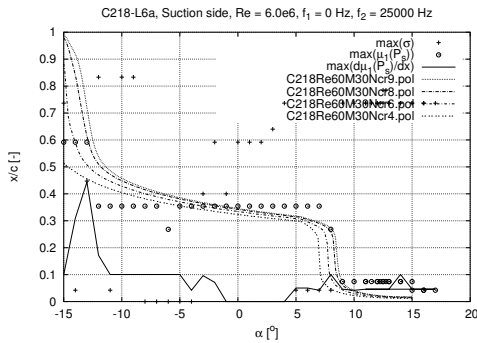


Figure 136: Transition detection

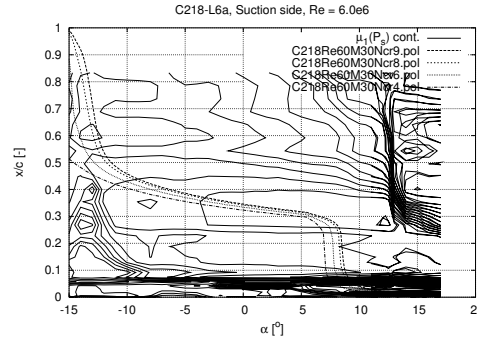
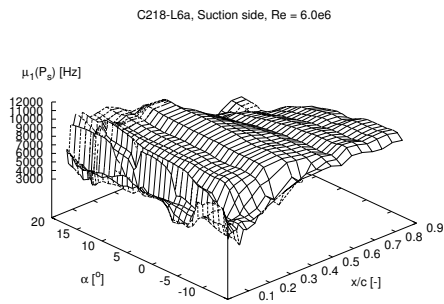


Figure 137: Fourier transform mean, $\mu_1(P_s)$

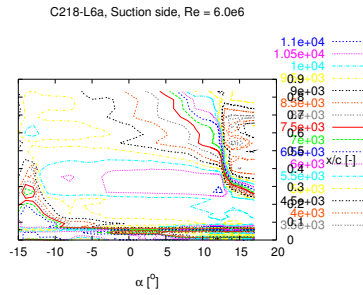


Figure 138: Contours of $\mu_1(P_s)$

C218-L6a
alpha [degrees] angle of attack
xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 $\max(\mu_1)$ [Hz] $\max \mu_1$ of all chordwise positions

alpha	xtr*	$d(\mu_1)/dx^*$	$\max(\mu_1)$
11.00	0.0460	46531.2	11166.6
12.00	0.0460	52816.1	11187.3
12.25	0.0460	53776.0	11209.6
12.50	0.0460	50684.9	11197.1
12.75	0.0460	49874.4	11111.0
13.00	0.0460	46334.3	10833.5
14.00	0.0460	48379.0	10571.1
15.00	0.0460	42970.5	10771.2
16.00	0.0460	43017.5	10831.8
17.00	0.0460	41596.5	11009.9
16.00	0.0460	41991.4	10919.9
15.00	0.0460	45608.1	10610.9
14.00	0.1005	41112.6	10524.0
13.00	0.0460	45411.1	10903.1
12.50	0.0460	49933.6	11188.5
12.00	0.0460	52790.4	11192.1
11.50	0.0460	50072.7	11170.9
11.00	0.0460	46249.7	11164.6
10.00	0.0419	45206.2	11044.6
9.00	0.0460	40599.6	10860.1
8.00	0.1005	39627.5	10779.9
7.00	0.0419	40468.0	10838.8
6.00	0.0502	39586.1	10860.2
5.00	0.0502	40232.6	10902.9
4.00	0.0000	53108.2	10890.1
3.00	0.0000	43231.8	10877.0
2.00	0.0000	50552.6	10846.8
1.00	0.0000	48090.9	10824.0
0.00	0.0000	44917.5	10779.5
-1.00	0.0000	40112.6	10768.8
-2.00	0.0712	37275.7	10726.5
-3.00	0.0963	39554.1	10599.6
-4.00	0.0419	45843.2	10459.6
-5.00	0.1005	42933.9	10407.4
-6.00	0.1005	43823.9	10374.1
-7.00	0.1005	43732.6	10464.6
-8.00	0.1005	43510.2	10548.0
-9.00	0.1005	44539.4	10505.9
-10.00	0.1005	42858.5	10443.0
-11.00	0.1005	36416.1	10341.5
-12.00	0.1716	25076.2	10132.6
-13.00	0.4437	22615.6	10149.8
-14.00	0.3098	21373.6	10075.5
-15.00	0.1005	27886.4	9425.9

3.1.24 T16a Trip wire. Bump tape 2% 200x200

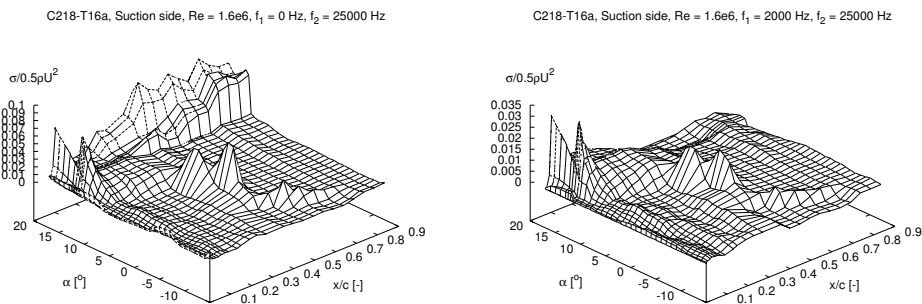
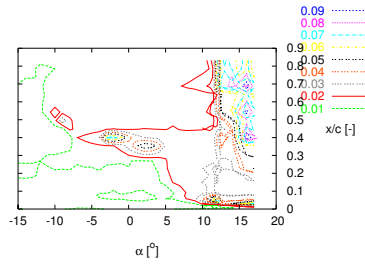


Figure 139: Pressure standard deviations, σ

C218-T16a, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16a, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

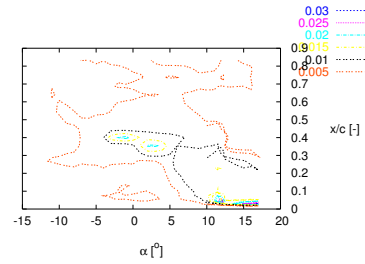
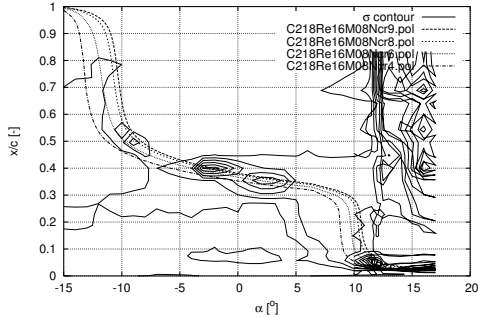


Figure 140: Contours of σ

C218-T16a, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16a, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

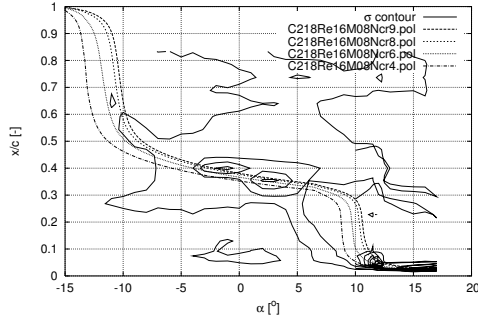
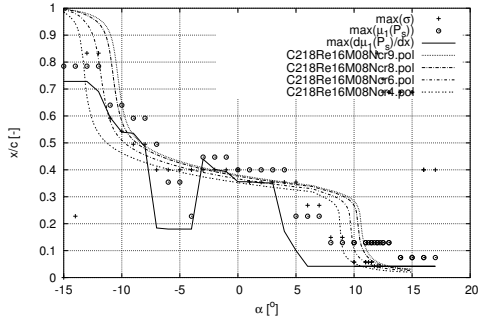


Figure 141: Contours of σ and Xfoil data

C218-T16a, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16a, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

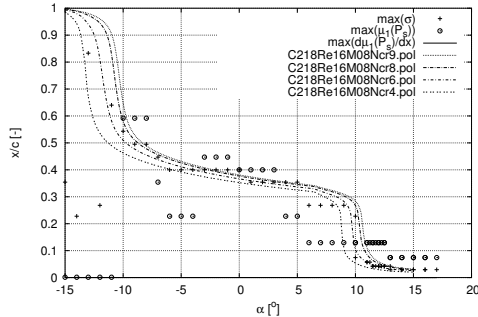
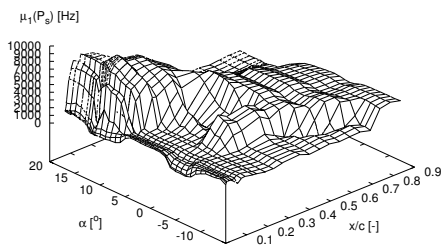


Figure 142: Transition detection

C218-T16a, Suction side, Re = 1.6e6



C218-T16a, Suction side, Re = 1.6e6

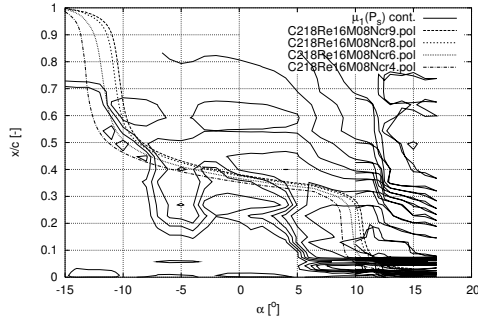


Figure 143: Fourier transform mean, $\mu_1(P_s)$

C218-T16a, Suction side, Re = 1.6e6

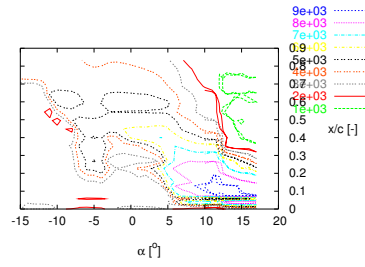


Figure 144: Contours of $\mu_1(P_s)$

C218-T16a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0419	83059.3	9107.0
11.00	0.0419	88138.8	9656.6
11.25	0.0419	91217.0	9810.6
11.50	0.0419	92584.1	9812.3
11.75	0.0419	94231.7	9849.1
12.00	0.0419	95560.5	9839.1
12.25	0.0419	93410.2	9719.2
12.50	0.0419	83208.8	8300.3
13.00	0.0419	79192.4	8203.6
14.00	0.0419	76419.2	8135.6
15.00	0.0419	72279.4	8098.6
16.00	0.0419	72890.4	8125.8
17.00	0.0419	72250.9	8057.0
16.00	0.0419	68667.2	8062.1
15.00	0.0419	74860.4	8171.6
14.00	0.0419	77447.9	8132.2
13.00	0.0419	75725.0	8168.2
12.50	0.0419	81452.5	8204.5
12.00	0.0419	83311.1	8266.9
11.50	0.0419	92584.4	9834.5
11.00	0.0419	89821.8	9710.6
10.00	0.0419	86166.7	9413.4
9.00	0.0419	79627.0	8142.2
8.00	0.0419	74344.3	8658.2
7.00	0.0419	71285.0	8423.1
6.00	0.0419	57656.7	8155.1
5.00	0.1005	47095.8	7663.2
4.00	0.1716	38584.0	7007.6
3.00	0.3516	33487.3	6963.1
2.00	0.3516	36589.3	6860.0
1.00	0.3558	37515.6	6621.2
0.00	0.3558	33857.9	6115.4
-1.00	0.3935	27366.2	6007.8
-2.00	0.4018	25202.8	5897.4
-3.00	0.4395	24392.9	5804.3
-4.00	0.1800	32836.1	5823.9
-5.00	0.1800	30724.8	5566.8
-6.00	0.1800	28936.8	5620.3
-7.00	0.1842	18056.4	5305.9
-8.00	0.4856	34529.1	5360.9
-9.00	0.5358	29318.4	5368.4
-10.00	0.5400	40321.9	5379.9
-11.00	0.5944	38524.6	5078.3
-12.00	0.6907	26549.1	4667.5
-13.00	0.7283	27581.8	4626.5
-14.00	0.7283	26270.5	4629.7
-15.00	0.7283	29215.9	4683.9

3.1.25 T3a Trip wire. Bump tape 2% 200x200

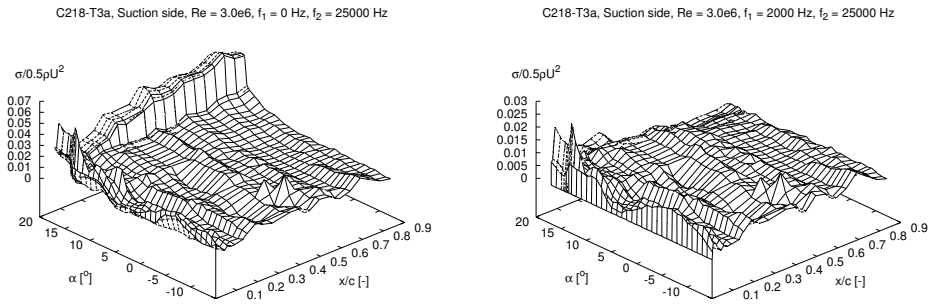


Figure 145: Pressure standard deviations, σ

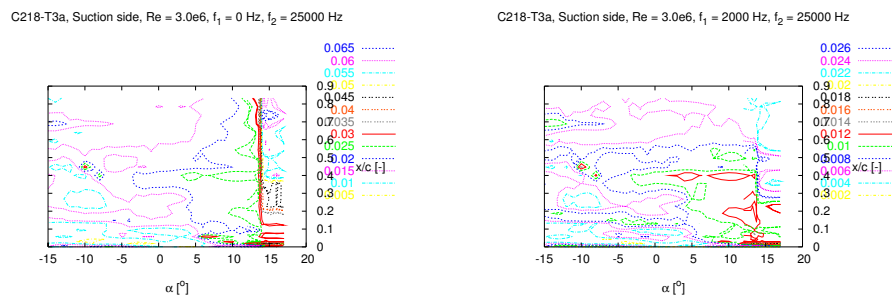


Figure 146: Contours of σ

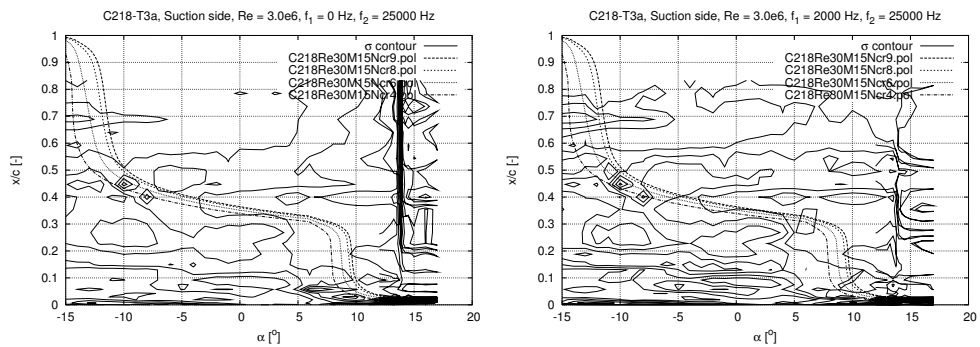


Figure 147: Contours of σ and XFOIL data

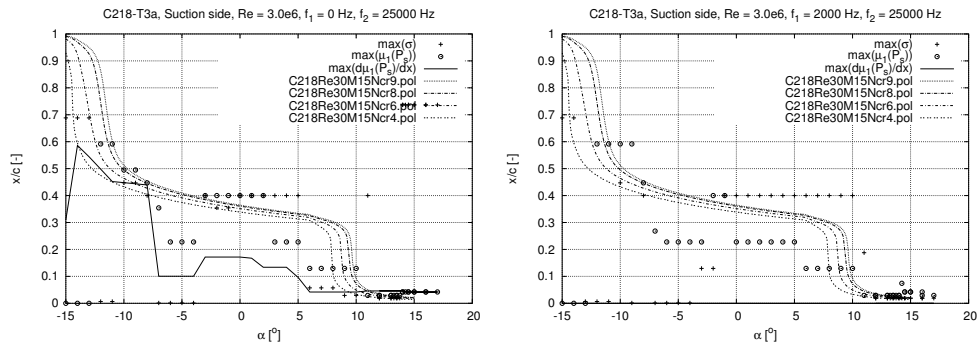


Figure 148: Transition detection

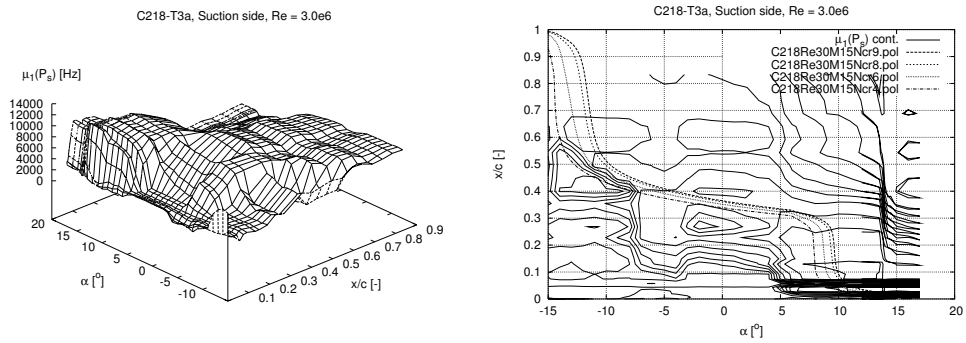


Figure 149: Fourier transform mean, $\mu_1(P_s)$

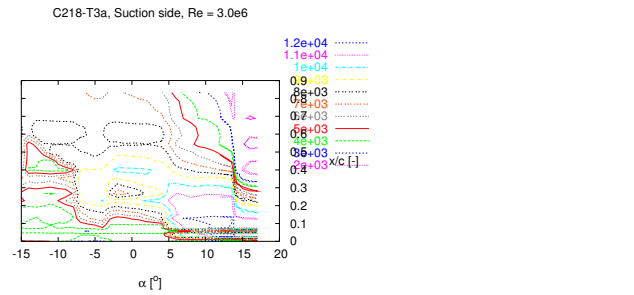


Figure 150: Contours of $\mu_1(P_s)$

C218-T3a

alpha	[degrees]	angle of attack
xtr*	-	transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx*	[Hz/-]	d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1)	[Hz]	max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0460	102166.4	12545.8
13.00	0.0460	98021.2	12639.4
13.25	0.0460	96012.7	12699.3
13.50	0.0460	95152.3	12697.4
13.75	0.0460	94237.7	12721.8
14.00	0.0460	88210.2	11901.1
14.25	0.0419	80285.5	11579.8
14.50	0.0419	81107.1	11530.4
15.00	0.0419	78441.1	11432.9
16.00	0.0419	76182.1	11521.3
17.00	0.0419	73524.2	11656.2
16.00	0.0419	76324.8	11555.0
15.00	0.0419	77955.1	11540.0
14.50	0.0419	79289.3	11521.6
14.00	0.0460	80983.7	11719.0
13.50	0.0460	92287.4	12784.8
13.00	0.0460	96188.3	12697.7
12.00	0.0460	100356.9	12634.0
11.00	0.0460	103027.0	12355.6

10.00	0.0419	104016.9	12269.0
9.00	0.0419	98661.4	12107.5
8.00	0.0419	98187.9	12064.3
7.00	0.0419	91368.2	12008.5
6.00	0.0419	82344.2	11607.1
5.00	0.0963	62744.4	11065.8
4.00	0.1339	54615.3	10493.7
3.00	0.1339	52094.8	10296.2
2.00	0.1339	49515.2	10092.5
1.00	0.1674	46314.0	10172.8
0.00	0.1716	47568.3	10209.8
-1.00	0.1716	50154.3	10263.5
-2.00	0.1716	50138.2	10283.2
-3.00	0.1716	44672.9	9720.8
-4.00	0.1005	51321.4	10017.3
-5.00	0.1005	48853.1	9853.7
-6.00	0.1005	46015.8	9651.6
-7.00	0.1005	37659.2	9344.5
-8.00	0.4395	43949.9	8891.3
-9.00	0.4437	58700.6	8855.5
-10.00	0.4479	55897.6	8822.8
-11.00	0.4521	58409.2	8765.3
-12.00	0.4981	44414.9	8917.0
-13.00	0.5442	48415.6	8716.9
-14.00	0.5860	35596.3	9259.5
-15.00	0.3098	26578.5	8933.8

3.1.26 T6a Trip wire. Bump tape 2% 200x200

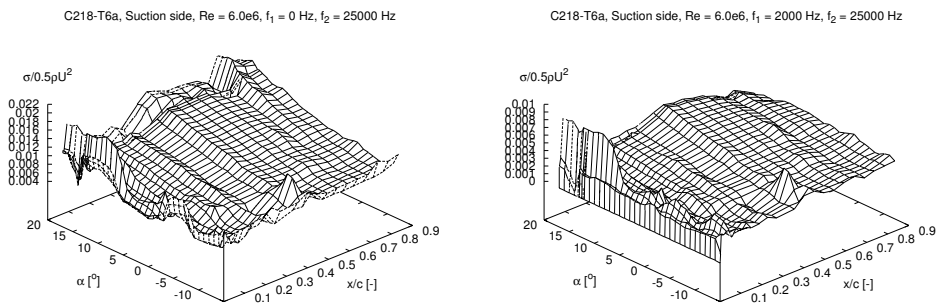


Figure 151: Pressure standard deviations, σ

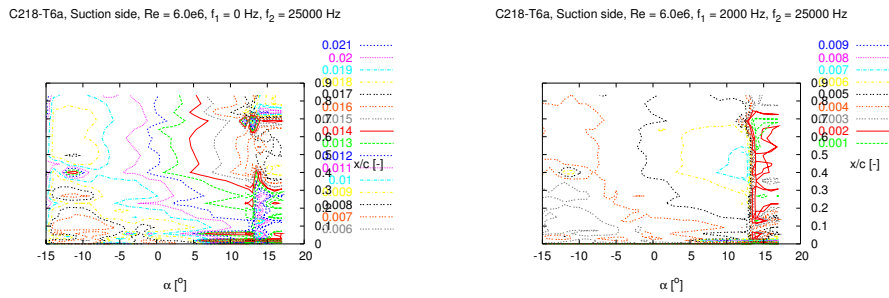


Figure 152: Contours of σ

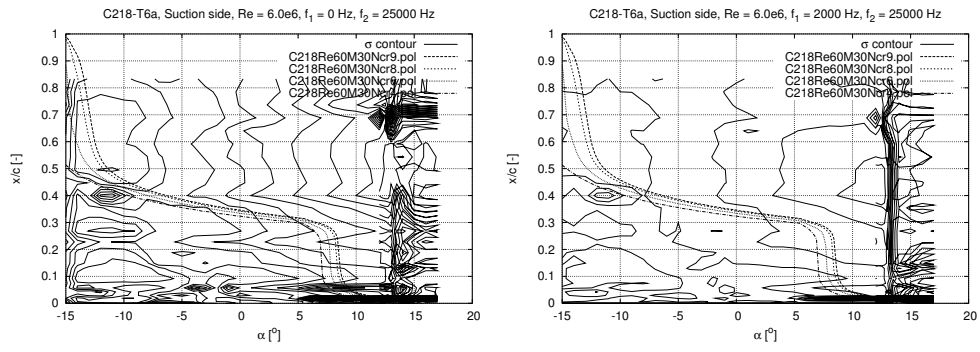


Figure 153: Contours of σ and XFOIL data

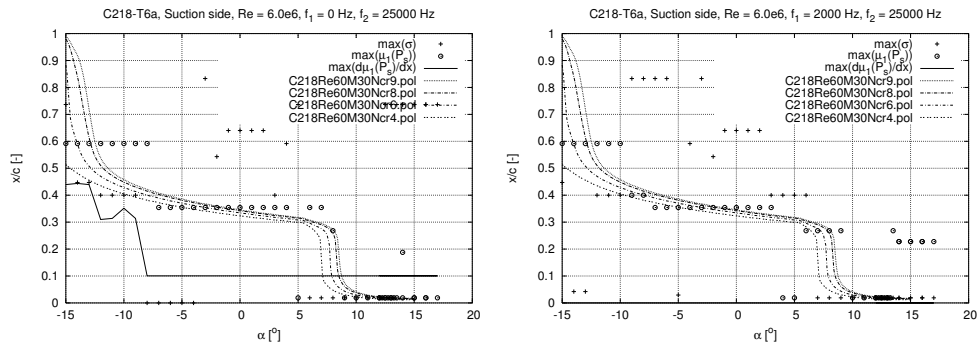


Figure 154: Transition detection

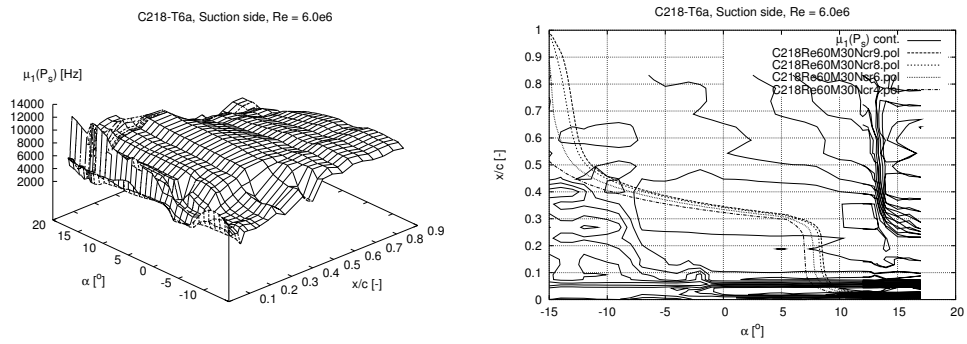


Figure 155: Fourier transform mean, $\mu_1(P_s)$

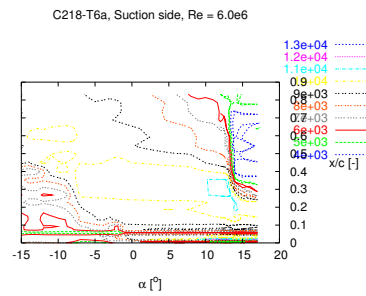


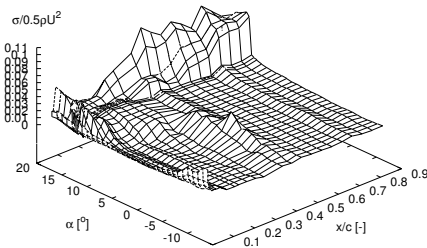
Figure 156: Contours of $\mu_1(P_s)$

C218-T6a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.1005	44933.1	13256.2
12.25	0.1005	45074.4	13285.4
12.50	0.1005	45290.4	13342.2
12.75	0.1005	45577.4	13348.6
13.00	0.1005	45644.7	13046.8
13.25	0.1005	45801.5	13167.9
14.00	0.1005	51511.2	11278.4
15.00	0.1005	49333.3	11700.5
16.00	0.1005	48363.6	12549.6
17.00	0.1005	46903.0	12947.2
16.00	0.1005	46062.4	12563.9
15.00	0.1005	48569.3	11984.4
14.00	0.1005	50636.5	11436.1
13.50	0.1005	49590.9	11643.1
13.00	0.1005	44922.4	13356.3
12.50	0.1005	45027.4	13358.1
12.00	0.1005	44488.6	13286.8
11.00	0.1005	45199.3	12833.7
10.00	0.1005	46047.8	12274.9
9.00	0.1005	45957.5	11057.7
8.00	0.1005	46040.9	10840.4
7.00	0.1005	45598.0	10847.9
6.00	0.1005	44708.7	10882.9
5.00	0.1005	43227.2	10935.8
4.00	0.1005	42730.5	10908.2
3.00	0.1005	42768.1	10895.9
2.00	0.1005	42593.8	10885.9
1.00	0.1005	42704.7	10865.8
0.00	0.1005	42887.7	10830.6
-1.00	0.1005	47113.2	10779.2
-2.00	0.1005	59281.5	10760.3
-3.00	0.1005	54667.2	10659.7
-4.00	0.1005	54251.4	10483.8
-5.00	0.1005	51566.1	10420.2
-6.00	0.1005	48208.9	10363.0
-7.00	0.1005	42622.9	10446.0
-8.00	0.1005	27034.9	10259.8
-9.00	0.3139	27129.1	10325.3
-10.00	0.3516	30599.8	10280.9
-11.00	0.3139	28281.9	10262.3
-12.00	0.3098	26505.6	10178.7
-13.00	0.4395	40959.8	10164.7
-14.00	0.4437	42256.3	10103.5
-15.00	0.4395	32700.0	9569.4

3.1.27 C16b Clean 100x100

C218-C16b, Suction side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C16b, Suction side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

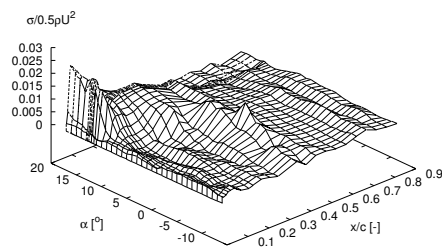
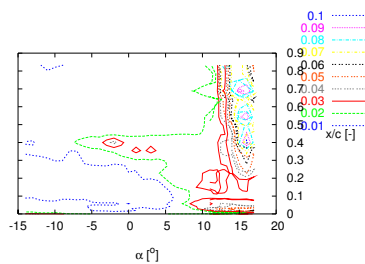


Figure 157: Pressure standard deviations, σ

C218-C16b, Suction side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C16b, Suction side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

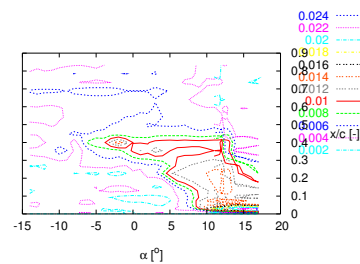


Figure 158: Contours of σ

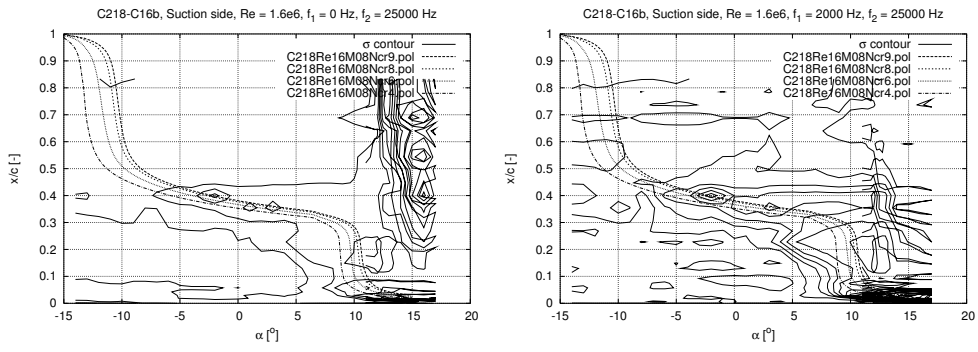


Figure 159: Contours of σ and XFoil data

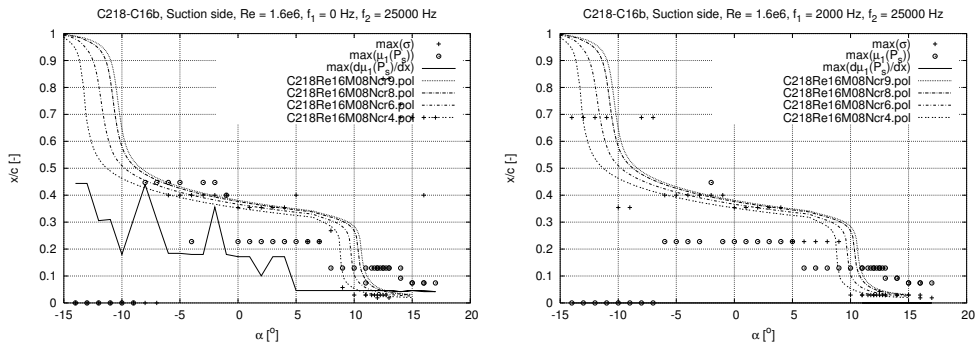


Figure 160: Transition detection

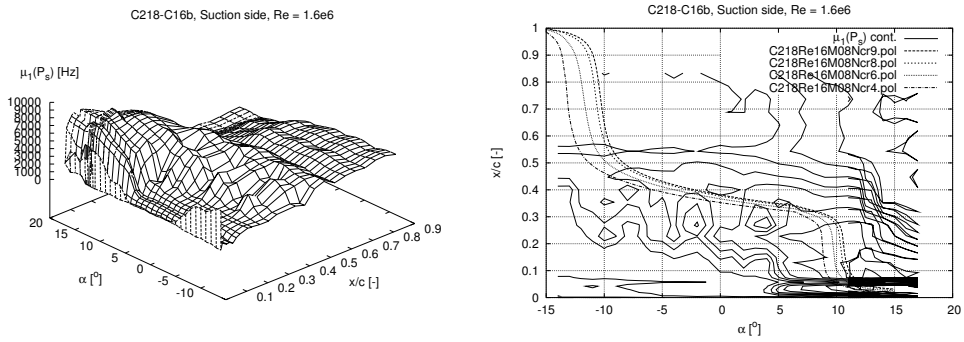


Figure 161: Fourier transform mean, $\mu_1(P_s)$

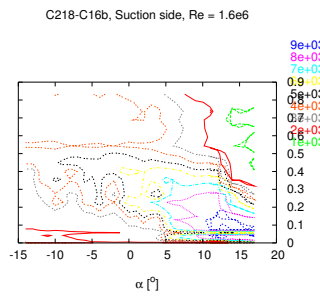


Figure 162: Contours of $\mu_1(P_s)$

C218-C16b
alpha [degrees] angle of attack
xtr* [-] transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
11.00	0.0460	82402.9	8938.3
11.75	0.0460	83878.9	9545.1
12.00	0.0460	86620.6	9703.3
12.25	0.0460	86742.1	9836.4
12.50	0.0460	86873.6	9907.3
12.75	0.0460	87041.2	9934.5
13.00	0.0460	86031.4	9940.4
14.00	0.0419	57380.8	9085.5
15.00	0.0460	54946.2	9094.4
16.00	0.0419	57265.9	9166.1
17.00	0.0419	68002.3	9182.8
16.00	0.0460	51038.4	9002.7
15.00	0.0460	54303.7	9108.9
14.00	0.0419	55082.7	9085.2
13.00	0.0460	64759.8	9161.8
12.50	0.0460	64391.9	9201.9
12.00	0.0460	86311.7	9808.5
11.50	0.0460	84985.8	9491.7
11.00	0.0460	83494.7	9168.0
10.00	0.0460	78186.2	8907.5
9.00	0.0460	70530.6	8763.6
8.00	0.0460	65257.3	8362.4
7.00	0.0460	62991.2	8192.3
6.00	0.0460	59310.9	8225.9
5.00	0.0460	39979.4	7966.0
4.00	0.1716	45573.4	7387.0
3.00	0.1716	37825.8	6981.9
2.00	0.1005	35363.4	6988.1
1.00	0.1716	32837.3	6427.7
0.00	0.1716	31541.9	6586.5
-1.00	0.1800	28388.9	6192.2
-2.00	0.3558	20921.5	5850.9
-3.00	0.1800	17925.2	5604.1
-4.00	0.1800	30746.8	5654.2
-5.00	0.1842	21419.7	5203.3
-6.00	0.1842	20103.3	5298.0
-7.00	0.3098	15144.2	5435.7
-8.00	0.4395	19154.3	5399.7
-9.00	0.3098	19063.6	5253.7
-10.00	0.1800	24143.8	5308.7
-11.00	0.3098	17394.6	5200.6
-12.00	0.3056	12619.5	5581.6
-13.00	0.4437	23744.0	6220.2
-14.00	0.4437	23152.6	6231.8

3.1.28 C3b Clean 100x100

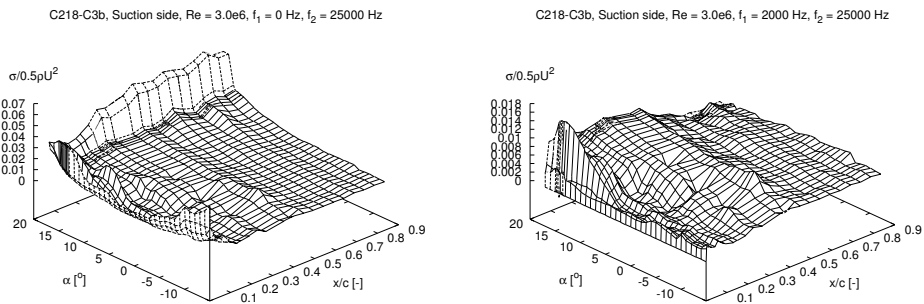


Figure 163: Pressure standard deviations, σ

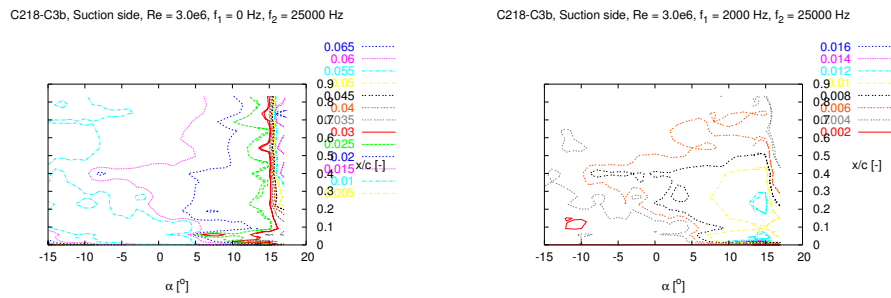


Figure 164: Contours of σ

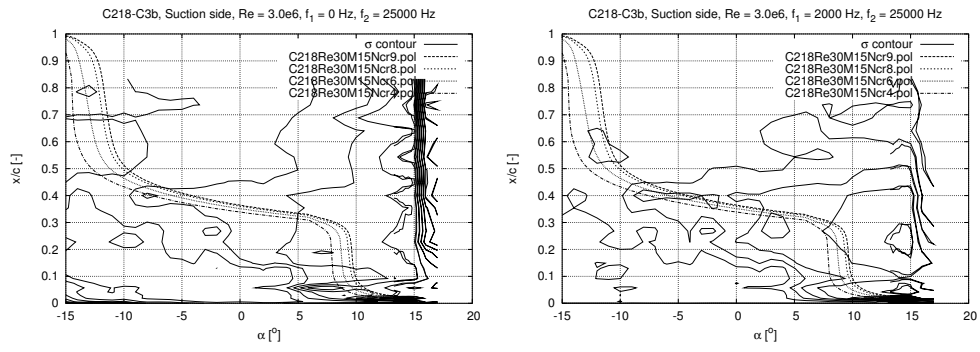


Figure 165: Contours of σ and XFOIL data

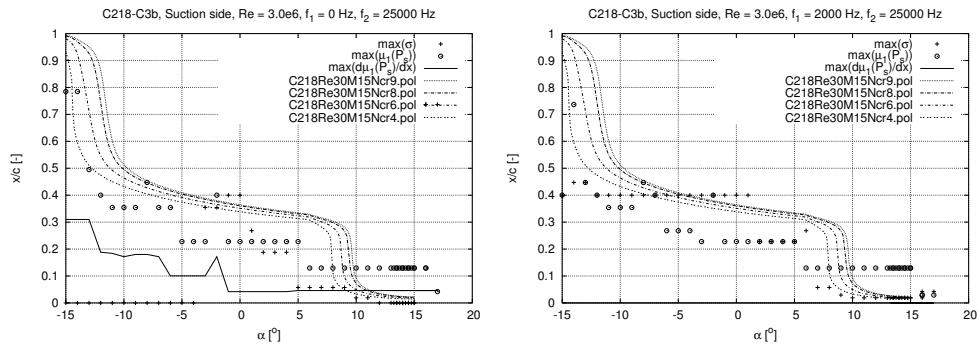


Figure 166: Transition detection

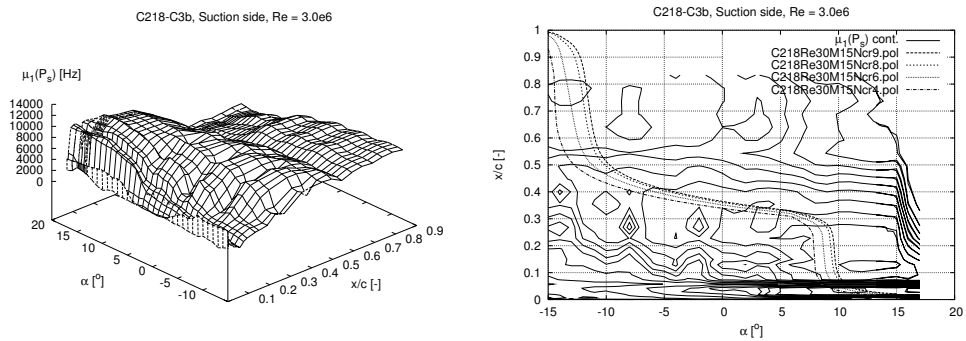


Figure 167: Fourier transform mean, $\mu_1(P_s)$

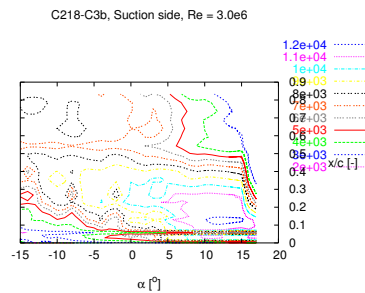


Figure 168: Contours of $\mu_1(P_s)$

C218-C3b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
13.25	0.0460	83579.5	12380.6
13.50	0.0460	81979.5	12424.7
13.75	0.0460	80690.3	12401.7
14.00	0.0460	79199.1	12401.4
14.25	0.0460	77714.6	12376.7
14.50	0.0460	77423.8	12361.1
14.75	0.0460	76139.2	12343.0
15.00	0.0460	74930.7	12290.1
16.00	0.0460	71887.6	11316.3
17.00	0.0460	68376.3	11085.5
16.00	0.0460	68998.3	11311.1
15.00	0.0460	73992.8	12315.0
14.50	0.0460	76079.1	12319.7
14.00	0.0460	77389.4	12368.9
13.50	0.0460	81289.5	12433.7
13.00	0.0460	83267.3	12459.3
12.00	0.0460	91784.7	12488.4
11.00	0.0460	96910.6	12423.8
10.00	0.0460	95247.1	11963.0
9.00	0.0460	84552.5	11988.9
8.00	0.0460	75054.1	11784.2
7.00	0.0460	72472.2	11393.7
6.00	0.0460	71461.8	11141.6
5.00	0.0460	65594.5	11051.0
4.00	0.0419	58061.0	10996.1
3.00	0.0419	56348.3	10804.8
2.00	0.0419	63666.7	10793.0
1.00	0.0419	59481.3	10567.6
0.00	0.0419	58829.6	10457.5
-1.00	0.0419	50121.4	10018.9
-2.00	0.1716	44474.4	9788.7
-3.00	0.1005	39334.4	9522.7
-4.00	0.1005	53999.4	10039.8
-5.00	0.1005	50421.0	9718.5
-6.00	0.1005	47857.7	9689.4
-7.00	0.1716	37879.2	8957.5
-8.00	0.1800	40853.7	8746.4
-9.00	0.1800	42665.3	9143.9
-10.00	0.1716	36909.7	9182.9
-11.00	0.1842	37218.3	9052.6
-12.00	0.1884	33699.6	8806.7
-13.00	0.3098	24187.6	8216.5
-14.00	0.3098	31066.4	8186.9
-15.00	0.3098	28903.4	8061.2

3.1.29 C6b Clean 100x100

C218-C6b, Suction side, Re = 6.0e6, f₁ = 0 Hz, f₂ = 25000 Hz

C218-C6b, Suction side, Re = 6.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

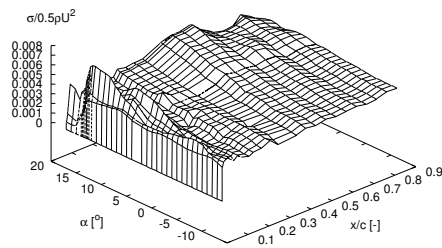
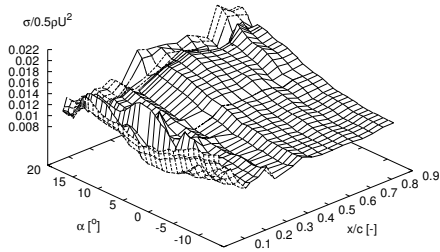


Figure 169: Pressure standard deviations, σ

C218-C6b, Suction side, Re = 6.0e6, f₁ = 0 Hz, f₂ = 25000 Hz

C218-C6b, Suction side, Re = 6.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

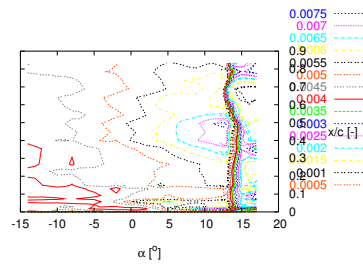
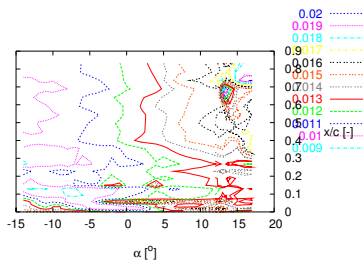


Figure 170: Contours of σ

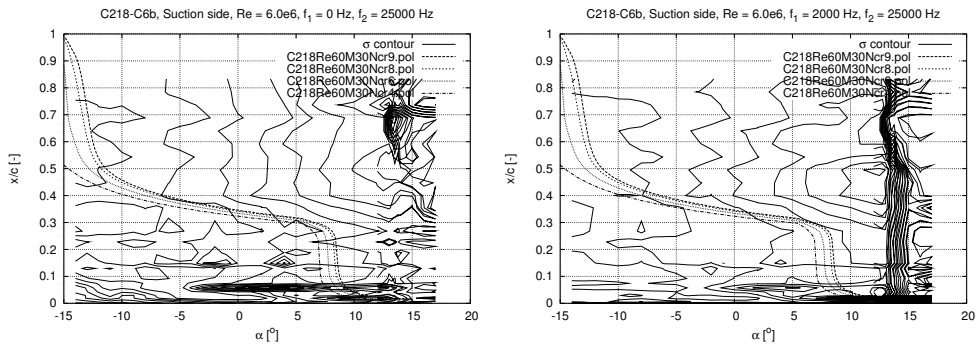


Figure 171: Contours of σ and XFOIL data

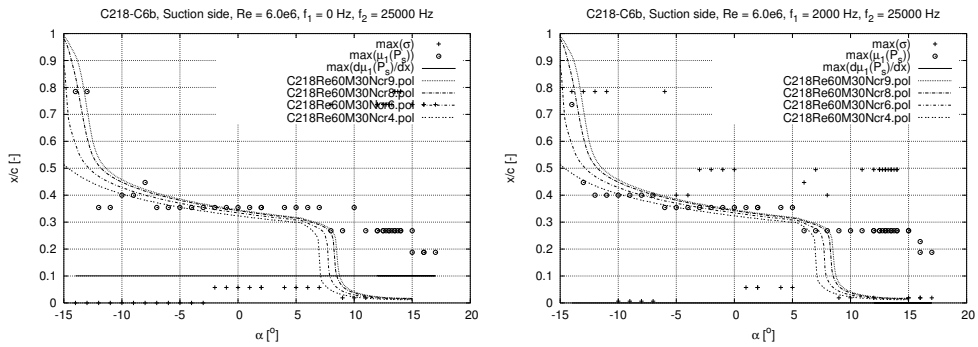


Figure 172: Transition detection

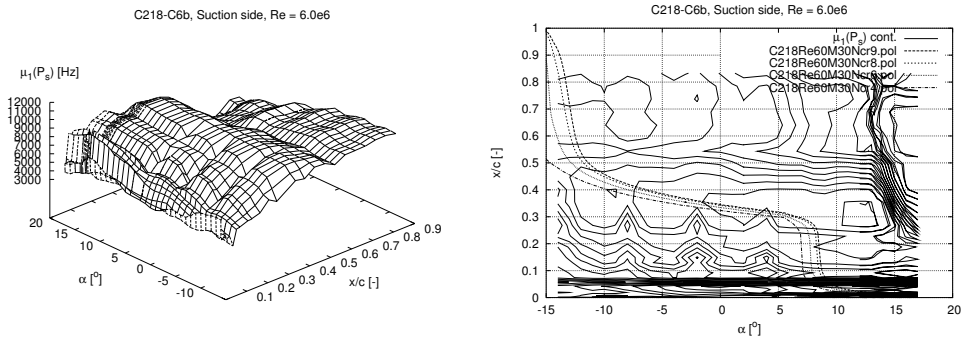


Figure 173: Fourier transform mean, $\mu_1(P_s)$

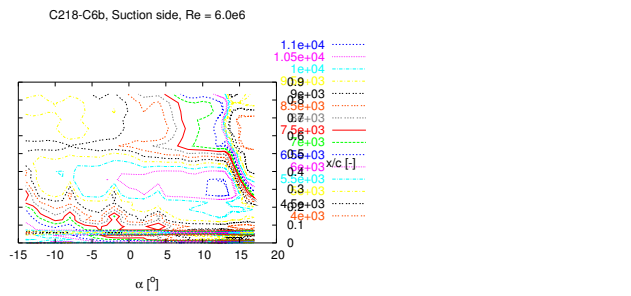


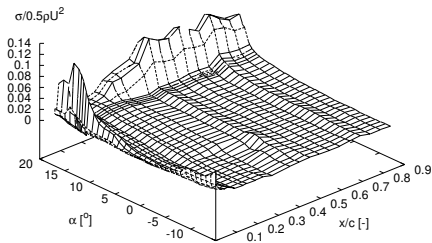
Figure 174: Contours of $\mu_1(P_s)$

C218-C6b
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.1005	46070.4	11133.3
12.50	0.1005	46263.7	11138.2
12.75	0.1005	46262.9	11156.5
13.00	0.1005	45855.7	11103.7
13.25	0.1005	45902.2	11096.2
13.50	0.1005	46529.7	11030.9
13.75	0.1005	47459.4	10953.8
14.00	0.1005	47174.7	10907.5
15.00	0.1005	50063.5	10165.0
16.00	0.1005	51809.3	10146.3
17.00	0.1005	53056.4	9971.6
16.00	0.1005	51172.5	9861.4
15.00	0.1005	50609.8	10235.8
14.00	0.1005	47425.4	10940.9
13.50	0.1005	46460.8	11002.0
13.00	0.1005	45359.3	11109.2
12.50	0.1005	45876.2	11135.0
12.00	0.1005	45837.7	11126.5
11.00	0.1005	45391.8	11042.9
10.00	0.1005	44261.3	10965.1
9.00	0.1005	43574.8	10875.0
8.00	0.1005	43148.5	10805.2
7.00	0.1005	42288.4	10743.8
6.00	0.1005	42103.1	10766.3
5.00	0.1005	39709.5	10815.3
4.00	0.1005	30305.0	10780.7
2.00	0.1005	48262.0	10660.8
2.00	0.1005	48298.8	10673.9
1.00	0.1005	47499.4	10620.3
0.00	0.1005	44650.8	10609.1
-1.00	0.1005	35000.1	10604.7
-2.00	0.1005	26599.4	10417.1
-3.00	0.1005	34924.1	10503.5
-4.00	0.1005	43932.1	10428.4
-5.00	0.1005	40957.7	10395.6
-6.00	0.1005	39069.1	10354.8
-7.00	0.1005	33245.2	10299.9
-8.00	0.1005	27229.7	9868.8
-9.00	0.1005	35553.8	10019.0
-10.00	0.1005	38045.5	9994.8
-11.00	0.1005	34424.0	9915.7
-12.00	0.1005	32828.6	9864.0
-13.00	0.1005	27912.2	9665.4
-14.00	0.1005	24336.6	9636.4

3.1.30 Z16b ZZ90 x/c=5% suc. x/c=10% press. 100x100

C218-Z16b, Suction side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-Z16b, Suction side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

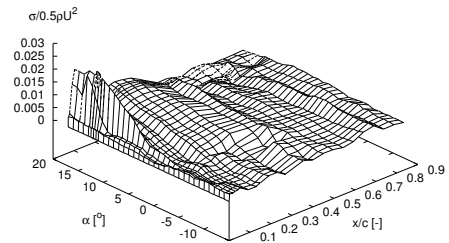
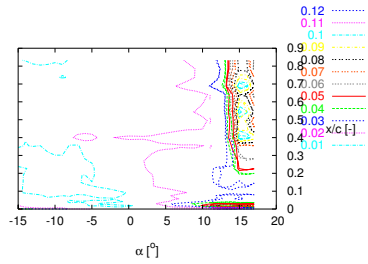


Figure 175: Pressure standard deviations, σ

C218-Z16b, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16b, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

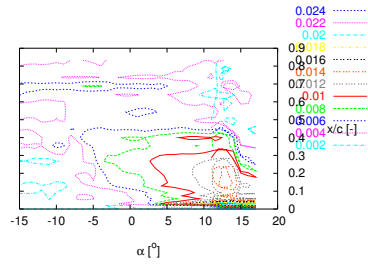


Figure 176: Contours of σ

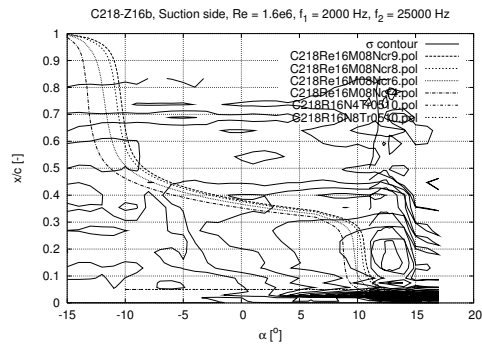
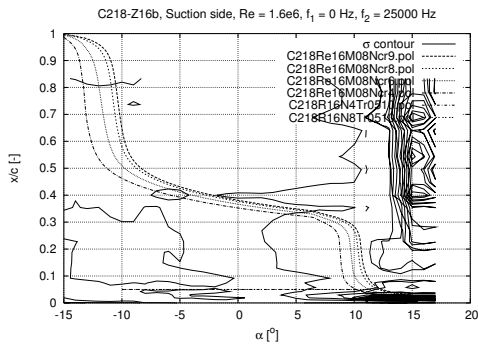


Figure 177: Contours of σ and XFOIL data

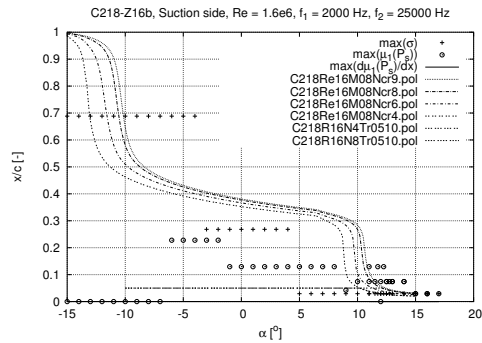
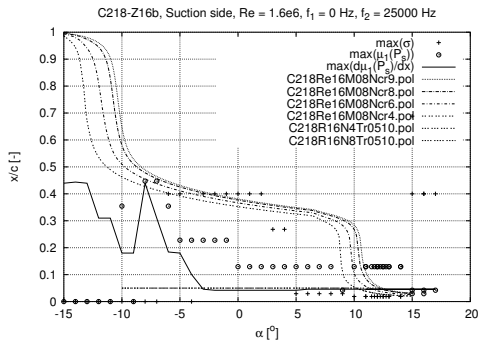


Figure 178: Transition detection

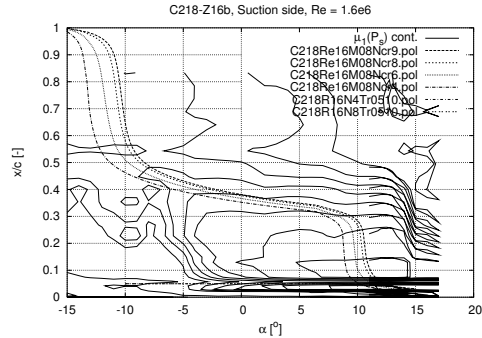
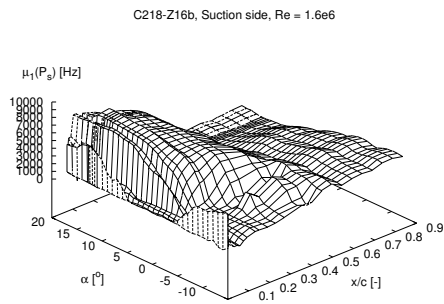


Figure 179: Fourier transform mean, $\mu_1(P_y)$

C218-Z16b, Suction side, Re = 1.6e6

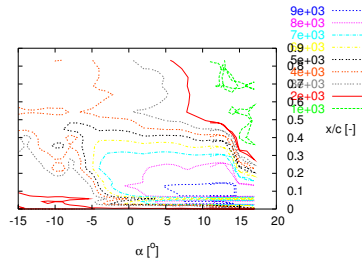


Figure 180: Contours of $\mu_1(P_s)$

C218-Z16b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	$d(\mu_1)/dx^*$	max(mu1)
11.00	0.0460	79293.0	9233.8
11.75	0.0460	82073.8	9377.6
12.00	0.0460	82338.1	9465.3
12.25	0.0460	82336.0	9494.1
12.50	0.0460	81648.4	9481.3
12.75	0.0460	82146.8	9513.6
13.00	0.0460	81587.9	9522.8
14.00	0.0460	74554.4	9224.3
15.00	0.0460	61509.6	8915.6
16.00	0.0460	53567.0	8954.5
17.00	0.0460	49078.1	8922.2
16.00	0.0460	58532.4	8905.3
15.00	0.0460	61472.0	8936.8
14.00	0.0460	77033.2	9553.4
13.00	0.0460	81792.1	9554.2
12.50	0.0460	82461.9	9527.0
12.00	0.0460	82812.3	9550.1
11.50	0.0460	83631.1	9493.7
11.00	0.0460	83261.4	9420.4
10.00	0.0460	80703.0	9329.7
9.00	0.0460	78078.2	9256.7
8.00	0.0460	79833.0	9249.1
7.00	0.0460	80195.7	9208.2
6.00	0.0460	78257.1	9155.4
5.00	0.0419	78555.6	9049.6
4.00	0.0419	79918.5	8867.4
3.00	0.0419	76615.8	8632.3
2.00	0.0419	72250.6	8394.4
1.00	0.0419	66257.1	8207.2
0.00	0.0419	63884.5	8106.0
-1.00	0.0419	59947.7	7916.5
-2.00	0.0419	51881.8	7851.2
-3.00	0.0460	41438.6	7602.6
-4.00	0.1005	32798.1	7039.2
-5.00	0.1800	29402.7	5902.2
-6.00	0.1842	23978.2	5327.3
-7.00	0.3098	15224.9	5478.0
-8.00	0.4395	18475.1	5403.6
-9.00	0.1800	23155.6	5239.9
-10.00	0.1800	23971.7	5192.9
-11.00	0.3098	16325.4	5146.4
-12.00	0.3098	14277.5	5541.3
-13.00	0.4395	18026.3	5633.5
-14.00	0.4437	23959.7	5961.2
-15.00	0.4395	14340.7	5979.7

3.1.31 Z3b ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 100x100

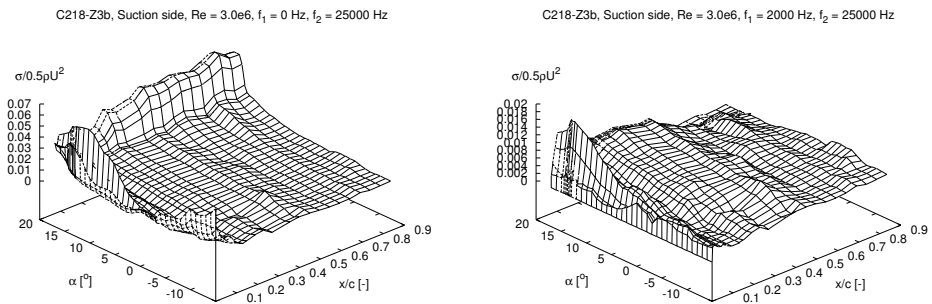
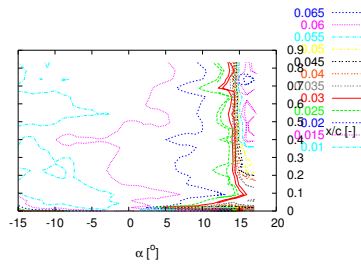


Figure 181: Pressure standard deviations, σ

C218-Z3b, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3b, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

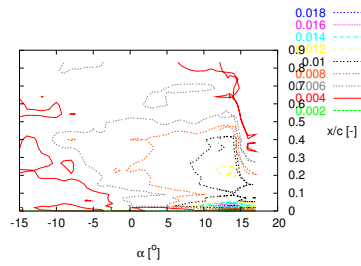


Figure 182: Contours of σ

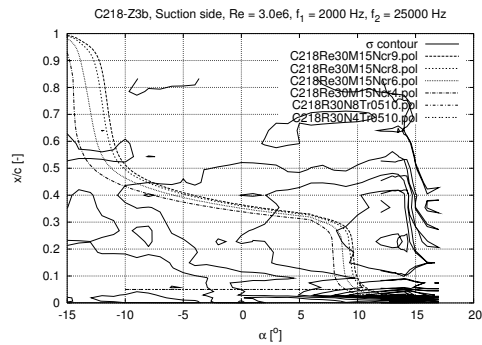
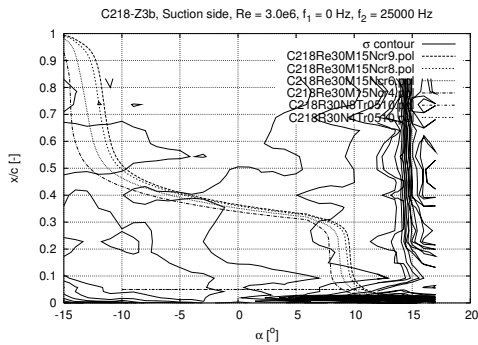


Figure 183: Contours of σ and XFOIL data

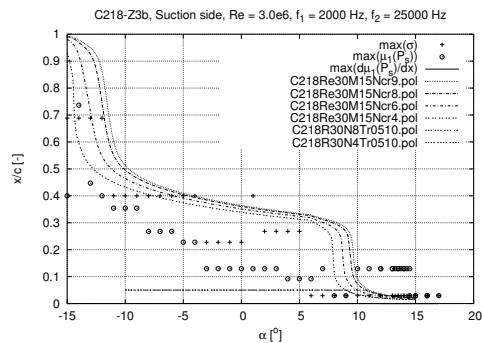
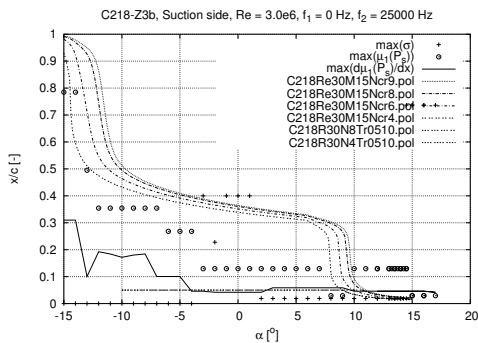


Figure 184: Transition detection

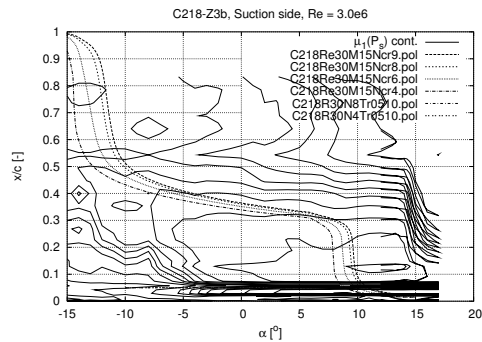
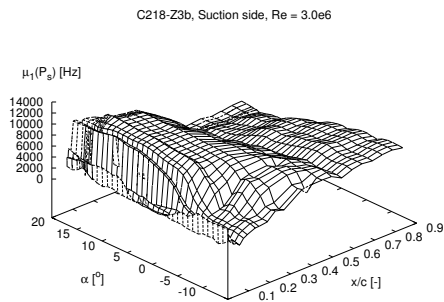


Figure 185: Fourier transform mean, $\mu_1(P_s)$

C218-Z3b, Suction side, Re = 3.0e6

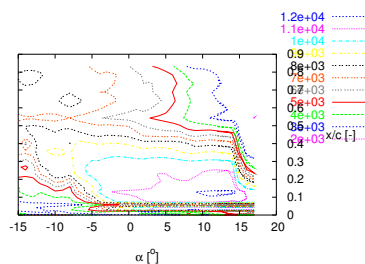


Figure 186: Contours of $\mu_1(P_s)$

C218-Z3b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0460	91165.6	12119.3
13.00	0.0460	83753.8	12197.0
13.25	0.0460	80463.1	12260.4
13.50	0.0460	78231.2	12217.3
13.75	0.0460	77169.3	12251.9
14.00	0.0460	74904.4	12242.9
14.25	0.0460	73242.5	12234.5
14.50	0.0460	72782.5	12032.1
15.00	0.0460	70839.1	11480.0
16.00	0.0460	67544.8	11401.4
17.00	0.0419	64951.4	11387.0
16.00	0.0460	69292.7	11396.1
15.00	0.0460	71706.9	11458.8
14.50	0.0460	72652.7	11682.2
14.00	0.0460	74296.0	12175.9
13.50	0.0460	77392.3	12284.2
13.00	0.0460	80796.3	12291.4
12.00	0.0460	89877.7	12250.7
11.00	0.0460	95770.9	12194.5
10.00	0.0460	94497.8	12095.8
9.00	0.0586	93381.4	12081.8
8.00	0.0586	93674.7	12022.0
7.00	0.0586	93827.3	11918.8
6.00	0.0586	92691.9	11879.2
5.00	0.0586	93966.5	11862.7
4.00	0.0586	96961.0	11787.2
3.00	0.0586	97277.7	11611.0
2.00	0.0419	95165.6	11438.0
1.00	0.0419	90776.5	11324.8
0.00	0.0419	89741.8	11257.9
-1.00	0.0419	88530.7	11210.4
-2.00	0.0419	83828.3	11067.9
-3.00	0.0460	76622.2	10835.3
-4.00	0.0460	66777.6	10423.5
-5.00	0.1005	59445.9	10347.5
-6.00	0.1005	55073.2	9990.3
-7.00	0.1005	46358.8	9610.5
-8.00	0.1842	42162.7	8842.0
-9.00	0.1800	42719.4	9141.6
-10.00	0.1716	40079.4	9096.7
-11.00	0.1842	37430.2	9043.6
-12.00	0.1925	33253.6	8790.0
-13.00	0.1005	23485.3	8196.0
-14.00	0.3098	27335.5	8193.7
-15.00	0.3098	26695.7	8053.7

3.1.32 Z6b ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 100x100

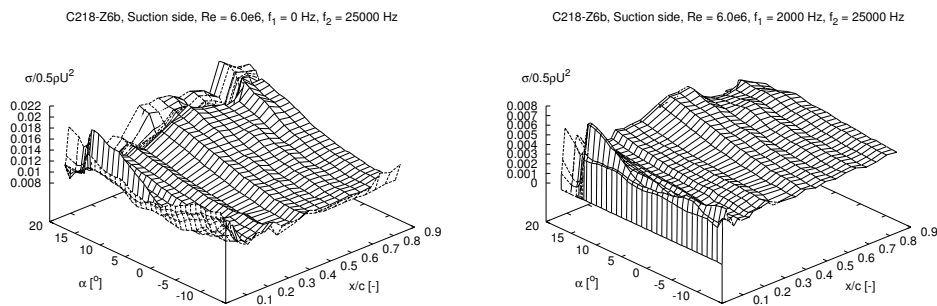
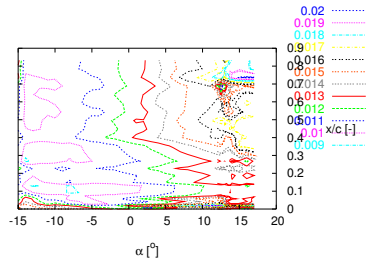


Figure 187: Pressure standard deviations, σ

C218-Z6b, Suction side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z6b, Suction side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

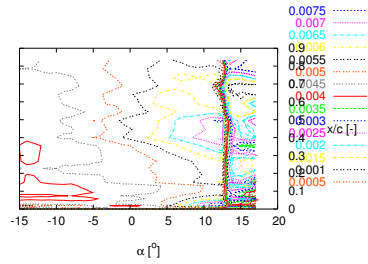


Figure 188: Contours of σ

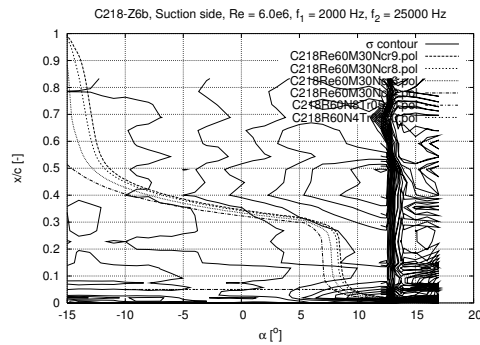
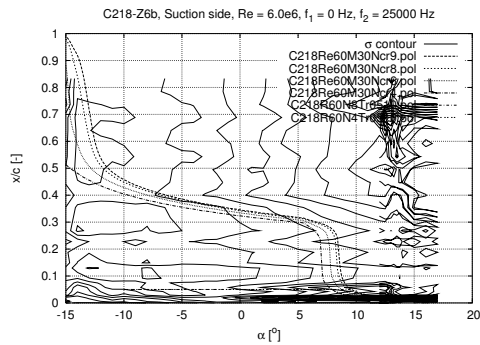


Figure 189: Contours of σ and XFOIL data

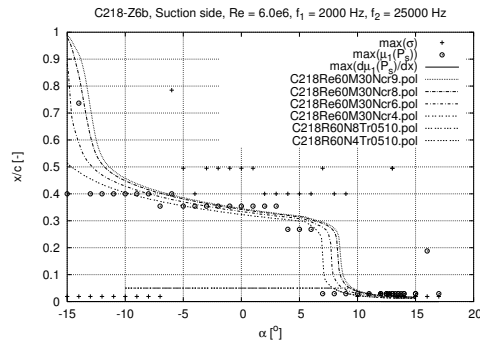
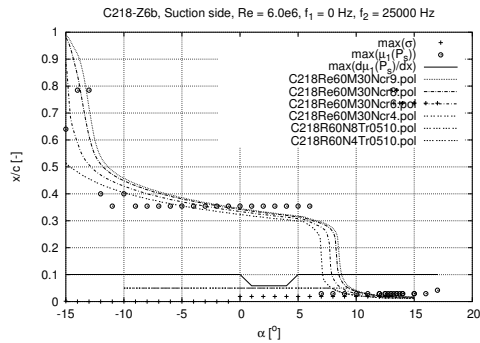


Figure 190: Transition detection

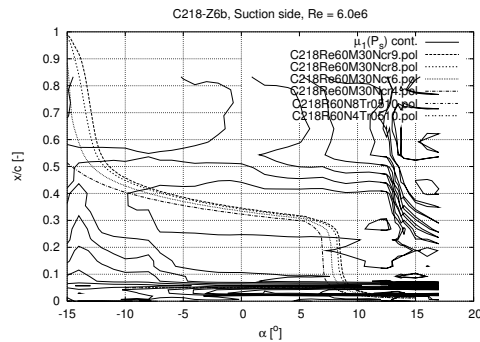
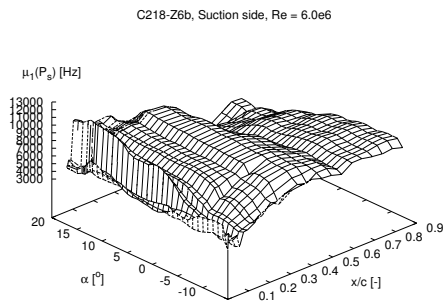


Figure 191: Fourier transform mean, $\mu_1(P_y)$

C218-Z6b, Suction side, Re = 6.0e6

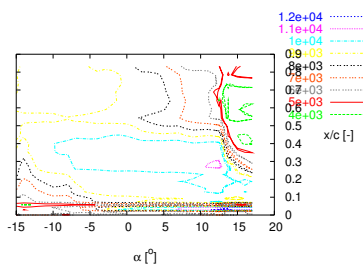


Figure 192: Contours of $\mu_1(P_s)$

C218-Z6b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x^*x/c) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	$d(\mu_1)/dx^*$	max(mu1)
12.00	0.1005	43203.7	11944.4
12.50	0.1005	43279.3	12036.9
12.75	0.1005	43890.5	12064.2
13.00	0.1005	43991.5	12154.5
13.25	0.1005	46159.9	12166.7
13.50	0.1005	46660.2	12164.2
13.75	0.1005	48099.8	12084.6
14.00	0.1005	47441.9	12024.5
15.00	0.1005	49238.2	11549.2
17.00	0.1005	48608.2	11173.4
16.00	0.1005	51296.3	11434.1
15.00	0.1005	47178.0	11495.7
14.00	0.1005	47050.4	12049.1
13.50	0.1005	46794.9	12277.3
13.00	0.1005	44997.2	12234.0
12.50	0.1005	43086.4	12114.5
12.00	0.1005	43103.2	12057.1
11.00	0.1005	42449.9	11961.3
10.00	0.1005	41911.6	11896.1
9.00	0.1005	41482.4	11770.8
8.00	0.1005	41676.2	11533.4
7.00	0.1005	41738.9	11180.7
6.00	0.1005	42357.6	10742.0
5.00	0.1005	42271.2	10787.5
4.00	0.0586	42944.5	10811.8
3.00	0.0586	44207.6	10734.6
2.00	0.0586	43898.5	10668.4
1.00	0.0586	42141.2	10632.7
0.00	0.1005	42437.4	10643.8
-1.00	0.1005	43088.5	10694.8
-2.00	0.1005	43007.4	10682.6
-3.00	0.1005	44874.3	10575.9
-4.00	0.1005	47601.8	10458.1
-5.00	0.1005	47617.9	10412.4
-6.00	0.1005	45019.2	10378.3
-7.00	0.1005	41314.8	10447.4
-8.00	0.1005	32161.2	10195.4
-9.00	0.1005	36447.1	10089.3
-10.00	0.1005	37720.5	9978.8
-11.00	0.1005	34700.1	9958.8
-12.00	0.1005	32917.1	9847.7
-13.00	0.1005	27855.4	9661.5
-14.00	0.1005	24513.4	9664.3
-15.00	0.1005	31554.3	9219.4

3.1.33 L16b LM standard LER 100x100

C218-L16b, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz

C218-L16b, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

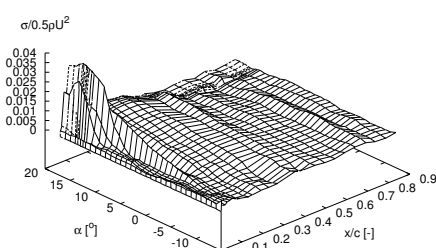
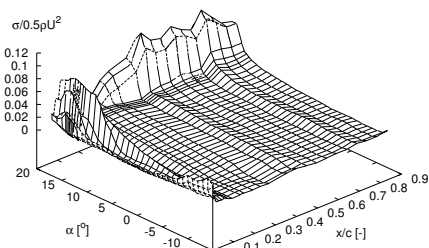
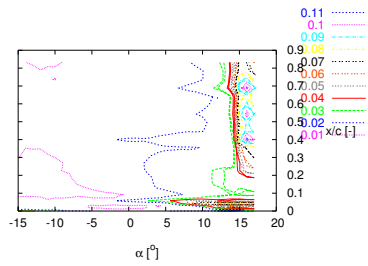


Figure 193: Pressure standard deviations, σ

C218-L16b, Suction side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16b, Suction side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

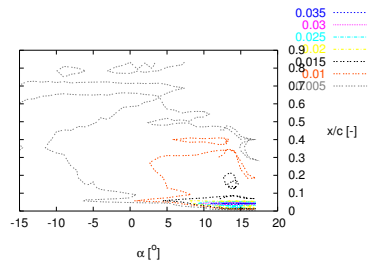


Figure 194: Contours of σ

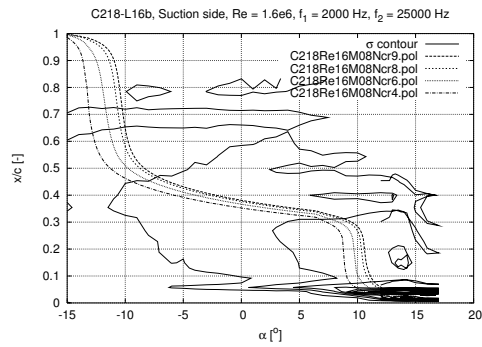
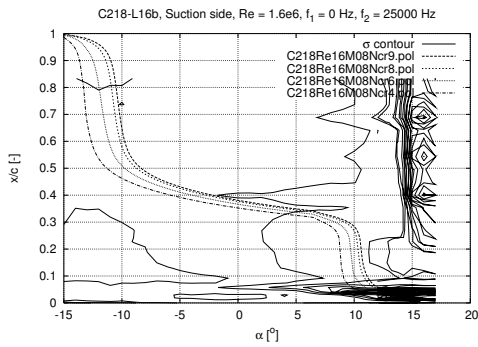


Figure 195: Contours of σ and XFOIL data

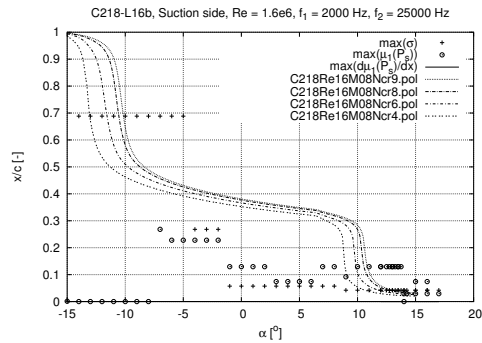
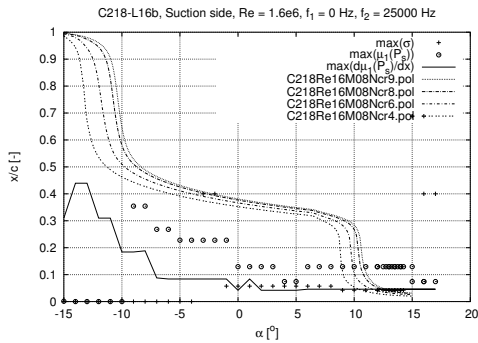


Figure 196: Transition detection

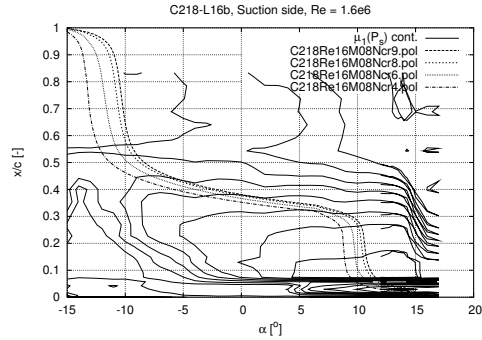
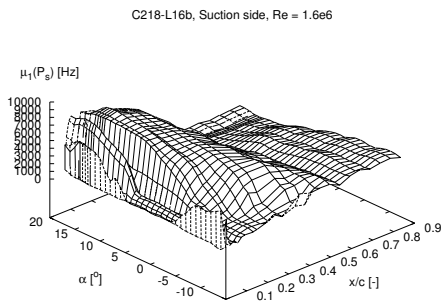


Figure 197: Fourier transform mean, $\mu_1(P_s)$

C218-L16b, Suction side, Re = 1.6e6

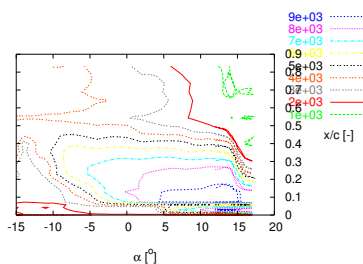


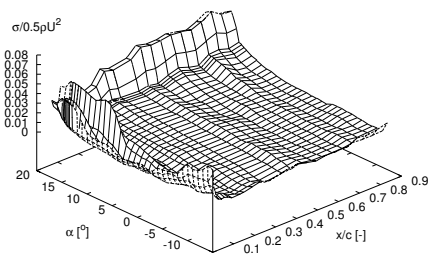
Figure 198: Contours of $\mu_1(P_s)$

C218-L16b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x=x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0460	84118.0	9580.5
12.75	0.0460	85276.9	9701.9
13.00	0.0460	84578.3	9740.3
13.25	0.0460	84266.7	9740.4
13.50	0.0460	84097.8	9728.0
13.75	0.0460	82243.5	9588.5
14.00	0.0460	80851.2	9664.8
14.25	0.0460	81489.8	9636.7
15.00	0.0460	62301.4	9021.5
16.00	0.0460	49289.1	8903.0
17.00	0.0460	48204.8	8816.3
16.00	0.0460	57875.9	8800.5
15.00	0.0460	71434.4	9281.3
14.00	0.0460	81587.0	9674.8
13.50	0.0460	83364.9	9716.1
13.00	0.0460	84925.9	9801.9
12.50	0.0460	86122.6	9803.1
12.00	0.0460	87432.7	9795.6
11.00	0.0460	86827.6	9696.7
10.00	0.0460	85285.9	9571.7
9.00	0.0460	83922.8	9452.7
8.00	0.0460	83155.7	9412.0
7.00	0.0460	83001.4	9360.1
6.00	0.0460	81414.4	9254.9
5.00	0.0419	81644.9	9103.6
4.00	0.0419	82933.0	8945.0
3.00	0.0419	78386.1	8666.0
2.00	0.0419	74077.8	8429.5
1.00	0.0837	68504.4	8209.6
0.00	0.0419	66162.4	8055.9
-1.00	0.0837	63290.3	7891.9
-2.00	0.0837	61822.7	7779.5
-3.00	0.0837	55267.7	7618.0
-4.00	0.0837	45731.5	7349.8
-5.00	0.0837	35599.6	7085.4
-6.00	0.0837	29980.0	6843.0
-7.00	0.0879	24291.6	6628.5
-8.00	0.1884	25678.7	6356.2
-9.00	0.1842	25227.3	5766.4
-10.00	0.1842	24241.0	5318.1
-11.00	0.3098	15760.5	5231.9
-12.00	0.3098	14990.7	5430.9
-13.00	0.4395	17801.4	5788.7
-14.00	0.4395	23468.8	6145.2
-15.00	0.3098	22526.0	5269.4

3.1.34 L3b LM standard LER 100x100

C218-L3b, Suction side, Re = 3.0e6, f1 = 0 Hz, f2 = 25000 Hz



C218-L3b, Suction side, Re = 3.0e6, f1 = 2000 Hz, f2 = 25000 Hz

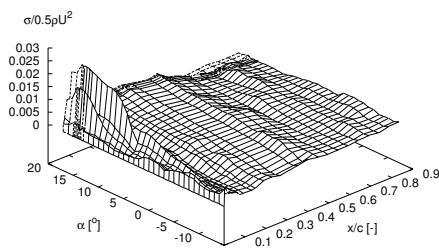
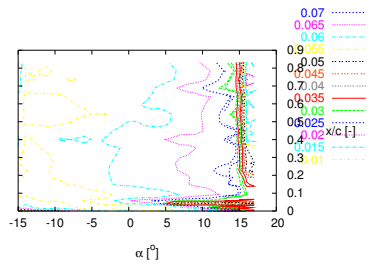


Figure 199: Pressure standard deviations, σ

C218-L3b, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3b, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

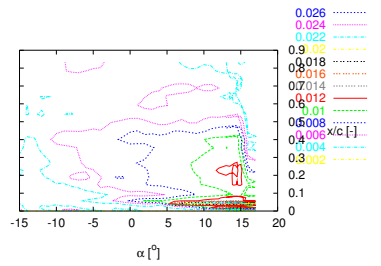
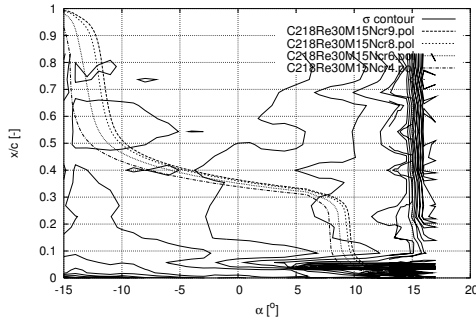


Figure 200: Contours of σ

C218-L3b, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3b, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

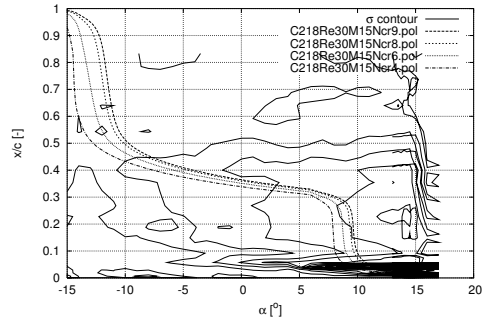
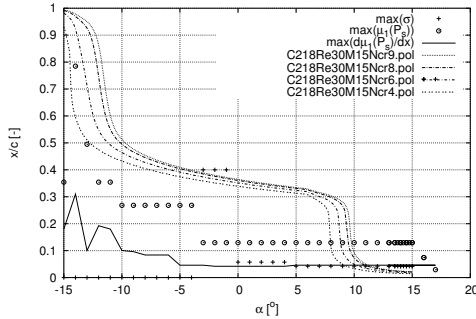


Figure 201: Contours of σ and XFOIL data

C218-L3b, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3b, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

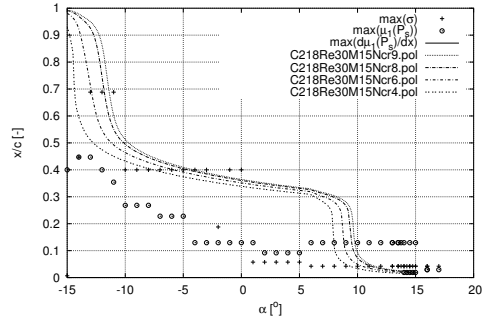
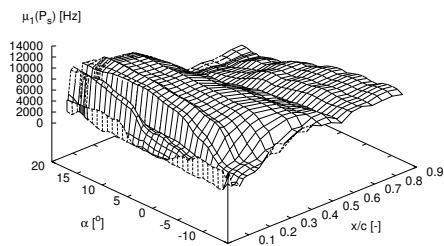


Figure 202: Transition detection

C218-L3b, Suction side, Re = 3.0e6



C218-L3b, Suction side, Re = 3.0e6

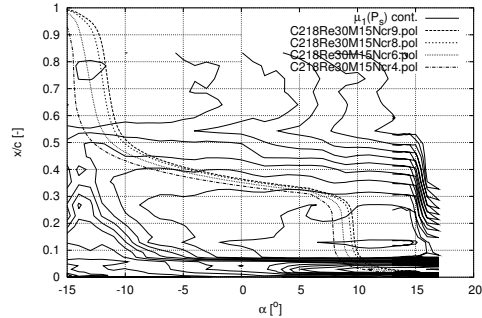


Figure 203: Fourier transform mean, $\mu_1(P_y)$

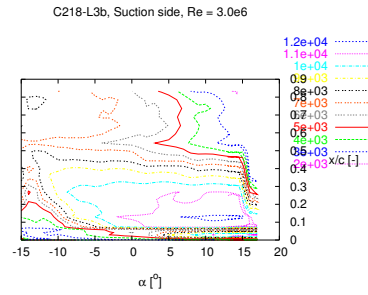


Figure 204: Contours of $\mu_1(P_s)$

C218-L3b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 $\max(\mu_1)$ [Hz] max μ_1 of all chordwise positions

alpha	xtr*	$d(\mu_1)/dx^*$	$\max(\mu_1)$
13.00	0.0460	86930.3	12173.2
13.50	0.0460	83106.0	12193.1
13.75	0.0460	80799.6	12211.2
14.00	0.0460	79089.8	12180.0
14.25	0.0460	77643.2	12200.4
14.50	0.0460	77117.4	12163.0
14.75	0.0460	76057.8	12164.4
15.00	0.0460	74694.5	12154.7
16.00	0.0460	72015.7	11065.9
17.00	0.0460	67309.0	11051.0
16.00	0.0460	70417.5	11105.2
15.00	0.0460	73498.5	11853.2
14.50	0.0460	75422.4	12222.9
14.00	0.0460	76826.9	12245.6
13.50	0.0460	81376.5	12260.0
13.00	0.0460	84587.7	12259.7
12.00	0.0460	91434.6	12265.7
11.00	0.0460	96404.3	12260.3
10.00	0.0460	96528.9	12187.0
9.00	0.0460	89315.6	12060.9
8.00	0.0460	86509.7	12034.6
7.00	0.0460	90404.8	12012.3
6.00	0.0460	91480.3	11985.1
5.00	0.0460	92110.0	11934.8
4.00	0.0419	97276.4	11806.1
3.00	0.0419	97998.1	11626.2
2.00	0.0419	96173.5	11423.0
1.00	0.0419	91173.6	11283.6
0.00	0.0419	89919.8	11235.2
-1.00	0.0419	88409.1	11156.4
-2.00	0.0419	83880.7	10963.9
-3.00	0.0460	78368.1	10776.1
-4.00	0.0460	73243.4	10391.3
-5.00	0.0460	65619.2	10297.9
-6.00	0.0837	64520.5	10349.3
-7.00	0.0837	67484.4	10298.8
-8.00	0.0837	63372.9	10160.0
-9.00	0.0963	53189.4	9949.8
-10.00	0.1005	39851.4	9312.0
-11.00	0.1800	37898.1	9080.4
-12.00	0.1925	33695.3	8794.3
-13.00	0.1005	21394.8	8172.1
-14.00	0.3098	28127.3	8115.0
-15.00	0.1800	38669.1	8391.0

3.1.35 L6b LM standard LER 100x100

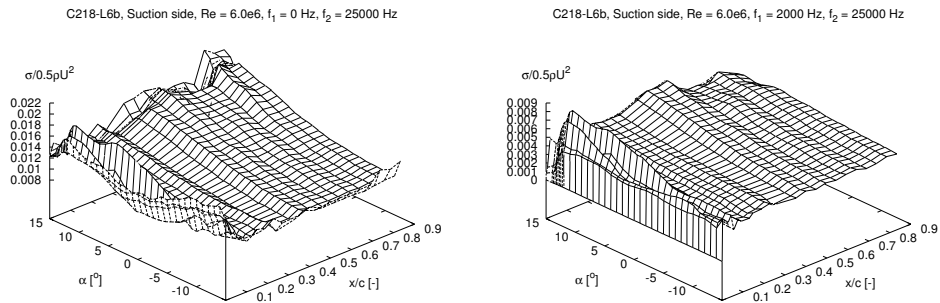
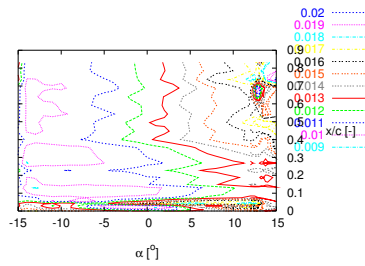


Figure 205: Pressure standard deviations, σ

C218-L6b, Suction side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L6b, Suction side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

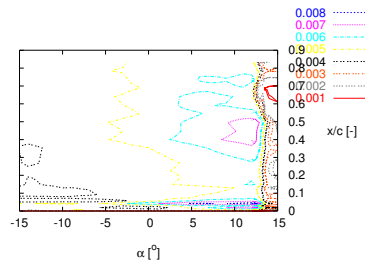


Figure 206: Contours of σ

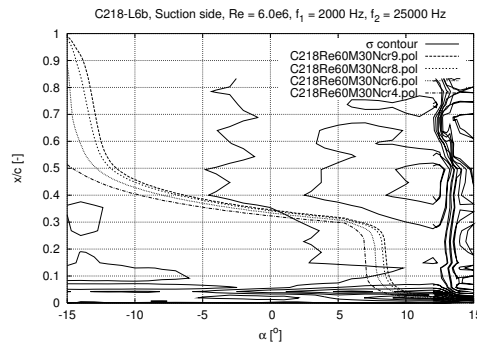
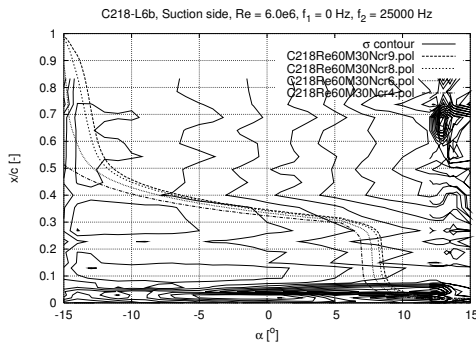


Figure 207: Contours of σ and XFOIL data

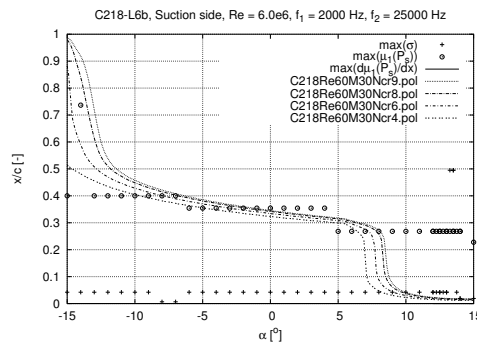
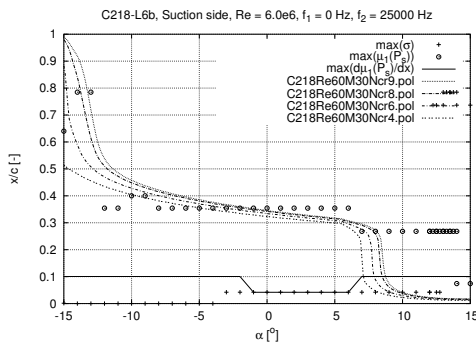
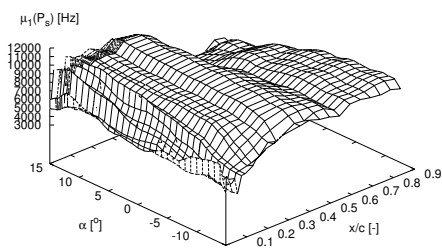


Figure 208: Transition detection

C218-L6b, Suction side, Re = 6.0e6



C218-L6b, Suction side, Re = 6.0e6

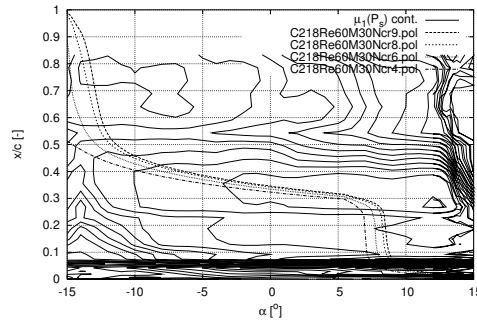


Figure 209: Fourier transform mean, $\mu_1(P_y)$

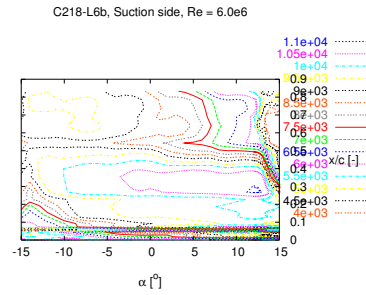


Figure 210: Contours of $\mu_1(P_s)$

C218-L6b
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.1005	42882.5	11065.0
12.25	0.1005	42679.5	11059.9
12.50	0.1005	43250.6	11069.2
12.75	0.1005	43764.4	11030.8
13.00	0.1005	44285.1	10996.4
13.25	0.1005	45271.2	10965.9
13.50	0.1005	46540.4	10862.3
13.75	0.1005	47276.9	10658.9
14.00	0.1005	47826.2	10751.7
15.00	0.1005	47466.9	10225.3
14.00	0.1005	46779.4	10387.2
13.50	0.1005	46003.9	10796.1
13.00	0.1005	44273.8	10966.7
12.50	0.1005	42951.8	11039.4
12.00	0.1005	42583.1	11065.3
11.00	0.1005	42144.3	10978.0
10.00	0.1005	41252.0	10893.2
9.00	0.1005	41248.3	10828.7
8.00	0.1005	40940.9	10784.5
7.00	0.1005	39991.5	10736.4
6.00	0.0419	40654.5	10737.3
5.00	0.0419	44428.4	10805.2
4.00	0.0419	44659.7	10809.8
3.00	0.0419	43649.0	10724.5
2.00	0.0419	44992.8	10669.6
1.00	0.0419	44722.3	10619.0
0.00	0.0419	45252.5	10630.1
-1.00	0.0419	44567.0	10706.0
-2.00	0.1005	42630.2	10684.1
-3.00	0.1005	44575.8	10548.1
-4.00	0.1005	46022.6	10450.4
-5.00	0.1005	47023.3	10385.7
-6.00	0.1005	48836.9	10378.8
-7.00	0.1005	49959.1	10422.4
-8.00	0.1005	50419.3	10360.1
-9.00	0.1005	48871.8	10110.8
-10.00	0.1005	45583.8	10007.3
-11.00	0.1005	39014.1	9916.3
-12.00	0.1005	35881.8	9876.8
-13.00	0.1005	30795.7	9664.0
-14.00	0.1005	26447.3	9614.3
-15.00	0.1005	33733.1	9186.6

3.1.36 T16b Trip wire. Bump tape 2% 100x100

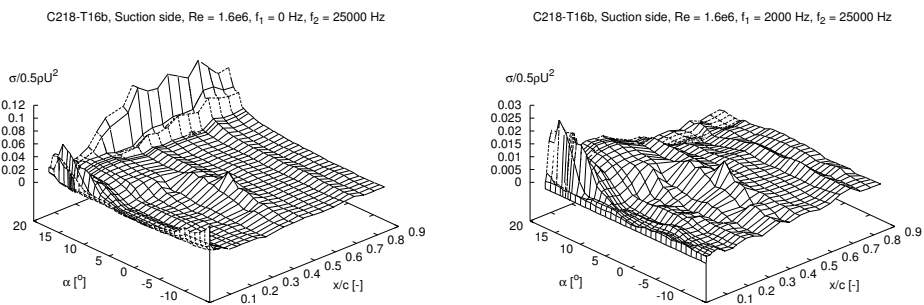
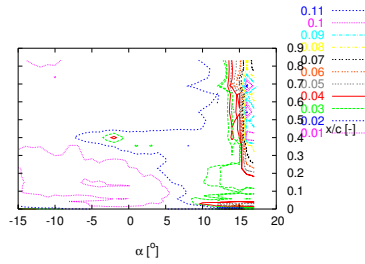


Figure 211: Pressure standard deviations, σ

C218-T16b, Suction side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16b, Suction side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

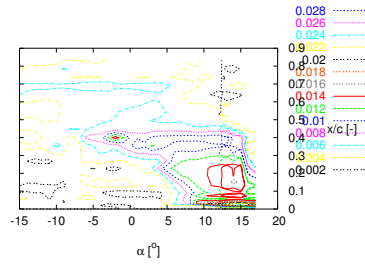


Figure 212: Contours of σ

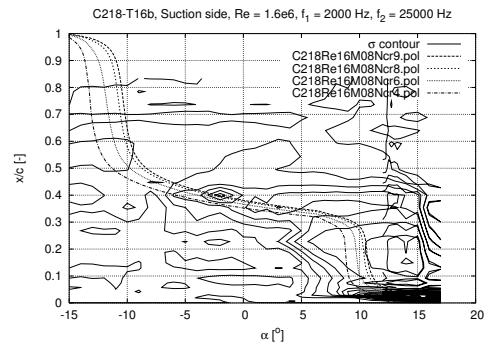
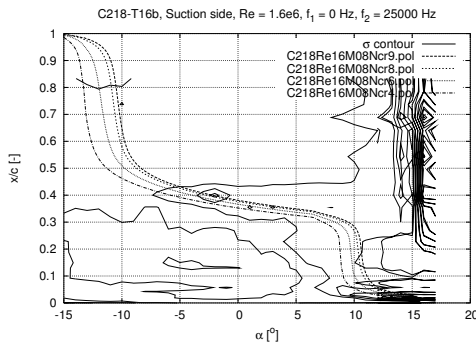


Figure 213: Contours of σ and XFOIL data

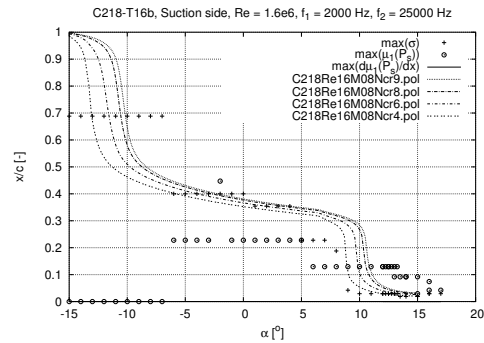
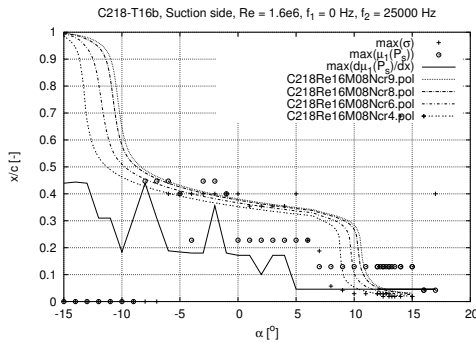


Figure 214: Transition detection

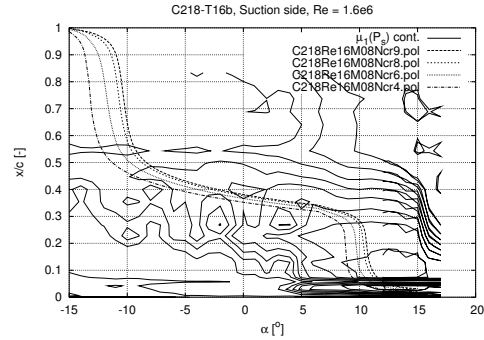
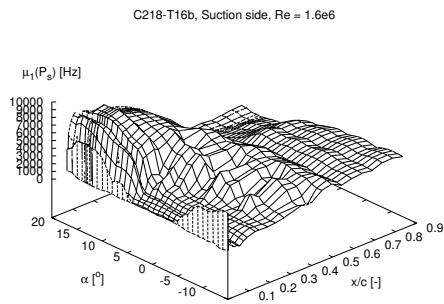


Figure 215: Fourier transform mean, $\mu_1(P_s)$

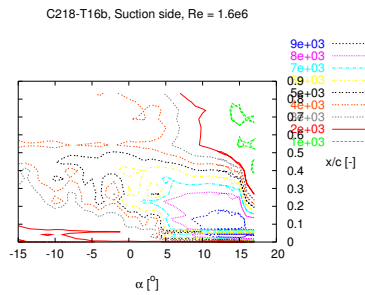


Figure 216: Contours of $\mu_1(P_s)$

C218-T16b
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0460	86524.8	9713.2
12.25	0.0460	86973.3	9832.2
12.50	0.0460	88352.0	9849.2
12.75	0.0460	88005.9	9847.5
13.00	0.0460	87361.2	9835.9
13.25	0.0460	85801.7	9829.8
14.00	0.0460	77092.9	9629.5
15.00	0.0460	79375.6	9731.7
16.00	0.0460	52320.3	9037.8
17.00	0.0460	47717.1	9116.5
16.00	0.0460	54164.0	9063.2
15.00	0.0460	77317.9	9692.6
14.00	0.0460	82982.5	9775.9
13.50	0.0460	84747.8	9803.4
13.00	0.0460	86197.3	9814.2
12.50	0.0460	87671.7	9900.0
12.00	0.0460	88663.7	9938.0
11.00	0.0460	86470.7	9740.9
10.00	0.0460	82494.6	9444.8
9.00	0.0460	75276.5	9203.6
8.00	0.0460	68045.8	8815.0
7.00	0.0460	66391.2	8458.2
6.00	0.0460	63154.3	8308.1
5.00	0.0460	50534.2	8140.5
4.00	0.1716	38442.0	7609.9
3.00	0.1716	39387.9	7176.6
2.00	0.1005	35687.8	7167.1
1.00	0.1716	31712.4	6577.8
0.00	0.1716	33032.2	6733.4
-1.00	0.1800	34424.1	6220.9
-2.00	0.3558	20983.5	5892.4
-3.00	0.1800	20804.5	5638.9
-4.00	0.1800	31458.1	5726.8
-5.00	0.1842	21349.8	5281.6
-6.00	0.1884	21477.4	5333.0
-7.00	0.3098	15413.2	5477.1
-8.00	0.4395	19249.6	5430.6
-9.00	0.3098	18444.6	5287.7
-10.00	0.1842	23949.7	5283.1
-11.00	0.3098	16270.7	5181.0
-12.00	0.3098	14766.0	5525.0
-13.00	0.4395	15744.3	5806.4
-14.00	0.4437	23644.4	6220.0
-15.00	0.4395	14291.9	6190.4

3.1.37 T3b Trip wire. Bump tape 2% 100x100

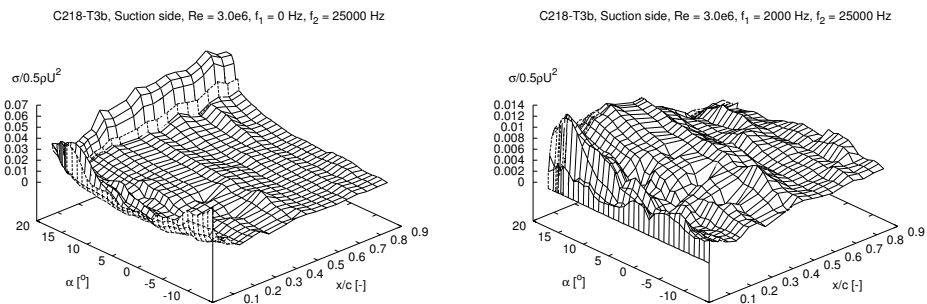
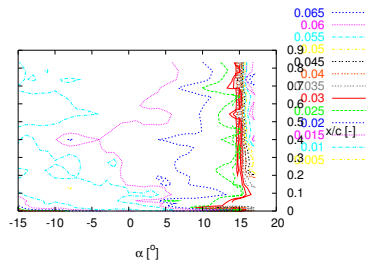


Figure 217: Pressure standard deviations, σ

C218-T3b, Suction side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3b, Suction side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

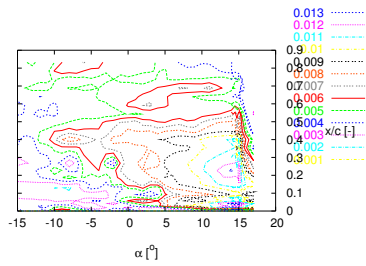


Figure 218: Contours of σ

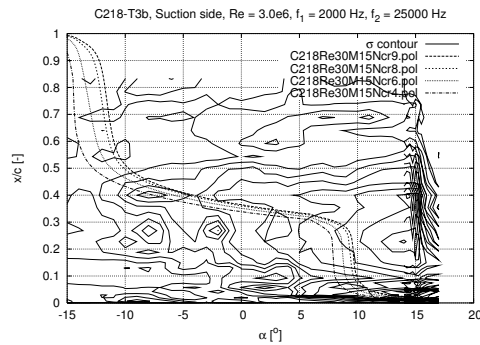
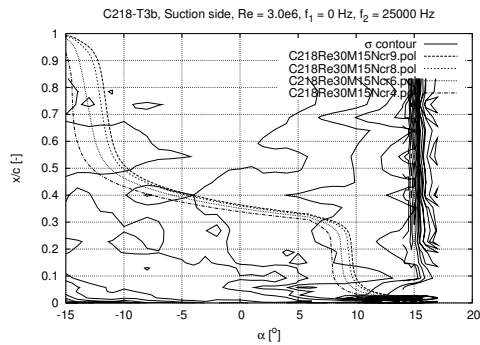


Figure 219: Contours of σ and XFOIL data

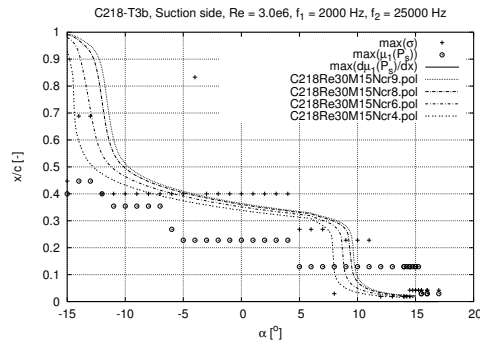
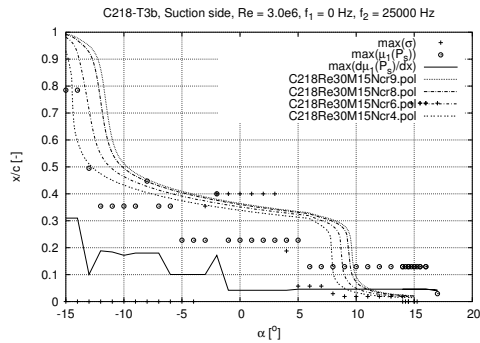


Figure 220: Transition detection

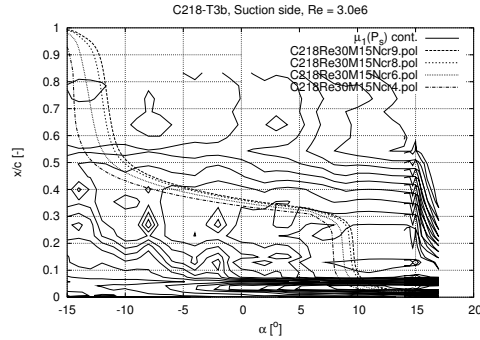
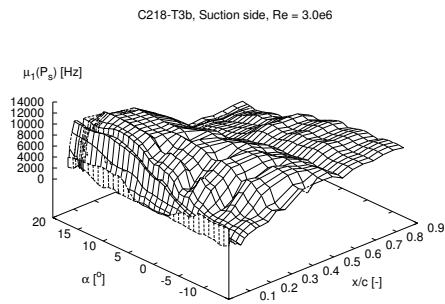


Figure 221: Fourier transform mean, $\mu_1(P_s)$

C218-T3b, Suction side, Re = 3.0e6

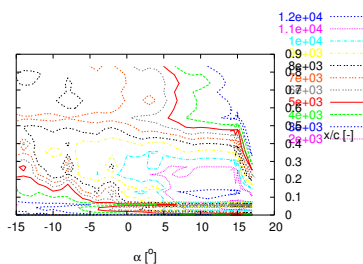


Figure 222: Contours of $\mu_1(P_s)$

C218-T3b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
14.00	0.0460	80841.6	12260.4
14.25	0.0460	78526.0	12268.8
14.50	0.0460	76729.1	12290.4
14.75	0.0460	76348.0	12038.6
15.00	0.0460	74192.8	12279.8
15.25	0.0460	72856.7	12245.5
15.50	0.0460	73247.7	11947.6
16.00	0.0460	71719.6	11498.6
17.00	0.0419	67091.4	11353.0
16.00	0.0460	72862.1	11310.1
15.50	0.0460	71477.8	11658.6
15.00	0.0460	73441.6	12320.3
14.50	0.0460	75371.2	12344.0
14.00	0.0460	78963.5	12366.4
13.00	0.0460	85243.5	12391.4
12.00	0.0460	94370.0	12401.1
11.00	0.0460	100726.8	12374.1
10.00	0.0460	100637.5	12285.9
9.00	0.0460	90387.2	12154.8
8.00	0.0460	86501.1	12052.1
7.00	0.0460	85939.6	11985.0
6.00	0.0460	82611.6	11733.4
5.00	0.0460	72513.9	11118.3
4.00	0.0419	67425.2	11090.8
3.00	0.0419	67176.5	10975.0
2.00	0.0419	72262.6	10877.0
1.00	0.0419	66929.0	10687.1
0.00	0.0419	65681.5	10623.1
-1.00	0.0419	56969.2	10184.3
-2.00	0.1716	42258.2	9670.8
-3.00	0.1005	41965.8	9577.1
-4.00	0.1005	54772.7	10028.4
-5.00	0.1005	50212.9	9725.3
-6.00	0.1005	49113.7	9663.9
-7.00	0.1800	36724.8	8987.1
-8.00	0.1800	40345.1	8646.8
-9.00	0.1800	42898.1	9169.0
-10.00	0.1716	39592.4	9134.8
-11.00	0.1842	37238.0	8997.8
-12.00	0.1884	33573.2	8756.1
-13.00	0.1005	23572.4	8191.1
-14.00	0.3098	27260.2	8173.6
-15.00	0.3098	26759.0	8025.8

3.1.38 T6b Trip wire. Bump tape 2% 100x100

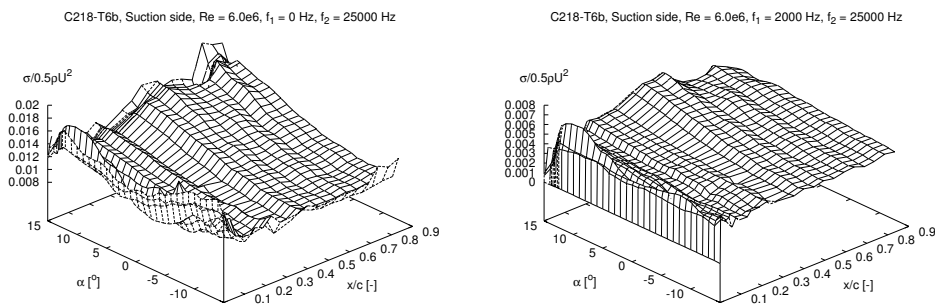
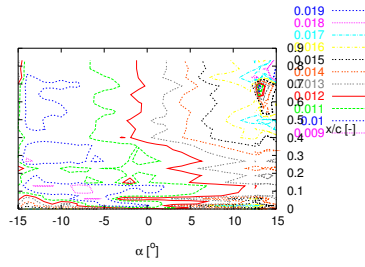


Figure 223: Pressure standard deviations, σ

C218-T6b, Suction side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T6b, Suction side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

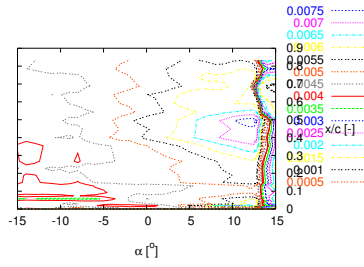


Figure 224: Contours of σ

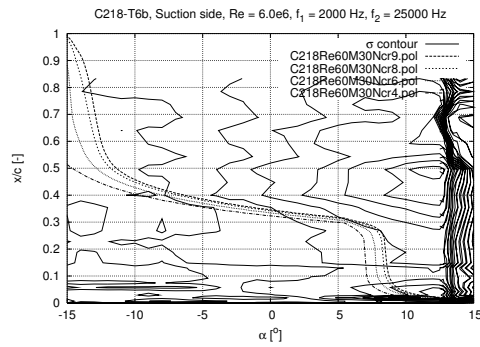
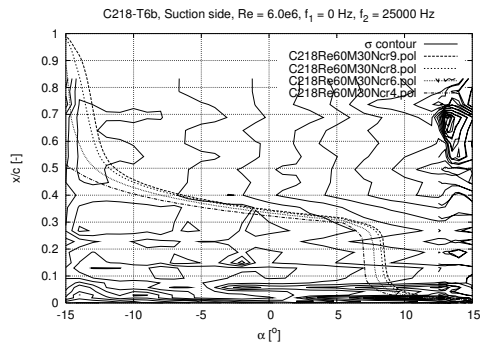


Figure 225: Contours of σ and XFOIL data

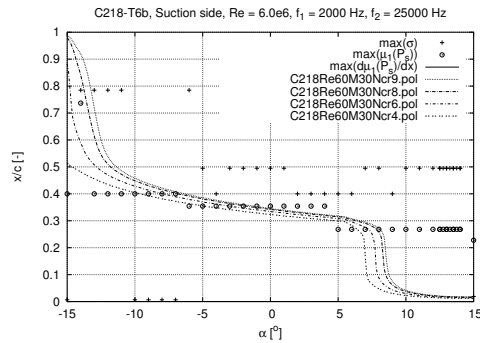
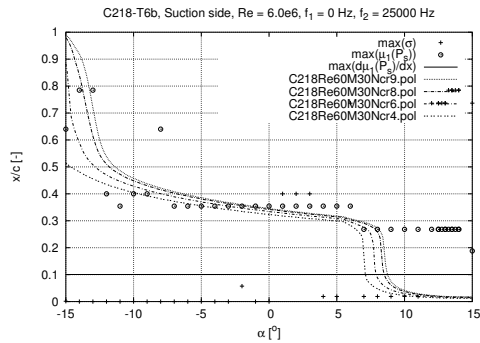


Figure 226: Transition detection

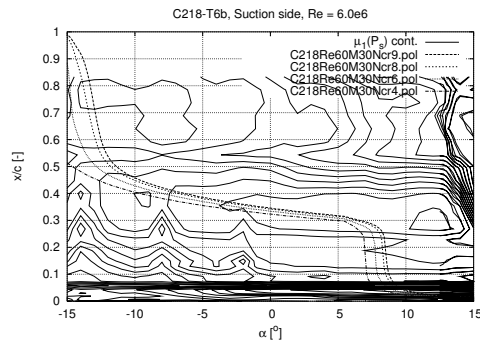
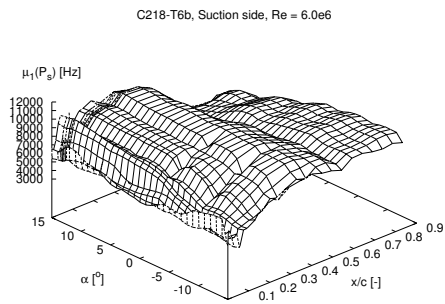


Figure 227: Fourier transform mean, $\mu_1(P_s)$

C218-T6b, Suction side, Re = 6.0e6

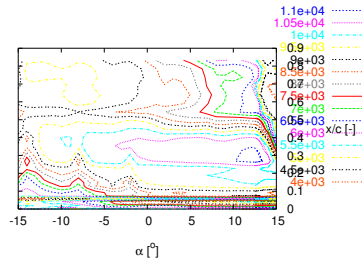


Figure 228: Contours of $\mu_1(P_s)$

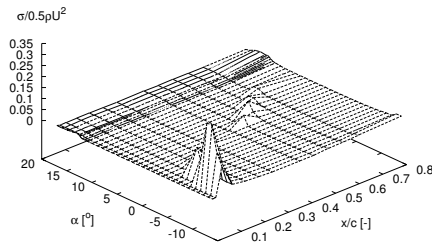
C218-T6b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.50	0.1005	48758.5	11153.0
12.75	0.1005	49166.1	11137.6
13.00	0.1005	49120.1	11076.8
13.25	0.1005	49762.3	11023.0
13.50	0.1005	50374.0	11002.5
13.75	0.1005	50923.6	10940.5
14.00	0.1005	51366.4	10880.3
15.00	0.1005	54521.5	10289.1
14.00	0.1005	51318.5	10861.5
13.50	0.1005	50399.9	10932.9
13.00	0.1005	49022.6	11096.2
12.50	0.1005	48696.4	11140.9
12.00	0.1005	48619.3	11135.3
11.00	0.1005	48098.4	11061.6
10.00	0.1005	47288.8	10977.5
9.00	0.1005	46235.7	10887.6
8.00	0.1005	45876.7	10825.6
7.00	0.1005	46045.9	10769.9
6.00	0.1005	45875.0	10761.6
5.00	0.1005	45612.6	10824.2
4.00	0.1005	45535.2	10831.6
3.00	0.1005	45804.0	10741.5
2.00	0.1005	45806.1	10683.6
1.00	0.1005	46337.4	10632.3
0.00	0.1005	48070.0	10637.5
-1.00	0.1005	48300.5	10682.6
-2.00	0.1005	33876.0	10633.7
-3.00	0.1005	43844.5	10572.4
-4.00	0.1005	49251.8	10474.9
-5.00	0.1005	44308.8	10405.9
-6.00	0.1005	41733.8	10366.8
-7.00	0.1005	36013.8	10345.9
-8.00	0.1005	29134.4	9883.2
-9.00	0.1005	37776.8	10048.9
-10.00	0.1005	41002.6	10006.0
-11.00	0.1005	37282.8	9943.3
-12.00	0.1005	35105.8	9865.3
-13.00	0.1005	29902.3	9687.6
-14.00	0.1005	26638.5	9643.4
-15.00	0.1005	32631.3	9200.5

3.2 Pressure side

3.2.1 C16 Clean -

C218-C16, Pressure side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C16, Pressure side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

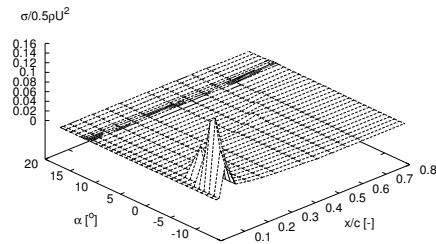
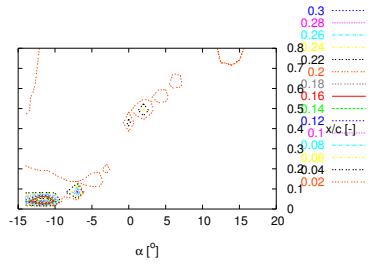


Figure 229: Pressure standard deviations, σ

C218-C16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

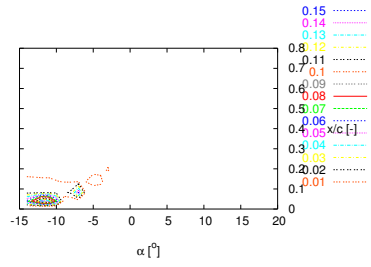
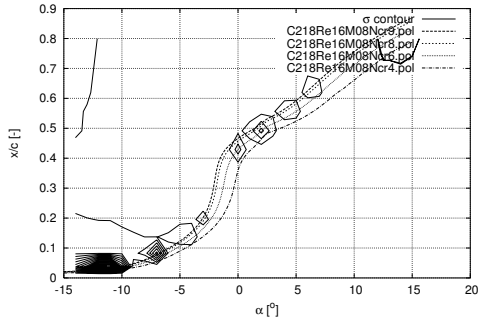


Figure 230: Contours of σ

C218-C16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

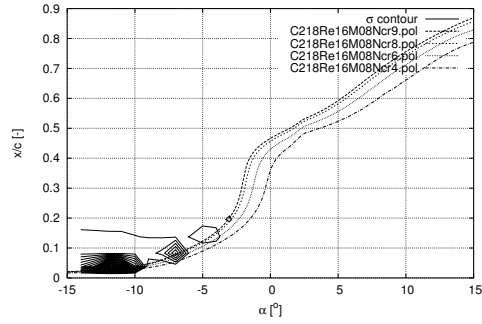
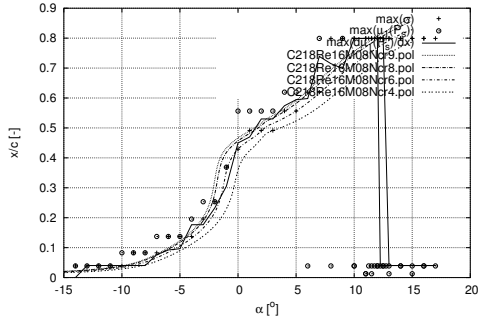


Figure 231: Contours of σ and XFOIL data

C218-C16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

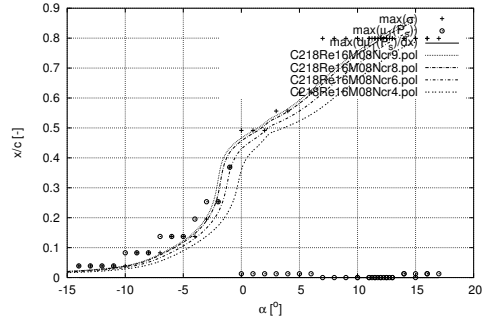
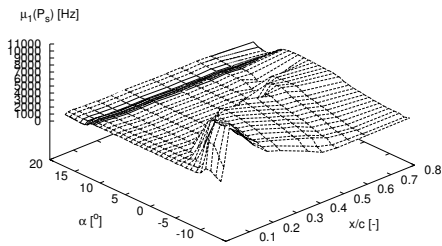


Figure 232: Transition detection

C218-C16, Pressure side, Re = 1.6e6



C218-C16, Pressure side, Re = 1.6e6

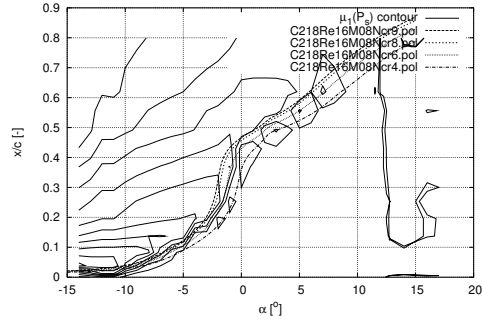


Figure 233: Fourier transform mean, $\mu_1(P_s)$

C218-C16, Pressure side, Re = 1.6e6

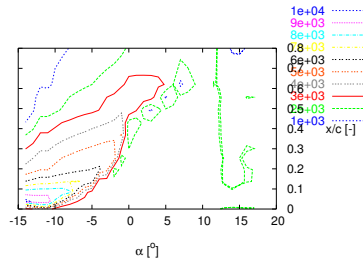


Figure 234: Contours of $\mu_1(P_s)$

C218-C16
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.7990	2383.4	2521.3
11.00	0.7990	2283.4	2514.1
11.25	0.7990	2252.4	2576.9
11.50	0.7990	2196.9	2437.9
11.75	0.7990	2110.2	2525.5
12.00	0.7990	1969.7	2447.5
12.25	0.0402	3210.1	2574.1
12.50	0.0402	4107.2	2457.1
12.75	0.0402	2339.3	2166.9
13.00	0.0402	2752.4	2183.2
14.00	0.0402	3310.6	2132.1
15.00	0.0402	2786.8	2134.8
16.00	0.0402	2398.8	2155.8
17.00	0.0402	2153.0	2161.4
16.00	0.0402	1924.0	2175.9
15.00	0.0402	2174.2	2147.9
14.00	0.0402	3241.0	2126.2
13.00	0.0402	3088.8	2180.6
12.50	0.7990	1510.5	2200.5
12.00	0.7990	1976.3	2432.3
11.50	0.7990	2207.3	2520.6
11.00	0.7990	2312.5	2498.3
10.00	0.7990	2464.0	2566.9
9.00	0.6986	3097.1	2557.4
8.00	0.7147	5917.7	2592.1
7.00	0.7388	9688.0	2539.8
6.00	0.5983	4727.8	2585.2
5.00	0.5942	23543.7	2955.9
4.00	0.5742	10831.0	3152.7
3.00	0.5300	28940.4	3396.8
2.00	0.5300	24571.4	3732.6
1.00	0.4698	23950.4	3859.3
0.00	0.4497	27476.2	3898.0
-1.00	0.3052	30105.3	5015.2
-2.00	0.2329	45770.6	5656.7
-3.00	0.1767	39290.1	5853.4
-4.00	0.1767	45116.3	6096.8
-5.00	0.0964	46278.0	6443.5
-6.00	0.0923	47048.4	6928.4
-7.00	0.0763	42870.0	7058.0
-8.00	0.0402	68694.5	8174.7
-9.00	0.0402	74629.4	8662.5
-10.00	0.0402	72103.0	8720.2
-11.00	0.0402	60545.8	9668.5
-12.00	0.0402	60460.4	9616.8
-13.00	0.0402	66021.9	9693.8
-14.00	0.0000	78834.6	10371.0

3.2.2 C3 Clean -

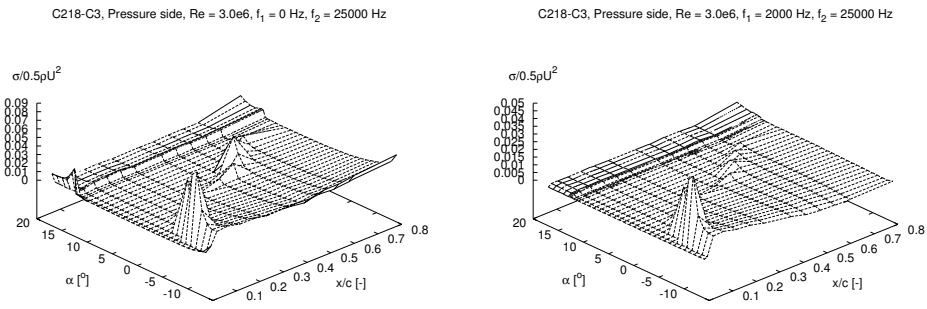


Figure 235: Pressure standard deviations, σ

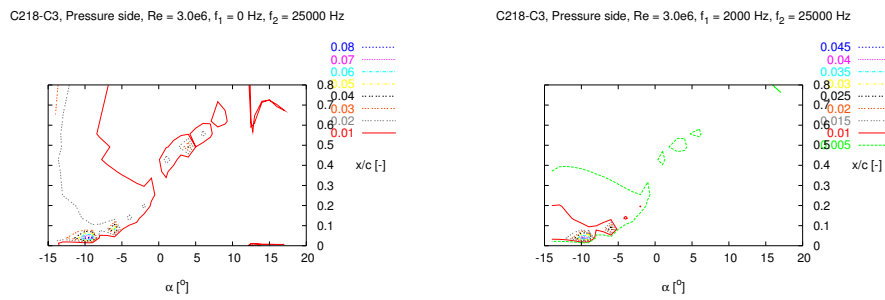


Figure 236: Contours of σ

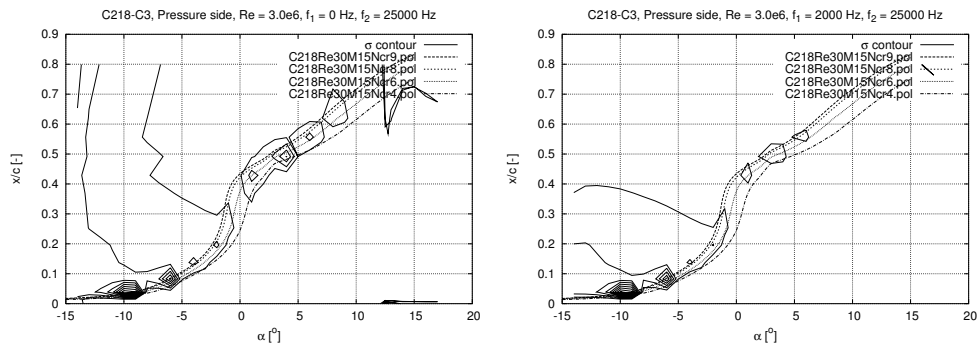


Figure 237: Contours of σ and XFOIL data

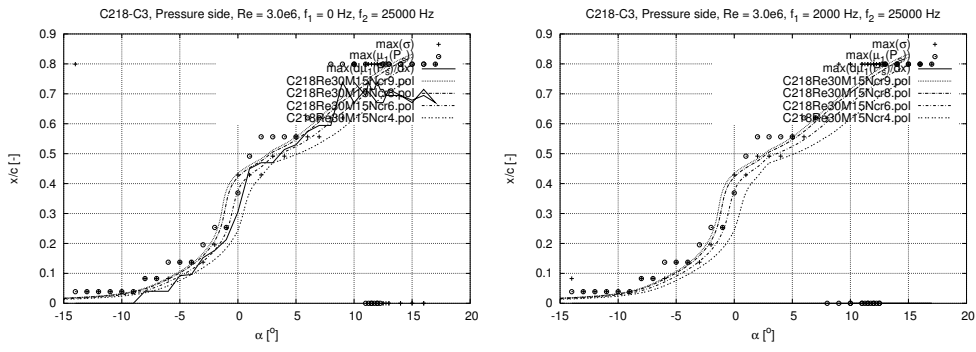


Figure 238: Transition detection

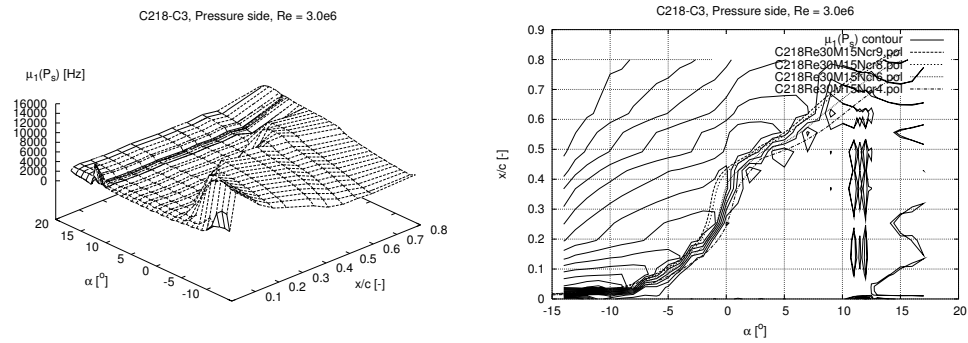


Figure 239: Fourier transform mean, $\mu_1(P_s)$

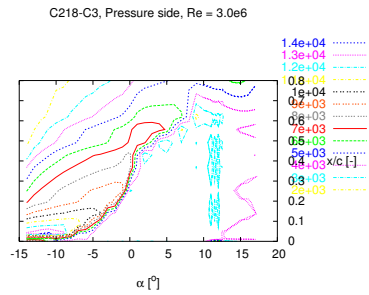


Figure 240: Contours of $\mu_1(P_s)$

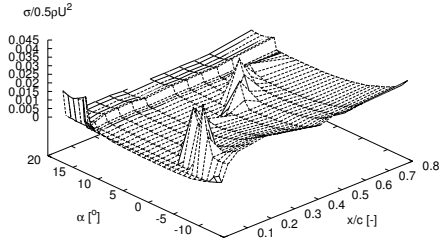
C218-C3
alpha [degrees] angle of attack
xtr* [-] transition point (x=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.7388	15525.0	5284.1
11.00	0.6946	15786.6	5490.2
11.25	0.7388	14914.4	5941.6
11.50	0.7147	15987.0	6417.5
11.75	0.7147	15223.0	6770.8
12.00	0.7388	16435.0	7083.3
12.25	0.7147	15732.4	7314.2
12.50	0.7147	16382.1	5636.5
12.75	0.6946	14162.4	5691.5
13.00	0.6946	14675.9	5868.2
14.00	0.6946	14867.3	6111.3
15.00	0.6705	14400.0	6143.2
16.00	0.7147	12666.9	5922.4
17.00	0.6705	8442.5	5211.7
16.00	0.6946	12716.4	5896.7
15.00	0.6786	14397.0	6179.7
14.00	0.6946	14998.8	6140.2
13.00	0.7147	14660.3	5876.1
12.50	0.6705	13271.7	5612.5

12.00	0.6705	16638.2	7314.6
11.50	0.6946	15266.7	6578.1
11.00	0.7147	16109.0	5802.8
10.00	0.6705	16421.3	5377.4
9.00	0.7388	19760.9	5267.2
8.00	0.5942	14779.9	5197.6
7.00	0.5942	49658.9	6141.5
6.00	0.5742	29372.7	6483.7
5.00	0.5300	55345.0	6850.1
4.00	0.5139	52641.7	7397.5
3.00	0.4698	39045.1	7589.7
2.00	0.4698	61369.2	7607.1
1.00	0.4497	31959.7	7568.7
0.00	0.3052	48584.6	8488.6
-1.00	0.2128	73933.8	9389.1
-2.00	0.1767	64436.7	9522.3
-3.00	0.1526	66375.5	9545.9
-4.00	0.0964	72054.9	10071.5
-5.00	0.0923	69468.7	10617.6
-6.00	0.0402	73226.3	10590.6
-7.00	0.0402	95930.1	11543.7
-8.00	0.0402	96874.6	11912.9
-9.00	0.0000	107188.9	13227.4
-10.00	0.0000	95736.3	13573.7
-11.00	0.0000	109374.6	14297.1
-12.00	0.0000	91851.8	14028.5
-13.00	0.0000	79938.8	13472.3
-14.00	0.0000	79181.6	13202.5

3.2.3 C4 Clean -

C218-C4, Pressure side, Re = 4.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C4, Pressure side, Re = 4.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

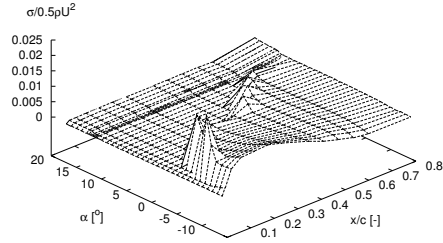
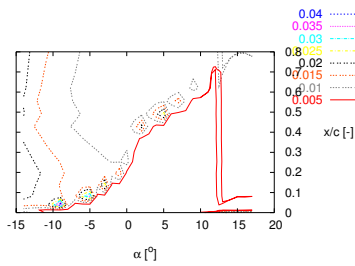


Figure 241: Pressure standard deviations, σ

C218-C4, Pressure side, Re = 4.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C4, Pressure side, Re = 4.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

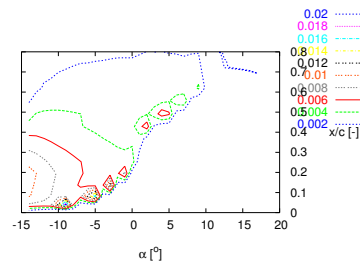


Figure 242: Contours of σ

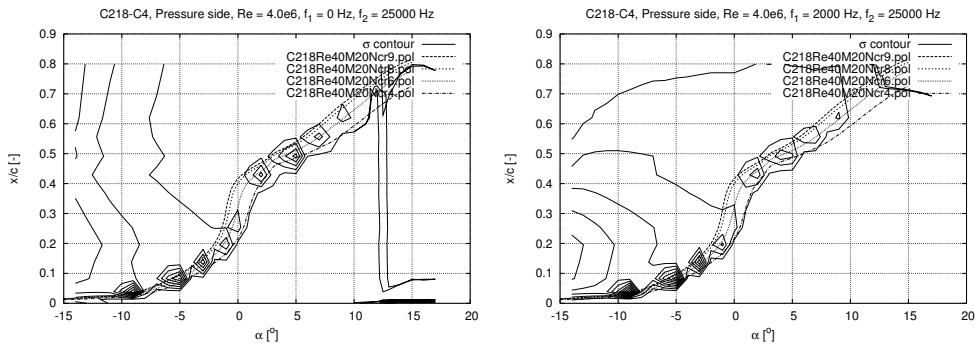


Figure 243: Contours of σ and XFOIL data

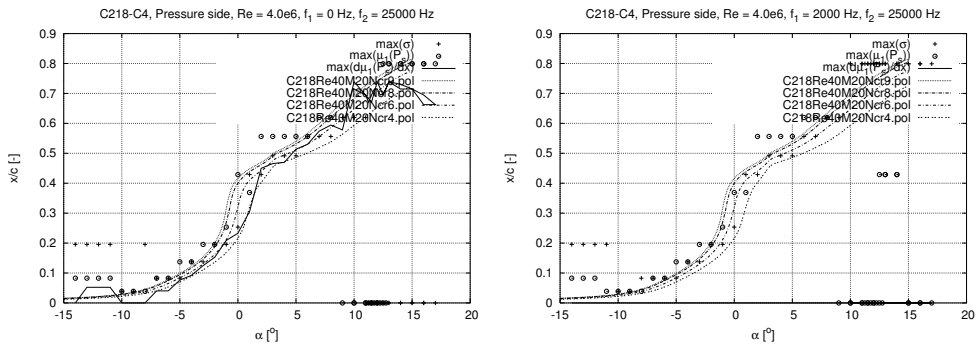


Figure 244: Transition detection

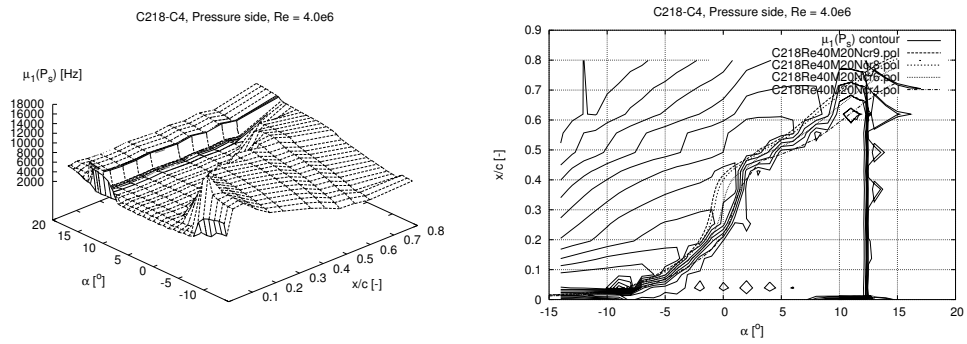


Figure 245: Fourier transform mean, $\mu_1(P_s)$

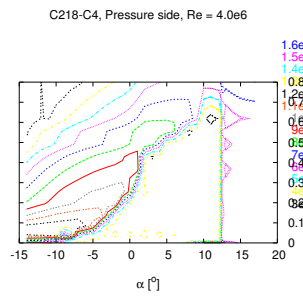


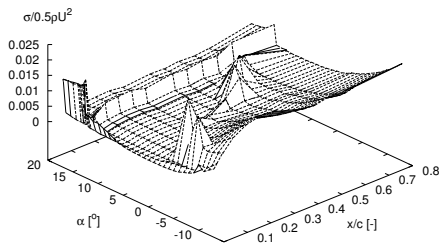
Figure 246: Contours of $\mu_1(P_s)$

C218-C4
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.7147	18252.8	9041.0
11.00	0.6946	23021.1	9247.9
11.25	0.6705	21759.8	9260.1
11.50	0.6946	21816.1	9304.1
11.75	0.7147	20686.0	9407.4
12.00	0.7147	20976.2	9416.0
12.25	0.6946	20482.5	9430.2
12.50	0.6986	7810.8	9660.2
12.75	0.7147	8032.9	9640.9
13.00	0.7388	12433.9	7381.6
14.00	0.7308	11105.7	7639.2
15.00	0.7147	10722.9	7829.1
16.00	0.6946	10927.8	7944.6
17.00	0.6625	10650.9	8004.9
16.00	0.6625	10472.4	7960.4
15.00	0.7147	10423.4	7853.5
14.00	0.7147	10998.9	7665.0
13.00	0.7388	12472.3	7433.1
12.50	0.6946	13516.7	7243.9
12.00	0.7388	21314.8	8413.8
11.50	0.6705	21351.9	8392.0
11.00	0.6946	23162.0	8300.1
10.00	0.7388	18406.3	8059.8
9.00	0.5782	33408.7	7450.0
8.00	0.5942	58199.3	7698.3
7.00	0.5742	36717.8	7875.7
6.00	0.5300	59269.7	8226.3
5.00	0.5139	62618.0	8739.8
4.00	0.4698	42862.8	8837.3
3.00	0.4658	67654.9	8855.1
2.00	0.4497	53037.6	8809.3
1.00	0.3052	50648.6	9672.1
0.00	0.2329	56955.8	9304.0
-1.00	0.2088	64779.8	10531.5
-2.00	0.1526	78956.9	10746.2
-3.00	0.1245	67034.5	10642.2
-4.00	0.0923	84373.6	11889.5
-5.00	0.0763	84696.1	11819.4
-6.00	0.0402	96968.1	12010.8
-7.00	0.0402	106041.8	12744.3
-8.00	0.0000	133039.9	15096.9
-9.00	0.0000	132225.3	16708.0
-10.00	0.0000	88629.6	13033.6
-11.00	0.0522	79249.4	12570.5
-12.00	0.0522	63861.9	12500.5
-13.00	0.0522	58839.4	12388.8
-14.00	0.0000	56194.0	12274.9

3.2.4 C5 Clean -

C218-C5, Pressure side, Re = 5.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C5, Pressure side, Re = 5.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

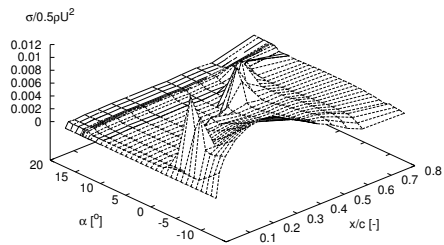
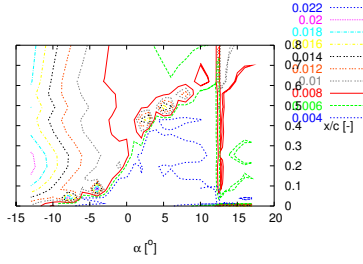


Figure 247: Pressure standard deviations, σ

C218-C5, Pressure side, Re = 5.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C5, Pressure side, Re = 5.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

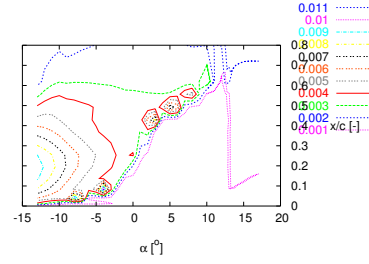


Figure 248: Contours of σ

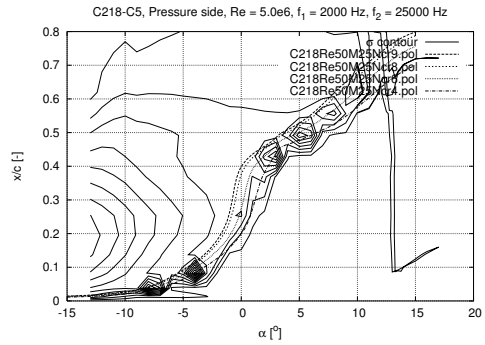
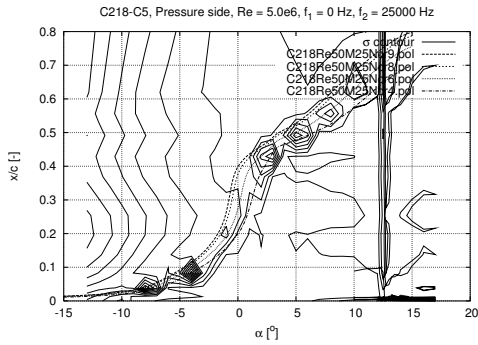


Figure 249: Contours of σ and Xfoil data

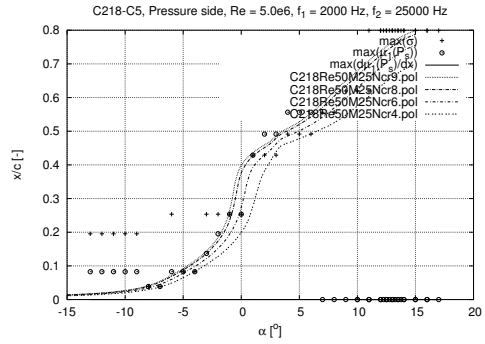
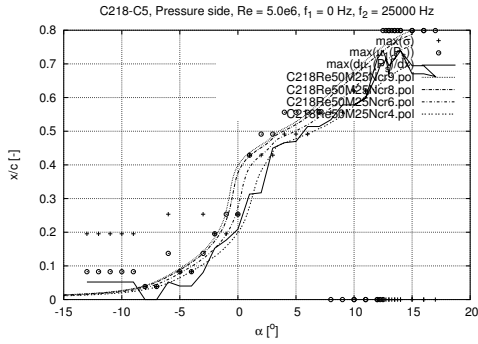


Figure 250: Transition detection

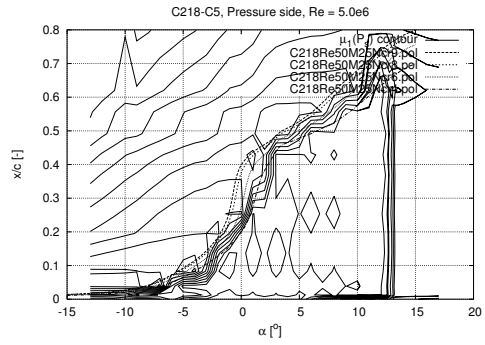
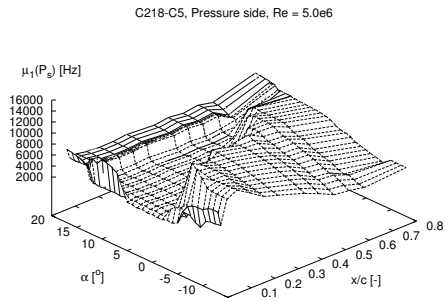


Figure 251: Fourier transform mean, $\mu_1(P_s)$

C218-C5, Pressure side, Re = 5.0e6

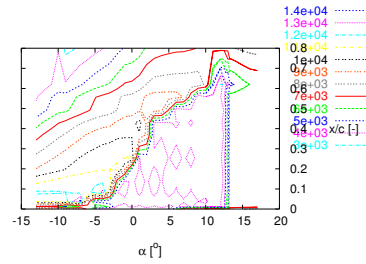


Figure 252: Contours of $\mu_1(P_s)$

C218-C5
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.5782	48979.8	9399.0
11.00	0.5983	18735.5	9464.7
12.00	0.6705	23435.1	8469.4
12.25	0.6946	23795.0	8576.7
12.50	0.6946	22523.3	8617.3
12.75	0.7147	17516.0	7194.4
13.00	0.6705	19558.2	7251.5
13.25	0.7147	16556.4	7608.6
13.50	0.7147	16914.3	7677.8
13.75	0.7388	16726.9	7959.0
14.00	0.7388	16145.1	8007.0
15.00	0.6705	13939.9	8167.8
16.00	0.6705	12536.3	8285.6
17.00	0.6625	12612.9	8389.7
16.00	0.6946	12620.8	8288.2
15.00	0.6946	13790.5	8142.7
14.00	0.7388	16100.1	7987.7
13.50	0.7147	16960.2	7919.4
13.00	0.6946	15319.5	7804.5
12.50	0.7388	12858.9	7123.7
12.00	0.7147	23526.4	8805.8
11.00	0.5983	16145.4	8251.6
10.00	0.5782	47123.4	9394.2
9.00	0.5782	62019.6	9160.7
8.00	0.5340	36609.1	8826.9
7.00	0.5139	63309.1	8957.5
6.00	0.5139	69044.5	9353.9
5.00	0.4698	44387.7	9383.1
4.00	0.4658	63236.3	9359.5
3.00	0.4497	66472.0	9454.7
2.00	0.3172	39482.4	9370.3
1.00	0.3132	51499.4	10290.8
0.00	0.2088	80307.7	11080.5
-1.00	0.1767	70573.3	11038.8
-2.00	0.1526	69740.8	11160.0
-3.00	0.0803	81189.9	11848.0
-4.00	0.0402	111878.1	13262.4
-5.00	0.0402	94457.1	12204.9
-6.00	0.0522	62209.3	11892.9
-7.00	0.0000	92622.9	14260.2
-8.00	0.0000	84086.6	12985.9
-9.00	0.0522	80677.5	12015.6
-10.00	0.0522	63667.0	12071.9
-11.00	0.0522	59566.4	12109.2
-12.00	0.0522	57818.2	12129.7
-13.00	0.0522	56334.8	12160.6

3.2.5 C6 Clean -

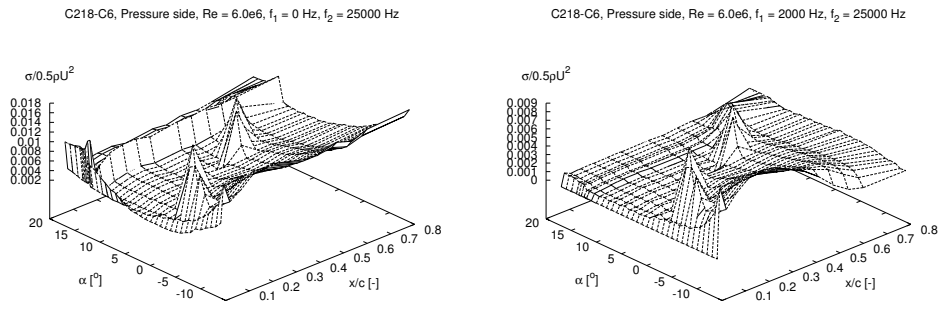


Figure 253: Pressure standard deviations, σ

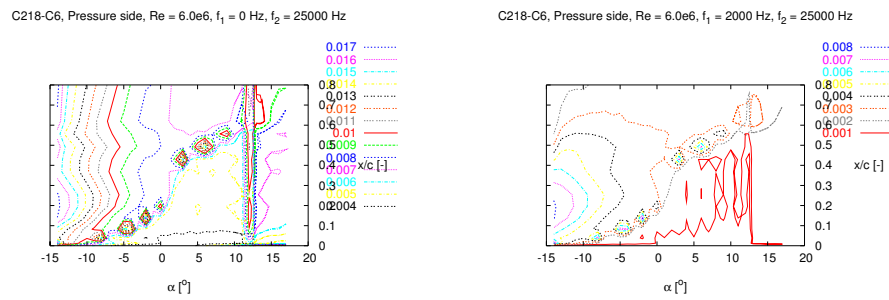


Figure 254: Contours of σ

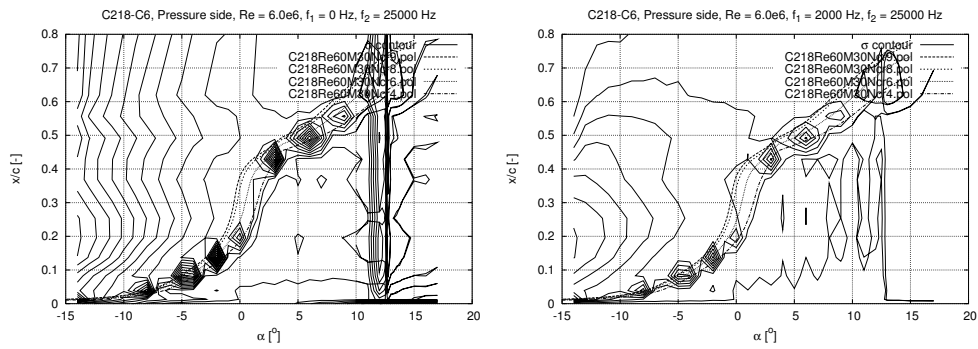


Figure 255: Contours of σ and XFOIL data

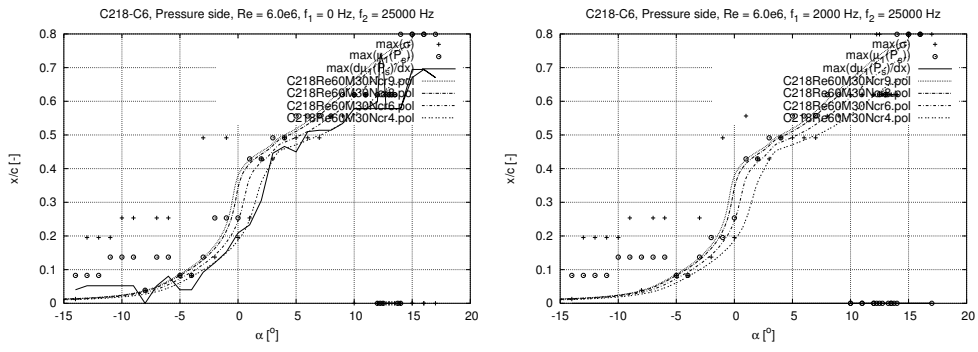


Figure 256: Transition detection

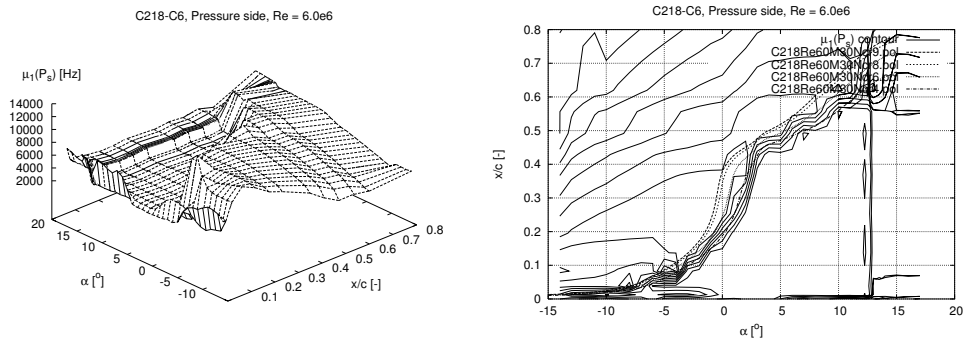


Figure 257: Fourier transform mean, $\mu_1(P_s)$

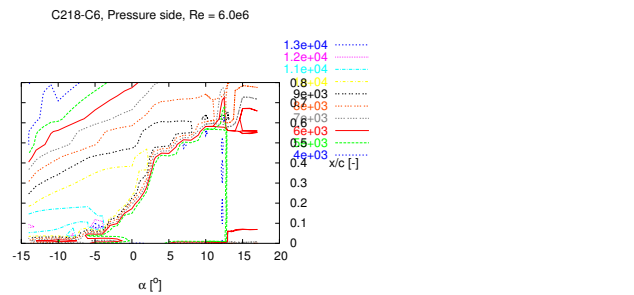


Figure 258: Contours of $\mu_1(P_s)$

C218-C6

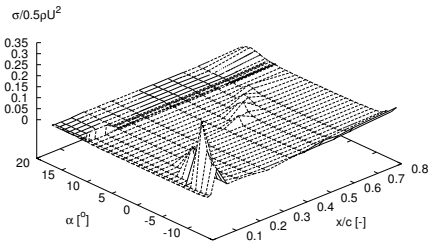
alpha	[degrees]	angle of attack
xtr*	-	transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx*	[Hz/-]	d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1)	[Hz]	max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.5782	61150.1	9174.2
11.00	0.5782	50990.7	8530.0
12.00	0.5983	15829.7	8233.2
12.25	0.7388	17225.7	8105.7
12.50	0.7147	20624.4	8041.2
12.75	0.5782	52364.7	8838.2
13.00	0.5782	40818.5	9135.5
13.25	0.5782	37408.6	8895.2
13.50	0.5782	32797.2	8542.4
13.75	0.5782	26266.6	8171.2
14.00	0.5782	20431.1	8254.6
15.00	0.6705	17526.6	8242.9
16.00	0.6946	18314.4	8319.3
17.00	0.6705	17068.1	8394.1
16.00	0.6946	18161.5	8330.5
15.00	0.6946	17530.9	8250.1
14.00	0.5782	20547.1	8118.9
13.50	0.5782	33145.5	8559.8
13.00	0.5782	42263.0	9239.3

12.50	0.5782	57240.5	9175.7
12.00	0.5782	57315.2	9126.8
11.00	0.5782	52256.1	8605.9
10.00	0.5782	61281.9	9180.7
9.00	0.5340	38311.0	8904.0
8.00	0.5139	60866.3	9489.0
7.00	0.5139	67855.7	9731.4
6.00	0.5099	45388.9	9649.0
5.00	0.4497	60397.9	9590.4
4.00	0.4658	67165.5	9916.8
3.00	0.4457	47951.2	9762.6
2.00	0.3052	46596.3	10793.3
1.00	0.2329	47294.9	10319.9
0.00	0.2088	60177.7	10943.1
-1.00	0.1526	74324.0	10933.6
-2.00	0.1205	66149.7	10982.9
-3.00	0.0923	72420.9	10989.4
-4.00	0.0402	103208.8	12965.4
-5.00	0.0402	108159.9	13826.9
-6.00	0.0803	72356.7	11236.5
-7.00	0.0522	52941.9	11396.0
-8.00	0.0000	74883.2	12400.6
-9.00	0.0522	68540.6	11577.7
-10.00	0.0522	72690.2	11606.1
-11.00	0.0522	68850.8	11628.5
-12.00	0.0522	68127.5	11673.6
-13.00	0.0522	67618.2	11948.0
-14.00	0.0402	49513.3	12191.3

3.2.6 Z16 ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. -

C218-Z16, Pressure side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16, Pressure side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

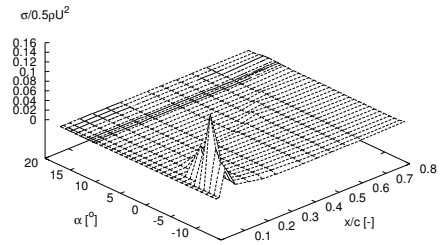
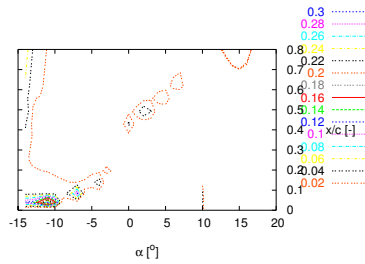


Figure 259: Pressure standard deviations, σ

C218-Z16, Pressure side, $Re = 1.6e6$, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16, Pressure side, $Re = 1.6e6$, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

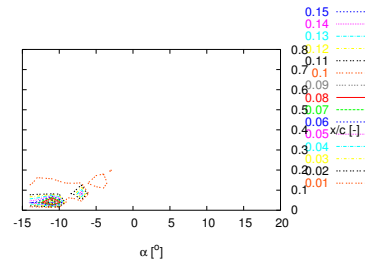


Figure 260: Contours of σ

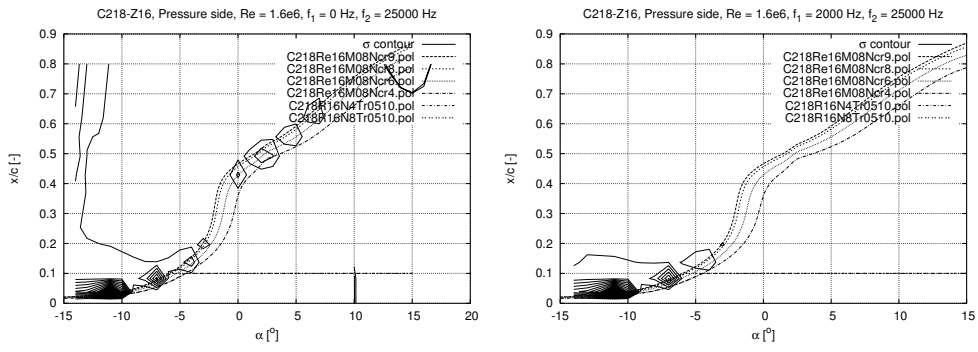


Figure 261: Contours of σ and XFOIL data

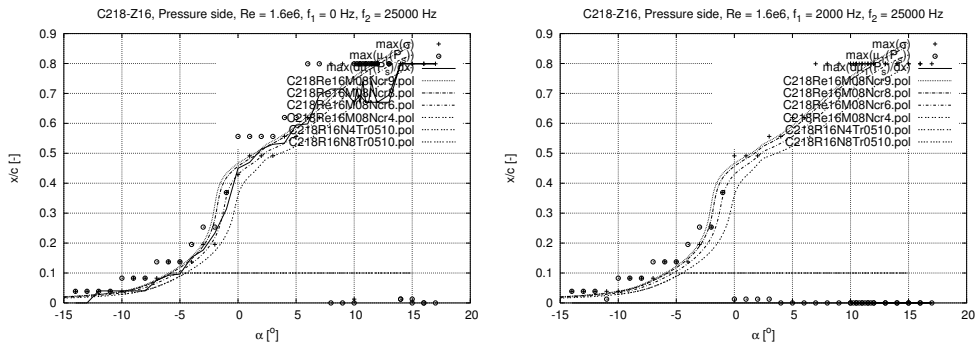


Figure 262: Transition detection

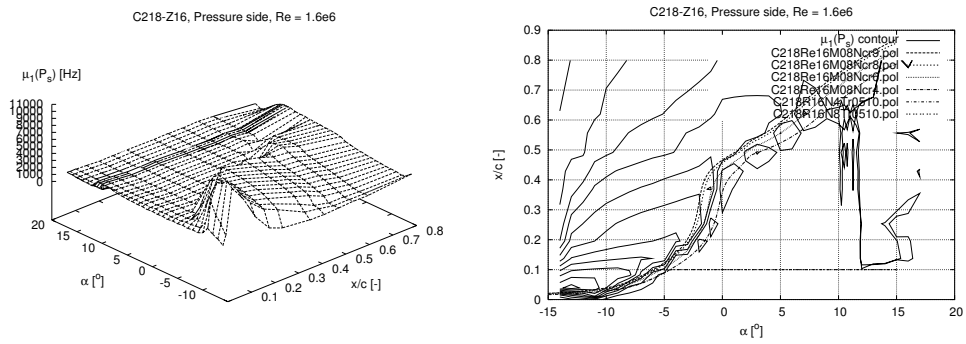


Figure 263: Fourier transform mean, $\mu_1(P_s)$

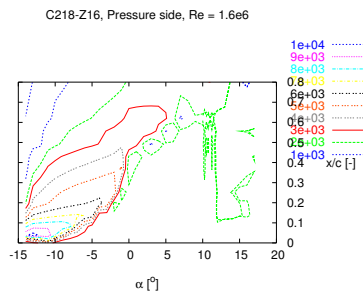


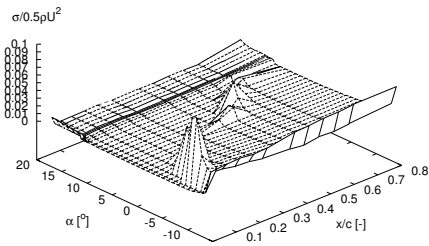
Figure 264: Contours of $\mu_1(P_s)$

C218-Z16
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.6625	3898.1	2759.2
10.25	0.7147	6774.5	2922.3
10.50	0.6705	5751.2	2968.5
10.75	0.7388	6663.3	3001.0
11.00	0.6705	5657.4	2990.7
11.25	0.6705	6502.3	2961.1
11.50	0.7388	5324.7	2945.4
11.75	0.6946	6095.1	2921.5
12.00	0.6705	5954.7	2823.1
13.00	0.6946	3523.5	2432.2
14.00	0.7990	1836.5	2186.9
15.00	0.7990	1179.6	2199.6
16.00	0.7990	985.1	2259.0
17.00	0.7990	1325.9	2293.5
16.00	0.7990	997.1	2257.7
15.00	0.7990	1208.7	2222.8
14.00	0.7990	1800.4	2184.0
13.00	0.6705	3402.4	2416.5
12.00	0.6705	5900.7	2838.6
11.50	0.6705	5956.8	2937.1
11.00	0.6705	5757.5	3003.1
10.50	0.6946	6658.9	2987.2
10.00	0.6705	6086.7	2952.4
9.00	0.7147	4552.6	2816.9
8.00	0.7147	7784.2	2772.1
7.00	0.6946	9952.4	2662.9
6.00	0.5983	10725.0	2612.6
5.00	0.5942	23894.2	3085.7
4.00	0.5340	13177.7	3256.6
3.00	0.5300	30365.1	3541.7
2.00	0.5139	22468.4	3844.8
1.00	0.4698	27928.7	3953.9
0.00	0.4497	27169.6	3984.9
-1.00	0.3132	31962.9	5066.5
-2.00	0.2329	48970.9	5898.8
-3.00	0.1767	43046.3	5899.5
-4.00	0.1526	44972.7	6169.9
-5.00	0.0964	47418.4	6569.7
-6.00	0.0923	47320.2	6986.8
-7.00	0.0763	43150.5	7101.5
-8.00	0.0402	70161.2	8320.1
-9.00	0.0402	75942.2	8797.7
-10.00	0.0402	72364.1	8817.0
-11.00	0.0402	60422.8	9649.3
-12.00	0.0402	66318.3	9787.3
-13.00	0.0000	78605.5	10457.0
-14.00	0.0000	83801.0	9809.9

3.2.7 Z3 ZZ90 x/c=5% suc. x/c=10% press. -

C218-Z3, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-Z3, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

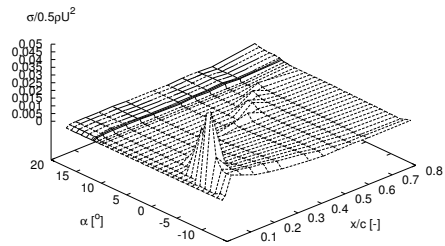
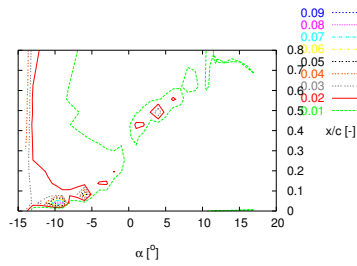


Figure 265: Pressure standard deviations, σ

C218-Z3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

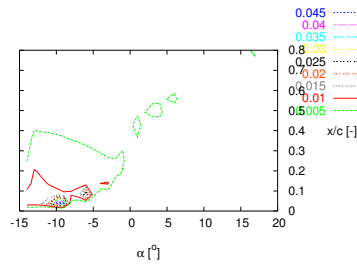
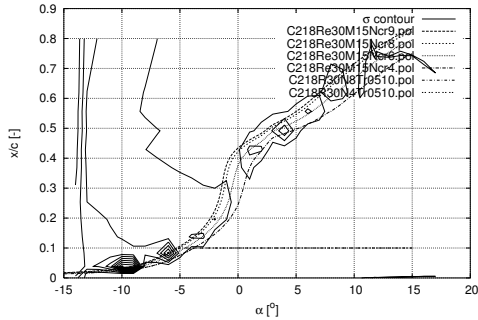


Figure 266: Contours of σ

C218-Z3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

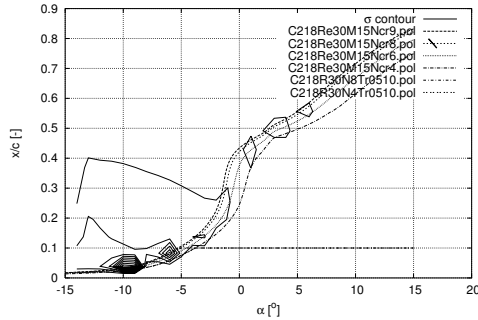
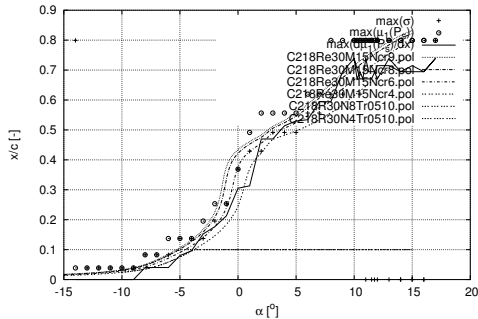


Figure 267: Contours of σ and XFOIL data

C218-Z3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

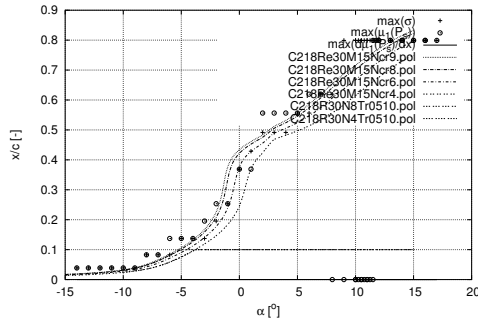
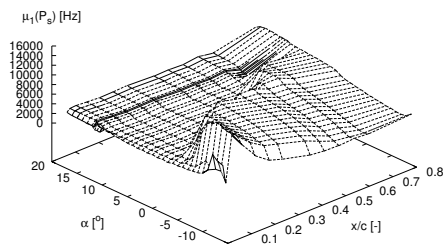


Figure 268: Transition detection

C218-Z3, Pressure side, Re = 3.0e6



C218-Z3, Pressure side, Re = 3.0e6

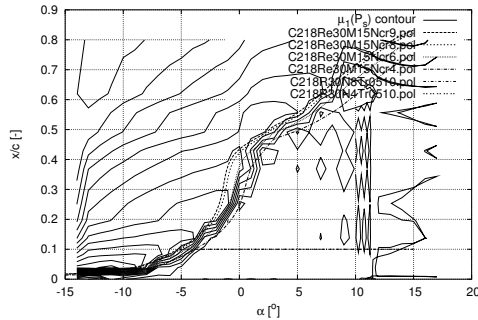


Figure 269: Fourier transform mean, $\mu_1(P_y)$

C218-Z3, Pressure side, Re = 3.0e6

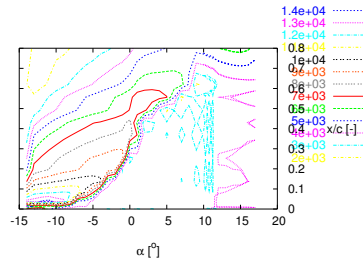


Figure 270: Contours of $\mu_1(P_s)$

C218-Z3
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.7388	18031.9	5410.9
10.25	0.6705	17927.9	5489.6
10.50	0.6946	16698.4	5536.9
10.75	0.6705	17011.4	5573.0
11.00	0.7388	15927.3	5604.9
11.25	0.6946	16812.4	5647.6
11.50	0.6946	16727.9	5691.9
11.75	0.6946	16117.4	5692.0
12.00	0.6705	15683.0	5966.5
13.00	0.7388	14925.7	6082.1
14.00	0.6946	15093.7	6234.5
15.00	0.6946	14898.9	6287.2
16.00	0.6946	13606.5	6144.7
17.00	0.7388	10127.3	5573.5
16.00	0.6946	13635.9	6127.4
15.00	0.7147	14936.9	6309.0
14.00	0.6946	14918.1	6255.8
13.00	0.7147	14737.6	6114.4
12.00	0.7147	15403.5	5982.9
11.50	0.6705	19289.2	5986.6
11.00	0.6705	19506.2	5871.9
10.50	0.6705	21228.2	5806.1
10.00	0.7388	18513.5	5517.5
9.00	0.6946	19502.3	5410.8
8.00	0.5942	24024.5	5303.4
7.00	0.5942	52508.6	6339.8
6.00	0.5340	29434.8	6551.1
5.00	0.5300	59247.0	7035.4
4.00	0.5139	50551.4	7464.5
3.00	0.4698	43568.6	7627.8
2.00	0.4698	61869.9	7621.2
1.00	0.3132	31327.2	7618.6
0.00	0.3052	50344.5	8505.8
-1.00	0.2128	75828.1	9513.4
-2.00	0.1767	69017.2	9533.3
-3.00	0.1526	65037.2	9553.1
-4.00	0.0964	74628.8	10277.8
-5.00	0.0803	70804.3	10627.4
-6.00	0.0402	75350.7	10580.8
-7.00	0.0402	97957.4	11671.7
-8.00	0.0402	99396.0	11994.5
-9.00	0.0000	106860.7	13236.9
-10.00	0.0000	98728.5	13578.3
-11.00	0.0000	111875.8	14349.2
-12.00	0.0000	91142.8	14043.3
-13.00	0.0000	88222.5	13546.3
-14.00	0.0000	103201.7	13401.6

3.2.8 Z6 ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. -

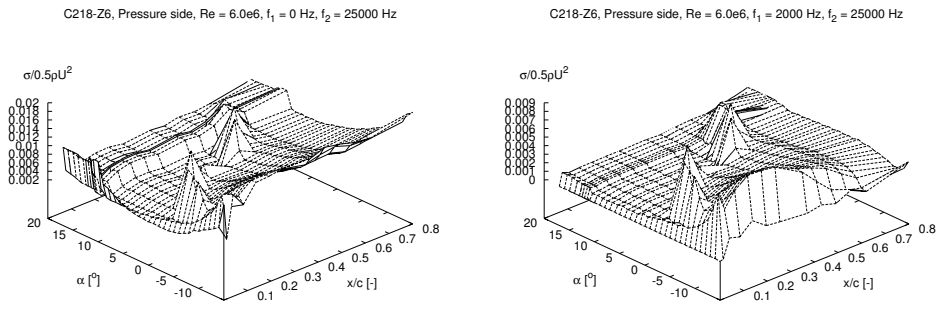


Figure 271: Pressure standard deviations, σ

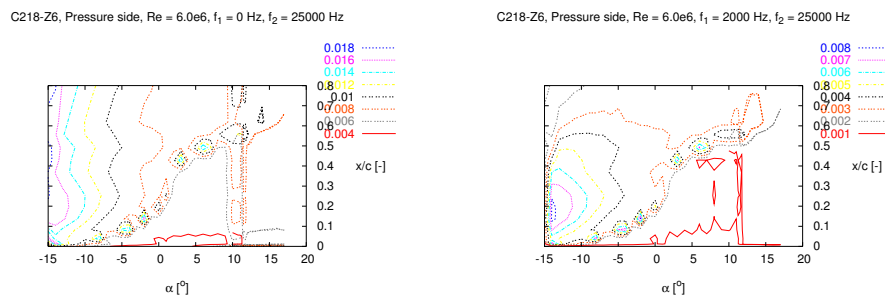


Figure 272: Contours of σ

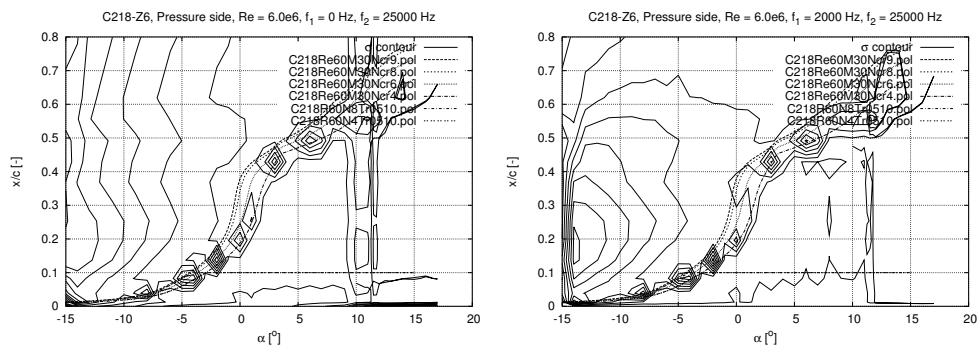


Figure 273: Contours of σ and XFOIL data

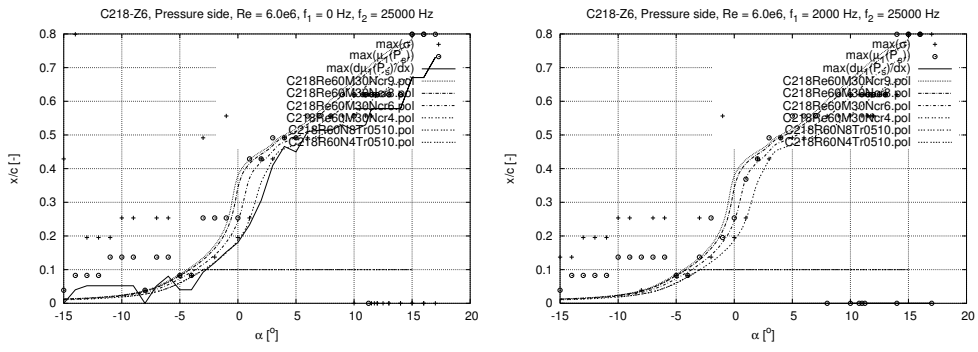


Figure 274: Transition detection

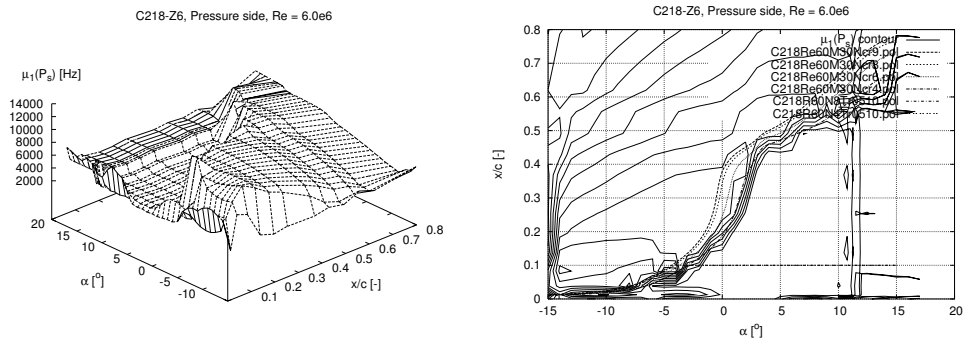


Figure 275: Fourier transform mean, $\mu_1(P_s)$

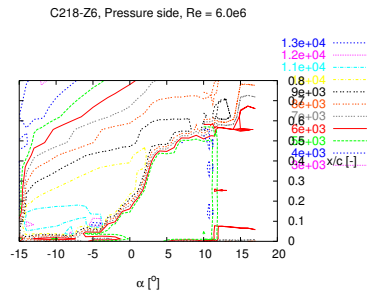


Figure 276: Contours of $\mu_1(P_s)$

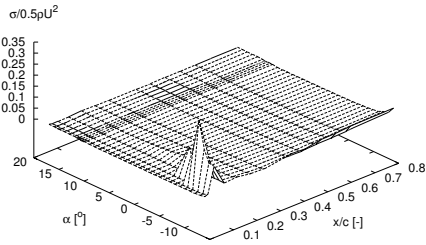
C218-Z6
alpha [degrees] angle of attack
xtr* [-] transition point (x=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.5782	61570.0	9183.4
10.75	0.5782	58507.2	8928.8
11.00	0.5782	52640.4	8715.2
11.25	0.5782	49459.4	8459.7
11.50	0.5742	43283.8	8945.1
11.75	0.5782	49372.3	9038.2
12.00	0.5782	49447.9	9634.3
13.00	0.5782	49384.4	9855.9
14.00	0.5782	30687.1	8513.4
15.00	0.6705	15468.8	8255.1
16.00	0.6705	18470.0	8324.8
17.00	0.7308	17244.3	8391.7
16.00	0.6705	18499.6	8340.8
15.00	0.6705	15271.5	8285.1
14.00	0.5782	31749.5	8562.7
13.00	0.5782	49722.7	9859.4
12.50	0.5782	52401.3	9868.1
12.00	0.5782	49356.8	9653.1
11.50	0.5782	38865.2	9424.4

11.00	0.5300	42057.9	8768.7
10.00	0.5139	60578.5	9734.6
9.00	0.5300	44880.8	8857.9
8.00	0.5139	65668.2	9719.5
7.00	0.5139	66382.7	9695.8
6.00	0.5099	40565.6	9637.5
5.00	0.4497	63915.9	9760.2
4.00	0.4658	68316.0	9887.2
3.00	0.4095	47491.6	9731.9
2.00	0.3052	47334.0	10801.2
1.00	0.2329	61177.5	10256.6
0.00	0.1807	57347.7	10960.8
-1.00	0.1526	73591.3	10975.0
-2.00	0.1205	67661.8	10992.4
-3.00	0.0923	69442.6	10953.1
-4.00	0.0402	107359.5	13415.8
-5.00	0.0402	103312.8	13515.1
-6.00	0.0803	70602.8	11136.5
-7.00	0.0522	53437.8	11309.3
-8.00	0.0000	74620.4	12321.5
-9.00	0.0522	68346.9	11539.4
-10.00	0.0522	72327.5	11596.6
-11.00	0.0522	73044.1	11583.0
-12.00	0.0522	71459.6	11631.3
-13.00	0.0522	69175.5	11994.3
-14.00	0.0402	49814.7	12332.3
-15.00	0.0000	57340.9	8853.6

3.2.9 L16 LM standard LER -

C218-L16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

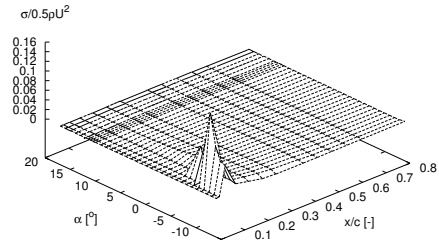
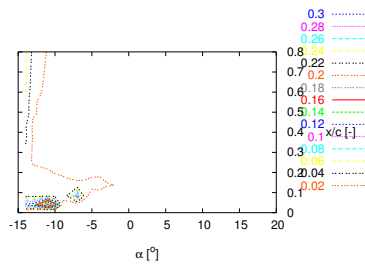


Figure 277: Pressure standard deviations, σ

C218-L16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

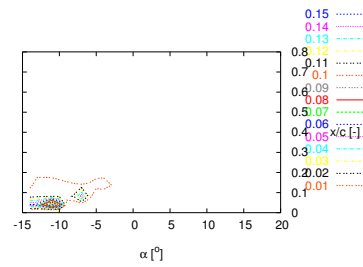


Figure 278: Contours of σ

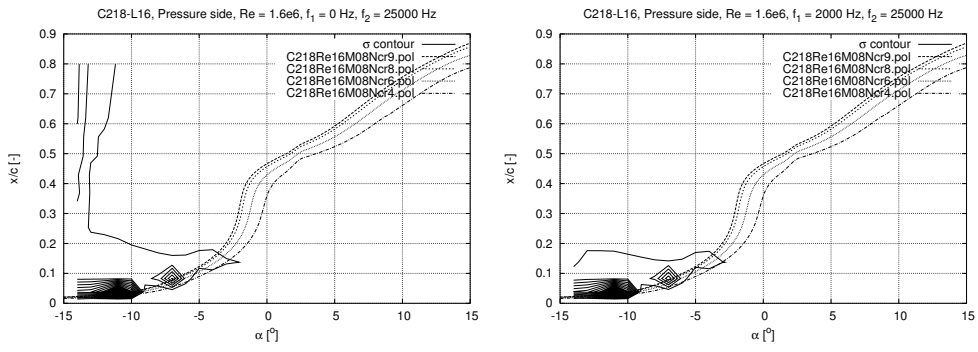


Figure 279: Contours of σ and XFOIL data

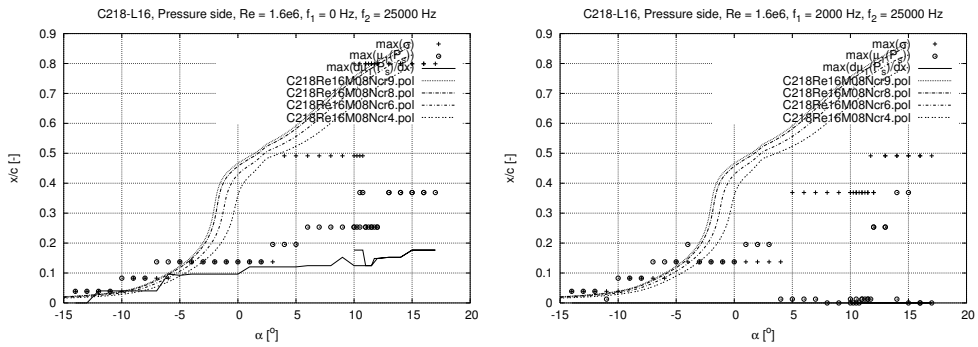


Figure 280: Transition detection

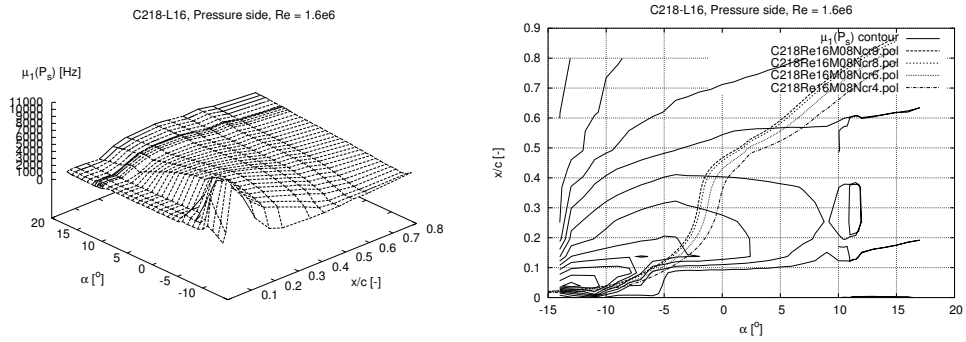


Figure 281: Fourier transform mean, $\mu_1(P_s)$

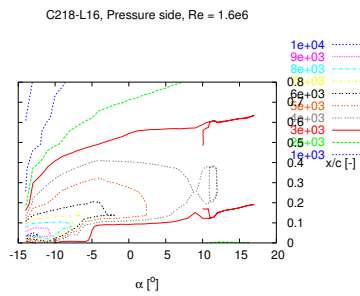


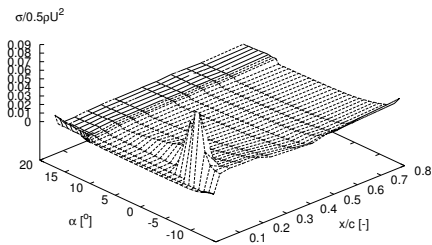
Figure 282: Contours of $\mu_1(P_s)$

C218-L16
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.1767	14961.7	3668.1
10.25	0.1767	15229.6	3749.3
10.50	0.1767	14904.9	3772.3
10.75	0.1767	15863.2	3769.4
11.00	0.1245	13333.5	4170.9
11.25	0.1245	14944.3	4155.2
11.50	0.1245	13982.8	4165.2
11.75	0.1486	14273.3	4142.3
12.00	0.1486	14773.9	3942.0
13.00	0.1526	14657.8	3940.8
14.00	0.1526	14067.4	3933.8
15.00	0.1767	13912.3	3902.0
16.00	0.1767	14214.8	3910.0
17.00	0.1767	14876.9	3886.6
16.00	0.1767	14054.6	3917.0
15.00	0.1767	13609.4	3940.5
14.00	0.1526	14108.4	3964.2
13.00	0.1526	14513.8	3966.6
12.00	0.1486	14795.6	4000.2
11.50	0.1245	14403.5	4189.2
11.00	0.1245	13819.2	4193.9
10.50	0.1245	15394.5	4187.6
10.00	0.1245	14151.8	4142.9
9.00	0.1526	14307.3	3969.0
8.00	0.1245	14360.4	4105.5
7.00	0.1245	18340.7	4220.1
6.00	0.1245	20216.7	4385.4
5.00	0.1205	23809.0	4538.6
4.00	0.1205	26411.8	4719.1
3.00	0.1205	30065.4	4893.1
2.00	0.1205	31177.6	5108.1
1.00	0.1205	34469.8	5341.7
0.00	0.0964	35682.3	5547.7
-1.00	0.0964	39288.0	5772.0
-2.00	0.0964	40546.2	6003.8
-3.00	0.0964	41702.1	6024.1
-4.00	0.0964	41346.5	6133.9
-5.00	0.0923	43734.8	6658.3
-6.00	0.0964	37106.5	6972.4
-7.00	0.0402	43125.7	7042.8
-8.00	0.0402	69034.3	8407.2
-9.00	0.0402	73559.2	8809.3
-10.00	0.0402	70666.6	8846.0
-11.00	0.0402	60334.3	9672.8
-12.00	0.0402	64583.3	9839.2
-13.00	0.0000	78581.7	10497.5
-14.00	0.0000	83008.9	9817.8

3.2.10 L3 LM standard LER -

C218-L3, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-L3, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

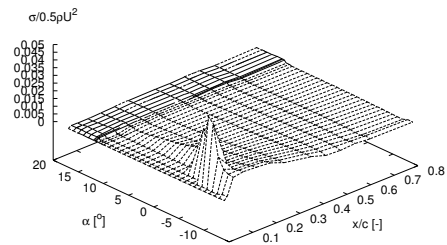
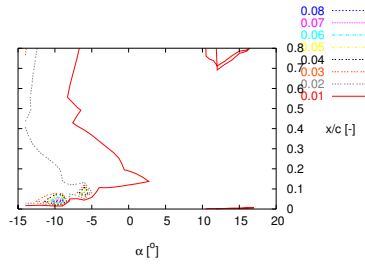


Figure 283: Pressure standard deviations, σ

C218-L3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

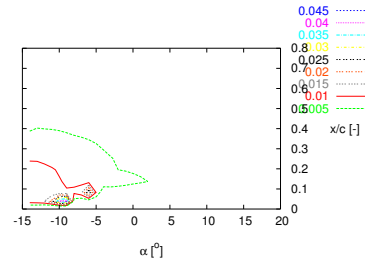
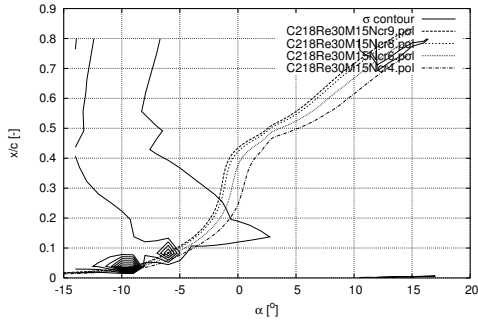


Figure 284: Contours of σ

C218-L3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

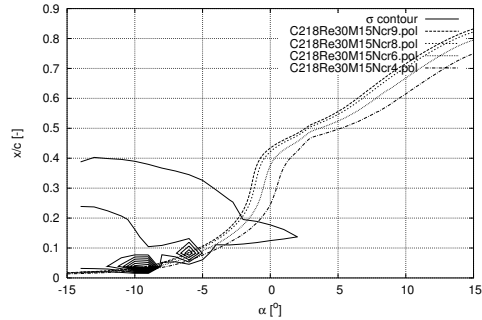
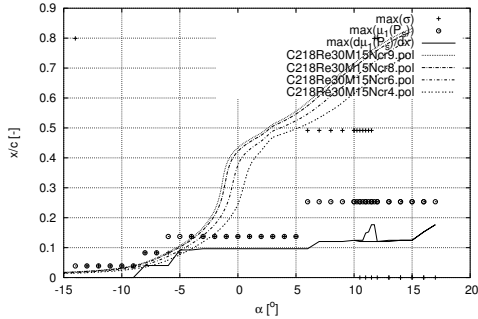


Figure 285: Contours of σ and Xfoil data

C218-L3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

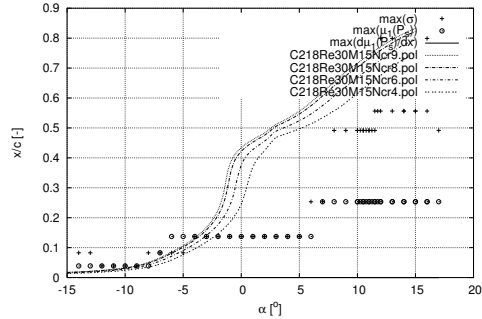
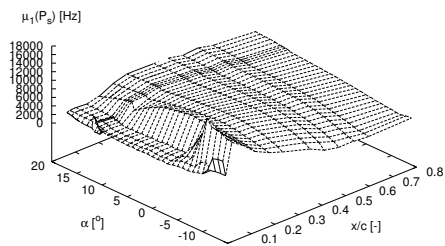


Figure 286: Transition detection

C218-L3, Pressure side, Re = 3.0e6



C218-L3, Pressure side, Re = 3.0e6

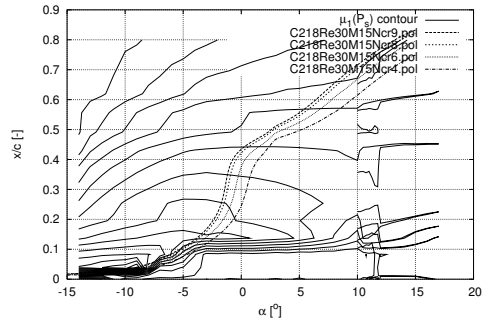


Figure 287: Fourier transform mean, $\mu_1(P_s)$

C218-L3, Pressure side, Re = 3.0e6

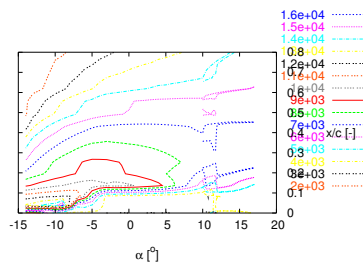


Figure 288: Contours of $\mu_1(P_s)$

C218-L3
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.1245	32105.5	7344.6
10.25	0.1245	33525.9	7346.0
10.50	0.1245	30895.4	7321.3
10.75	0.1245	31198.2	7267.1
11.00	0.1486	29551.0	7260.0
11.25	0.1526	31079.8	7186.4
11.50	0.1767	23436.9	7104.7
11.75	0.1767	23647.5	7084.1
12.00	0.1205	33411.7	7771.2
12.00	0.1245	30547.6	7744.5
14.00	0.1245	27457.5	7697.2
15.00	0.1245	24273.5	7614.3
16.00	0.1526	22776.0	7531.9
17.00	0.1767	24590.7	7467.0
16.00	0.1526	23079.3	7576.9
15.00	0.1245	24372.8	7644.8
14.00	0.1245	27568.9	7762.8
13.00	0.1205	30718.6	7837.4
12.00	0.1205	33492.7	7888.2
11.50	0.1205	40636.1	7927.7
11.00	0.1205	39524.4	7897.2
10.50	0.1205	43020.8	7920.6
10.00	0.1245	33513.4	7484.8
9.00	0.1205	41572.9	7659.0
8.00	0.1205	45489.0	7824.9
7.00	0.1205	52953.2	8007.2
6.00	0.0964	55794.0	8172.3
5.00	0.0964	64904.9	8773.3
4.00	0.0964	66992.5	9228.6
3.00	0.0964	72118.2	9480.2
2.00	0.0964	72221.7	9712.4
1.00	0.0964	73183.6	9946.6
0.00	0.0964	76970.4	10128.2
-1.00	0.0964	80527.6	10315.2
-2.00	0.0964	77745.4	10373.7
-3.00	0.0964	77096.8	10153.8
-4.00	0.0923	66666.0	10301.7
-5.00	0.0923	56853.3	10525.4
-6.00	0.0402	74218.3	10491.1
-7.00	0.0402	96879.6	11783.3
-8.00	0.0402	96603.3	12029.4
-9.00	0.0000	126821.6	16092.3
-10.00	0.0000	102909.8	14570.0
-11.00	0.0000	107118.1	14333.8
-12.00	0.0000	89176.9	13992.0
-13.00	0.0000	79657.7	13392.7
-14.00	0.0000	76255.8	13128.5

3.2.11 L6 LM standard LER -

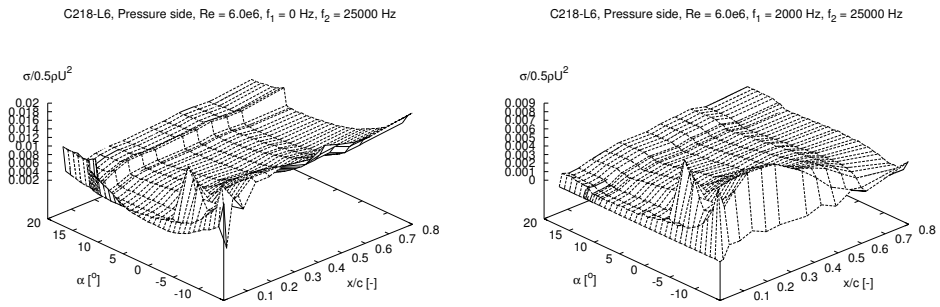


Figure 289: Pressure standard deviations, σ

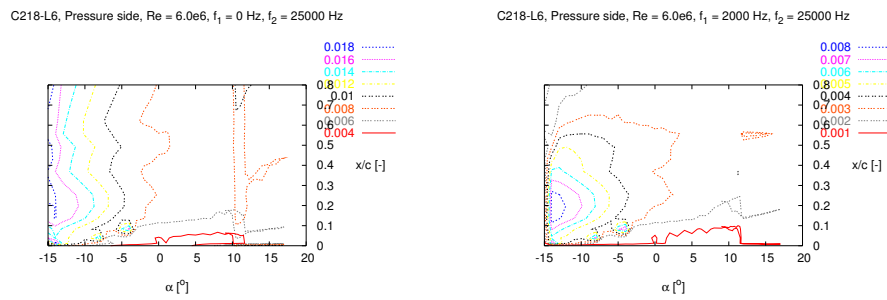


Figure 290: Contours of σ

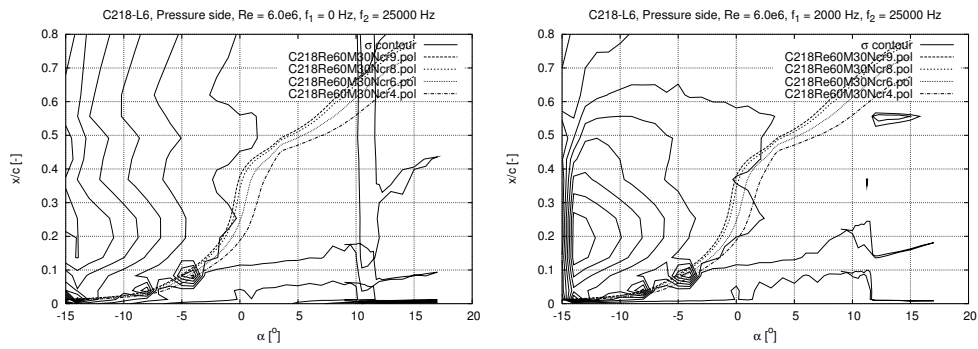


Figure 291: Contours of σ and XFOIL data

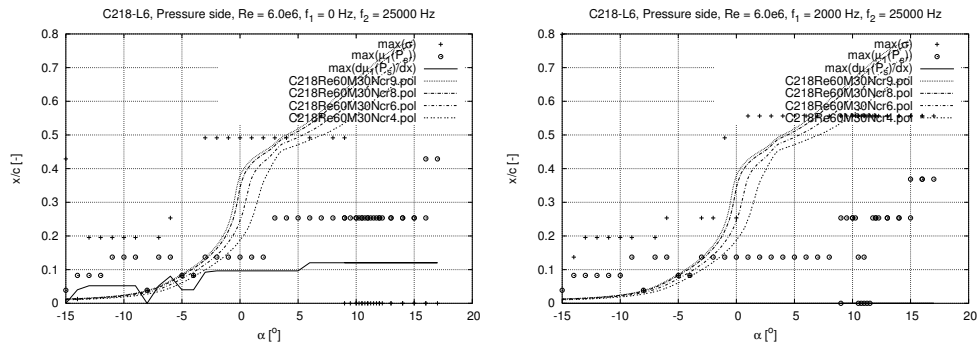


Figure 292: Transition detection

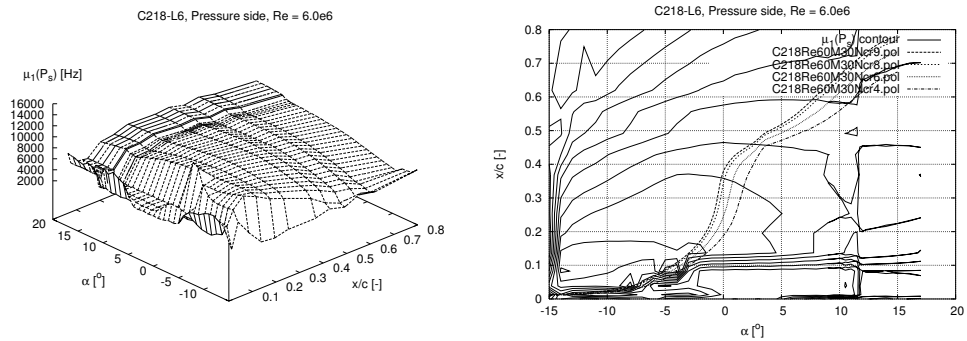


Figure 293: Fourier transform mean, $\mu_1(P_s)$

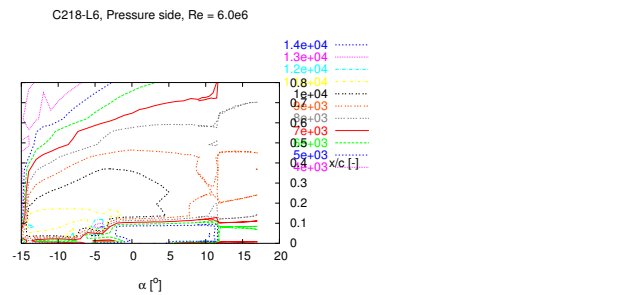


Figure 294: Contours of $\mu_1(P_s)$

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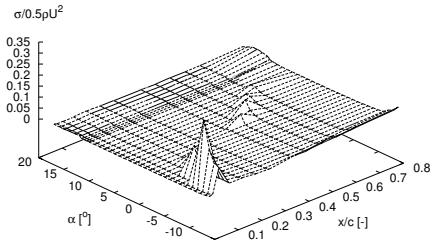
C218-L6
alpha      [degrees] angle of attack
xtr*       [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/~-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1)   [Hz] max mu1 of all chordwise positions
  
```

alpha	xtr*	d(mu1)/dx*	max(mu1)
9.00	0.1205	50784.5	9327.2
10.00	0.1205	47473.3	9158.6
10.25	0.1205	44940.0	9119.2
10.50	0.1205	46314.0	9057.9
10.75	0.1205	42965.3	9016.4
11.00	0.1205	44156.3	8962.0
11.25	0.1205	42084.8	8890.6
11.50	0.1205	42390.6	8876.6
11.75	0.1205	33873.7	9545.9
12.00	0.1205	33930.9	9561.3
12.25	0.1205	33588.5	9499.4
13.00	0.1205	32589.9	9475.4
14.00	0.1205	31147.5	9458.9
15.00	0.1205	29903.2	9379.8
16.00	0.1205	28024.0	9300.4
17.00	0.1205	26046.5	9236.5
16.00	0.1205	28063.0	9286.4
15.00	0.1205	29725.8	9366.6
14.00	0.1205	31323.5	9399.2

13.00	0.1205	32622.9	9474.8
12.00	0.1205	33808.3	9546.5
11.00	0.1205	45431.8	9118.9
10.50	0.1205	43081.5	9143.2
10.00	0.1205	46383.2	9140.6
9.50	0.1205	47158.9	9261.8
9.00	0.1205	51143.1	9320.0
8.00	0.1205	52611.4	9548.0
7.00	0.1205	57246.2	9666.8
6.00	0.1205	59320.1	9862.6
5.00	0.0964	63652.7	10007.0
4.00	0.0964	64966.1	10175.4
3.00	0.0964	67972.8	10302.1
2.00	0.0964	69024.6	10470.2
1.00	0.0964	71305.4	10581.9
0.00	0.0964	71244.5	10706.8
-1.00	0.0964	73481.1	10786.1
-2.00	0.0964	75383.8	11231.4
-3.00	0.0923	61709.3	11223.8
-4.00	0.0402	113615.8	14061.5
-5.00	0.0402	101253.5	13476.3
-6.00	0.0803	69187.9	11177.9
-7.00	0.0522	52903.3	11264.2
-8.00	0.0000	75211.7	12466.5
-9.00	0.0522	67030.9	11432.7
-10.00	0.0522	70788.0	11484.6
-11.00	0.0522	72642.1	11515.8
-12.00	0.0522	68115.8	11646.4
-13.00	0.0522	67956.2	11934.8
-14.00	0.0402	49600.6	12185.3
-15.00	0.0000	46736.7	8659.5

3.2.12 T16 Trip wire. Bump tape 2% -

C218-T16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

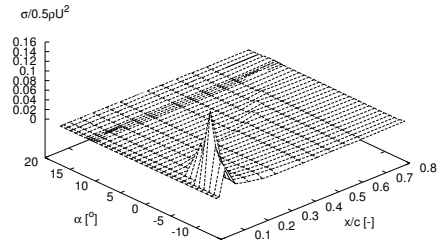
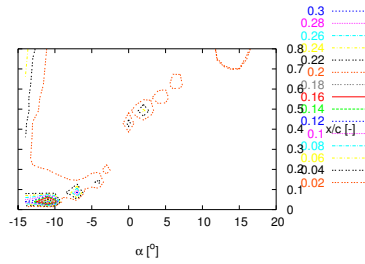


Figure 295: Pressure standard deviations, σ

C218-T16, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

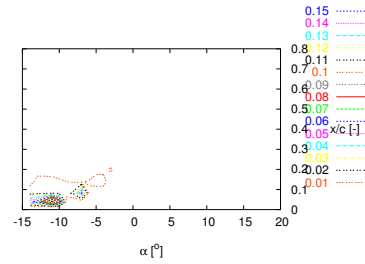


Figure 296: Contours of σ

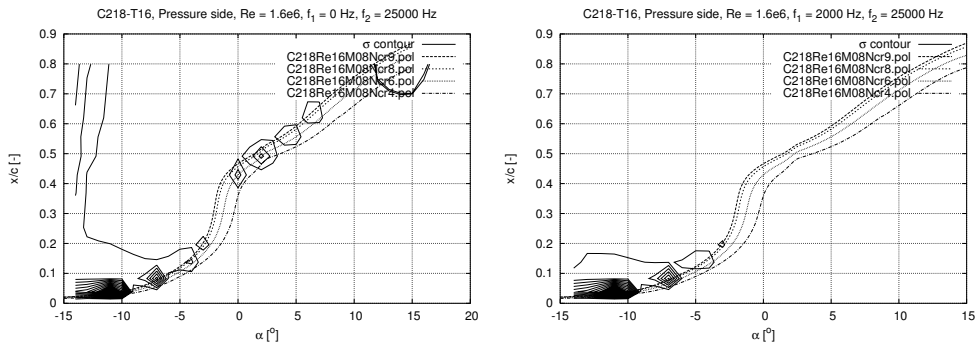


Figure 297: Contours of σ and XFOIL data

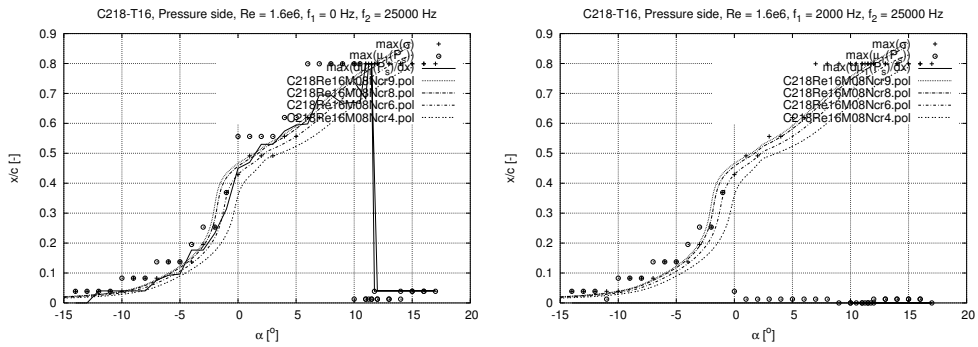


Figure 298: Transition detection

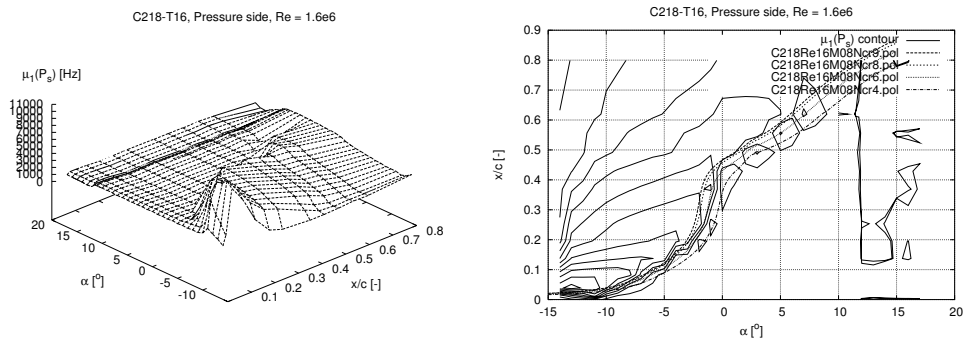


Figure 299: Fourier transform mean, $\mu_1(P_s)$

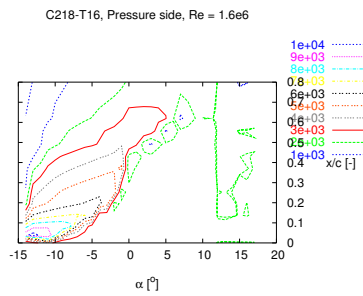


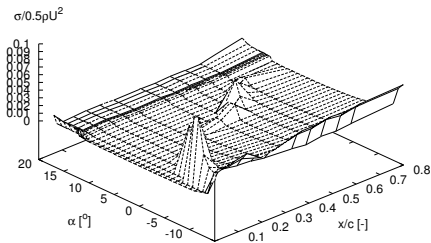
Figure 300: Contours of $\mu_1(P_s)$

C218-T16
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.7388	2677.1	2475.0
11.00	0.6826	2388.9	2465.3
11.25	0.7990	2376.9	2510.9
11.50	0.7990	2280.4	2428.1
11.75	0.0402	3412.5	2562.7
12.00	0.0402	2099.2	2216.0
13.00	0.0402	3054.1	2179.6
14.00	0.0402	2782.9	2195.0
15.00	0.0402	2530.4	2220.7
16.00	0.0402	2310.8	2199.6
17.00	0.0402	2687.4	2232.9
16.00	0.0402	2676.4	2231.6
15.00	0.0402	2835.4	2227.3
14.00	0.0402	2428.3	2214.3
13.00	0.0402	3414.7	2210.6
12.00	0.0402	2383.6	2255.4
11.50	0.7990	2287.2	2426.1
11.00	0.7990	2444.7	2526.7
10.50	0.6665	3081.8	2556.8
10.00	0.6705	2867.3	2577.6
9.00	0.6665	3407.4	2614.2
8.00	0.6946	6359.4	2607.0
7.00	0.6946	9739.6	2570.9
6.00	0.5983	5832.2	2564.3
5.00	0.5942	24282.2	3041.7
4.00	0.5742	10915.9	3220.2
3.00	0.5300	29830.7	3482.9
2.00	0.5300	24677.8	3816.0
1.00	0.4698	25263.9	3962.7
0.00	0.4497	27909.8	3992.2
-1.00	0.3132	31381.4	5132.1
-2.00	0.2329	47825.8	5834.1
-3.00	0.1767	41072.6	5951.1
-4.00	0.1767	45903.0	6208.2
-5.00	0.0964	46991.1	6549.6
-6.00	0.0923	47417.4	7004.0
-7.00	0.0763	42848.1	7112.6
-8.00	0.0402	70756.2	8370.9
-9.00	0.0402	76069.2	8834.7
-10.00	0.0402	73340.7	8865.0
-11.00	0.0402	61180.7	9704.3
-12.00	0.0402	66719.9	9842.7
-13.00	0.0000	79289.7	10488.9
-14.00	0.0000	83031.6	9752.4

3.2.13 T3 Trip wire. Bump tape 2% -

C218-T3, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-T3, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

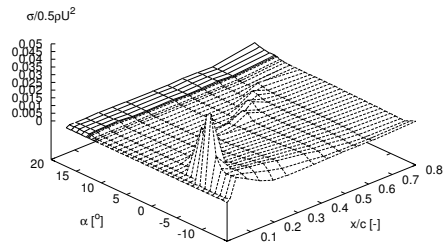
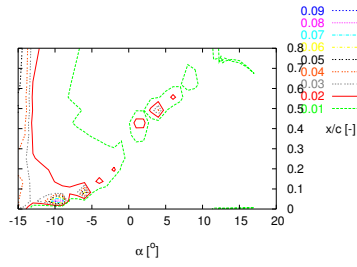


Figure 301: Pressure standard deviations, σ

C218-T3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

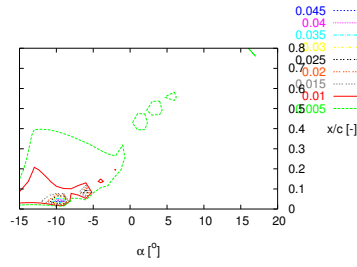
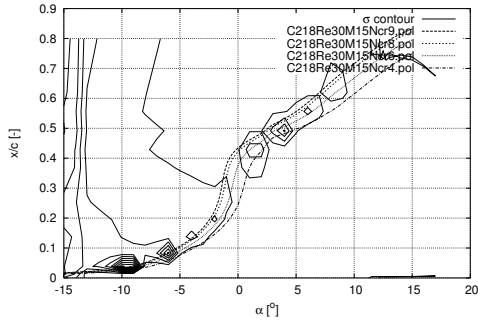


Figure 302: Contours of σ

C218-T3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

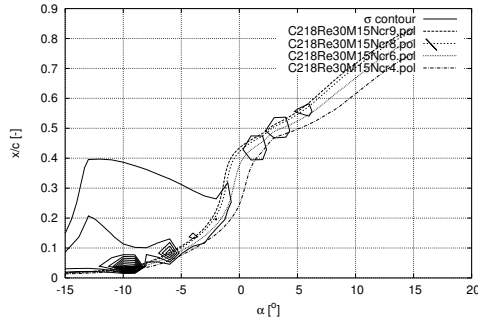
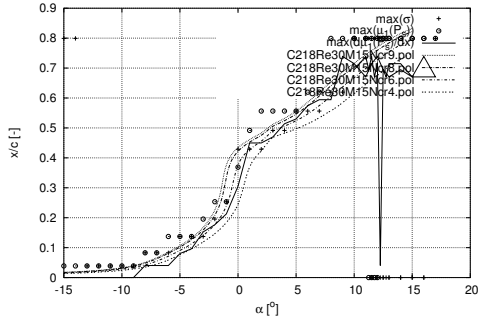


Figure 303: Contours of σ and XFOIL data

C218-T3, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

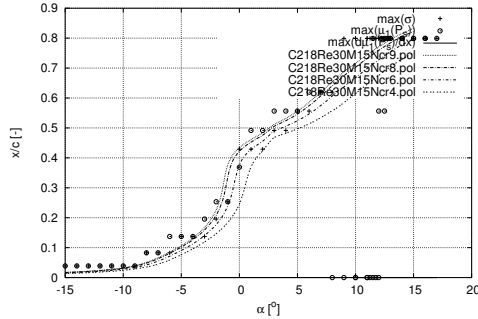
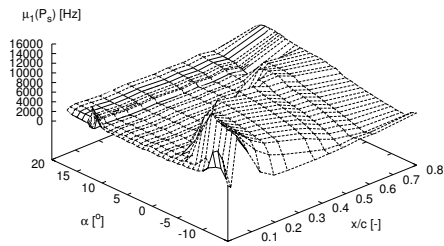


Figure 304: Transition detection

C218-T3, Pressure side, Re = 3.0e6



C218-T3, Pressure side, Re = 3.0e6

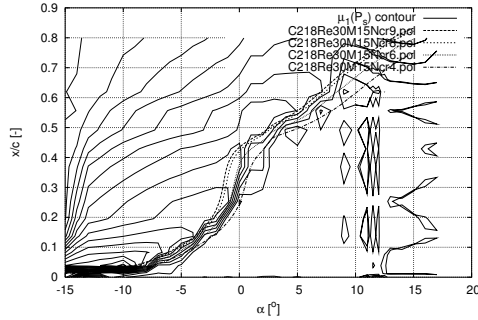


Figure 305: Fourier transform mean, $\mu_1(P_y)$

C218-T3, Pressure side, Re = 3.0e6

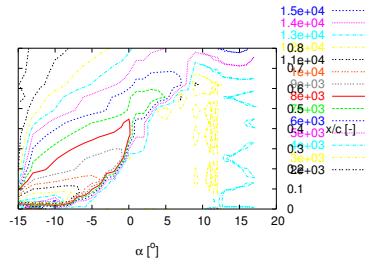


Figure 306: Contours of $\mu_1(P_s)$

C218-T3
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.6946	17380.5	5382.4
11.00	0.7388	16321.9	5567.4
11.25	0.6946	15440.7	5626.8
11.50	0.7388	16455.8	6167.1
11.75	0.6705	15808.1	6585.6
12.00	0.7147	16868.8	6917.0
12.25	0.0402	16310.0	5952.9
12.50	0.6946	17233.8	6086.6
12.75	0.6705	14861.5	6048.4
13.00	0.7147	14809.2	6116.5
14.00	0.7147	15262.2	6264.0
15.00	0.6705	15115.1	6321.5
16.00	0.7388	13732.4	6108.1
17.00	0.6705	9459.7	5405.5
16.00	0.6705	13482.0	6097.8
15.00	0.6705	15219.8	6317.4
14.00	0.6946	15518.5	6269.2
13.00	0.6705	15215.1	6207.2
12.50	0.6946	15095.5	6067.5
12.00	0.7388	17361.3	6038.3
11.50	0.7147	16402.3	5920.9
11.00	0.6705	16692.3	5621.3
10.00	0.7147	18098.1	5502.2
9.00	0.7388	19674.7	5364.2
8.00	0.5942	18124.7	5216.5
7.00	0.5942	50702.6	6236.1
6.00	0.5742	28323.0	6535.3
5.00	0.5300	56697.5	6938.8
4.00	0.5139	53169.0	7479.0
3.00	0.4698	40150.5	7657.6
2.00	0.4497	28058.2	7594.6
1.00	0.4497	27809.8	7595.0
0.00	0.3052	49658.9	8567.6
-1.00	0.2128	75071.2	9472.6
-2.00	0.1767	66478.2	9581.6
-3.00	0.1526	66510.8	9624.4
-4.00	0.0964	73468.1	10127.1
-5.00	0.0803	70183.3	10636.5
-6.00	0.0402	75171.1	10610.7
-7.00	0.0402	98291.2	11690.8
-8.00	0.0402	100139.5	12061.7
-9.00	0.0000	107609.4	13291.8
-10.00	0.0000	116189.5	15390.0
-11.00	0.0000	111935.1	14348.6
-12.00	0.0000	90653.2	13998.6
-13.00	0.0000	79283.0	13457.7
-14.00	0.0000	97294.6	13360.1
-15.00	0.0000	120085.3	13011.9

3.2.14 T6 Trip wire. Bump tape 2% -

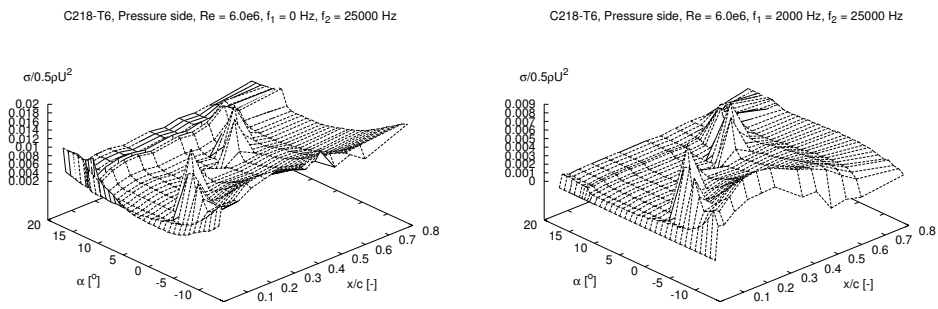


Figure 307: Pressure standard deviations, σ

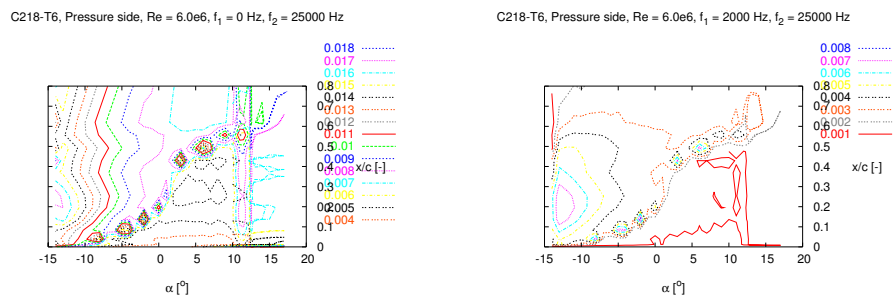


Figure 308: Contours of σ

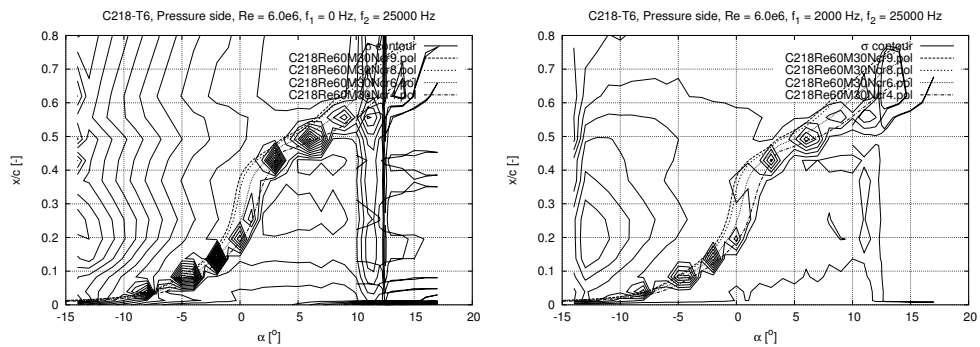


Figure 309: Contours of σ and XFOIL data

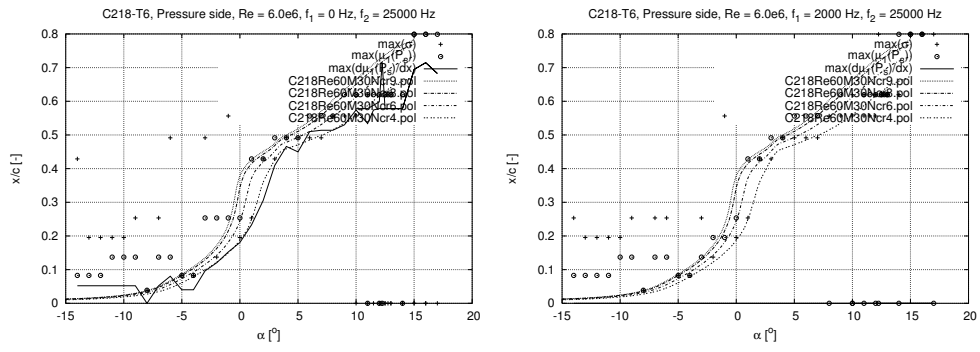


Figure 310: Transition detection

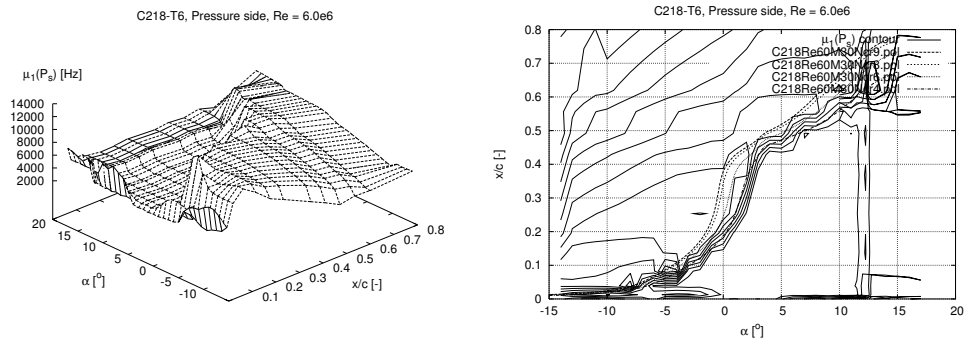


Figure 311: Fourier transform mean, $\mu_1(P_s)$

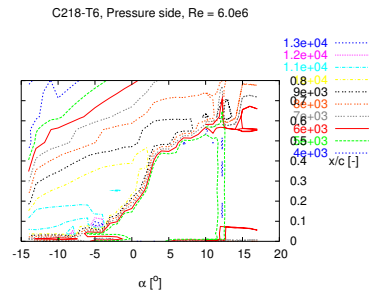


Figure 312: Contours of $\mu_1(P_s)$

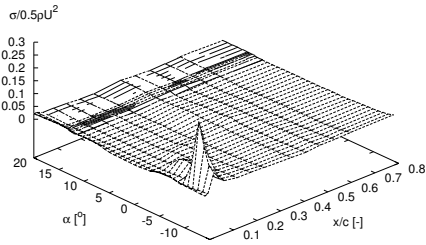
C218-T6
alpha [degrees] angle of attack
xtr* [-] transition point (x*=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.5782	61014.8	9147.1
11.00	0.5782	51453.8	8550.5
12.00	0.5983	15702.8	8311.5
12.25	0.7147	16304.6	8198.8
12.50	0.5782	58723.5	9448.9
12.75	0.5782	49801.8	9803.3
13.00	0.5782	47408.9	9722.2
14.00	0.5782	27564.7	8266.2
15.00	0.6946	15730.8	8243.8
16.00	0.7147	18383.3	8322.0
17.00	0.6826	17091.3	8386.8
16.00	0.7147	18465.4	8351.5
15.00	0.6946	15707.8	8268.2
14.00	0.5782	29313.8	8350.3
13.00	0.5782	49133.6	9827.4
12.50	0.5782	52252.8	9861.3
12.00	0.5782	50695.4	9647.6
11.50	0.5742	43174.6	8971.2
11.00	0.5340	35519.5	8801.4

10.00	0.5742	47809.1	9139.9
9.00	0.5300	42523.2	8898.1
8.00	0.5139	63983.5	9652.8
7.00	0.5139	67084.1	9707.0
6.00	0.5099	41897.1	9670.1
5.00	0.4497	63521.0	9727.6
4.00	0.4658	67944.3	9873.7
3.00	0.4095	46118.8	9740.0
2.00	0.3052	46694.1	10777.2
1.00	0.2329	57146.7	10276.3
0.00	0.1807	56515.2	10960.4
-1.00	0.1526	74512.3	10985.8
-2.00	0.1205	66444.3	11014.4
-3.00	0.0964	71854.1	10988.4
-4.00	0.0402	104325.6	13158.6
-5.00	0.0402	107825.1	13795.0
-6.00	0.0803	71765.9	11158.2
-7.00	0.0522	53305.6	11334.5
-8.00	0.0000	77530.7	12648.1
-9.00	0.0522	67622.8	11558.5
-10.00	0.0522	71783.6	11599.6
-11.00	0.0522	69165.7	11610.3
-12.00	0.0522	68154.8	11606.6
-13.00	0.0522	67867.3	11910.6
-14.00	0.0522	54826.4	11841.0

3.2.15 C16a Clean 200x200

C218-C16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

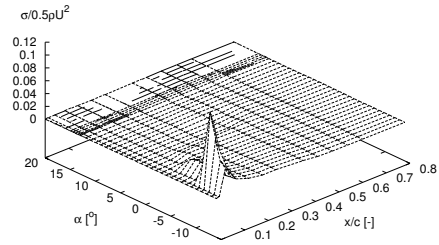
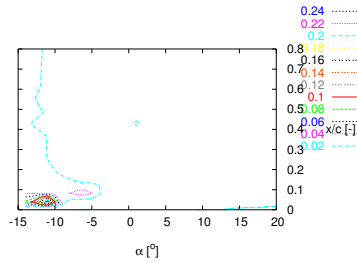


Figure 313: Pressure standard deviations, σ

C218-C16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

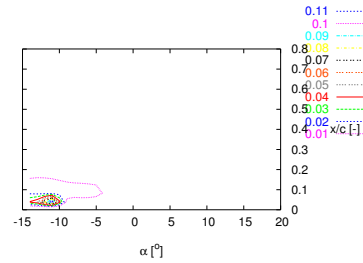


Figure 314: Contours of σ

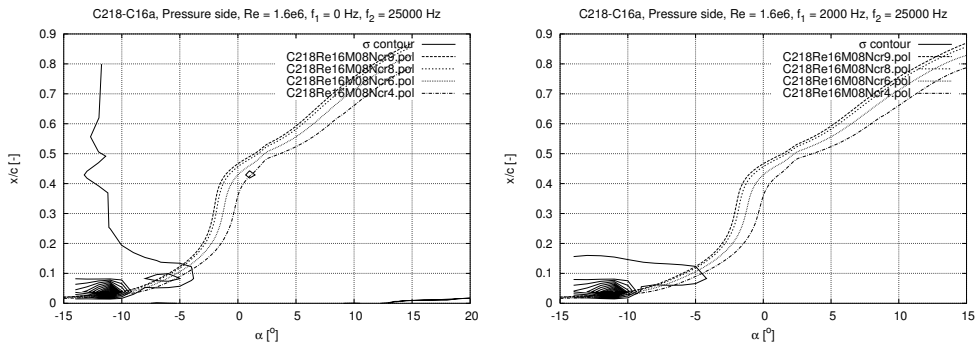


Figure 315: Contours of σ and XFOIL data

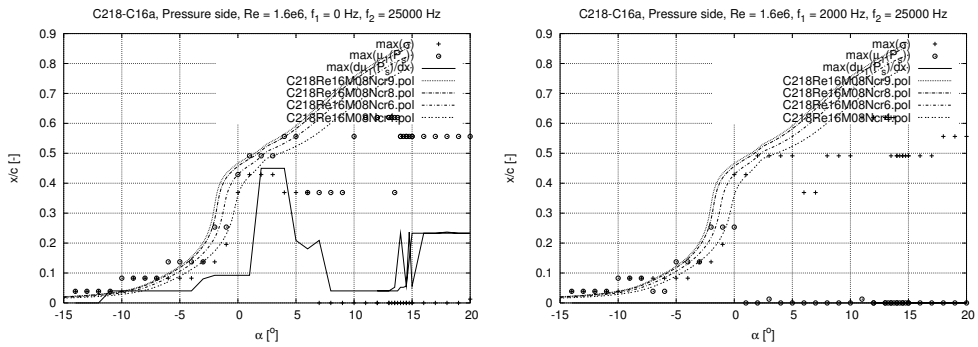


Figure 316: Transition detection

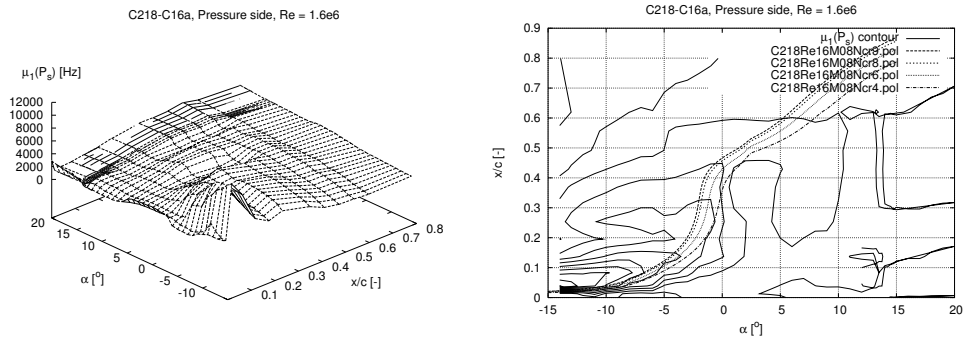


Figure 317: Fourier transform mean, $\mu_1(P_s)$

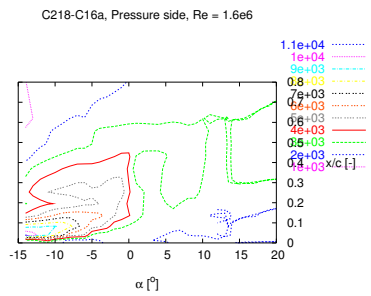


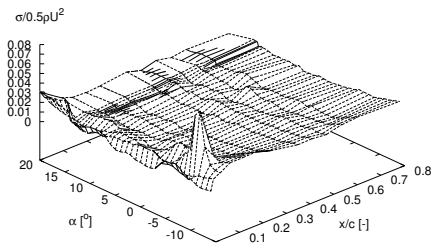
Figure 318: Contours of $\mu_1(P_s)$

C218-C16a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0402	10503.3	2843.4
13.00	0.0402	10486.9	2952.9
13.25	0.0402	10927.4	3027.5
13.50	0.0402	9783.6	2992.1
13.75	0.0402	9004.7	2982.1
14.00	0.0522	6614.1	3365.4
14.25	0.0522	6640.6	3374.9
14.50	0.0562	6871.8	3434.2
14.75	0.2369	7229.2	3460.7
15.00	0.0562	6691.2	3452.4
16.00	0.2329	7492.0	3535.8
17.00	0.2329	8085.1	3635.9
18.00	0.2369	7655.0	3684.0
19.00	0.2329	7964.2	3711.6
20.00	0.2329	7896.3	3724.7
15.00	0.2329	7204.4	3497.1
14.50	0.0562	7067.5	3467.5
14.00	0.2329	7063.1	3374.9
13.50	0.0522	7170.2	3345.7
13.00	0.0402	10569.1	3005.0
12.00	0.0402	10800.2	3032.4
11.00	0.0402	11572.2	3073.7
10.00	0.0402	12342.8	3460.0
9.00	0.0402	12931.1	3599.2
8.00	0.0402	12379.2	3573.9
7.00	0.2088	10195.1	3752.6
6.00	0.1807	10646.9	3881.3
5.00	0.2088	8913.9	3579.3
4.00	0.4497	11133.3	3493.1
3.00	0.4497	12480.9	3527.6
2.00	0.4497	13410.2	3608.1
1.00	0.0923	12089.0	3681.7
0.00	0.0923	18617.8	4161.3
-1.00	0.0923	22975.7	5524.6
-2.00	0.0923	28945.1	5738.9
-3.00	0.0803	36533.7	5697.3
-4.00	0.0402	44594.8	6232.5
-5.00	0.0402	50276.4	6355.0
-6.00	0.0402	59344.5	6448.6
-7.00	0.0402	71557.5	7262.9
-8.00	0.0402	80332.6	8241.5
-9.00	0.0402	80888.6	8910.8
-10.00	0.0402	78786.7	9036.1
-11.00	0.0402	74672.8	9043.2
-12.00	0.0000	81977.0	9464.7
-13.00	0.0000	98550.1	10529.6
-14.00	0.0000	103508.1	11030.6

3.2.16 C3a Clean 200x200

C218-C3a, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C3a, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

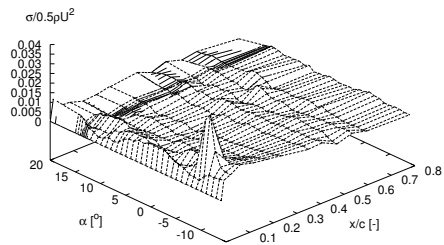
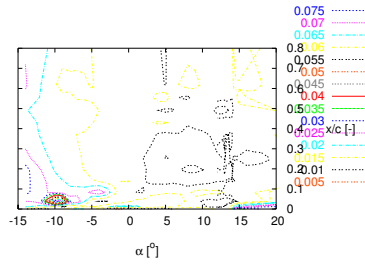


Figure 319: Pressure standard deviations, σ

C218-C3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

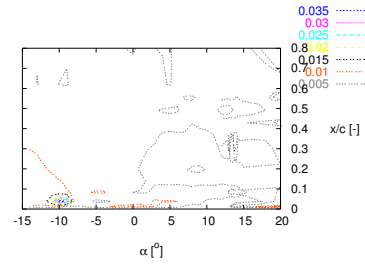
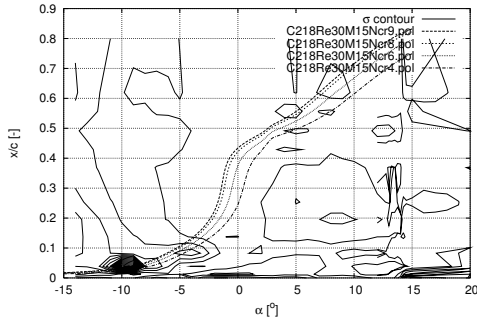


Figure 320: Contours of σ

C218-C3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

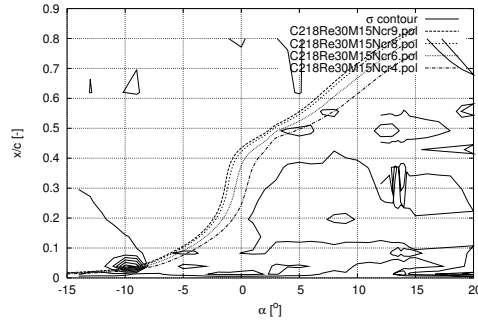
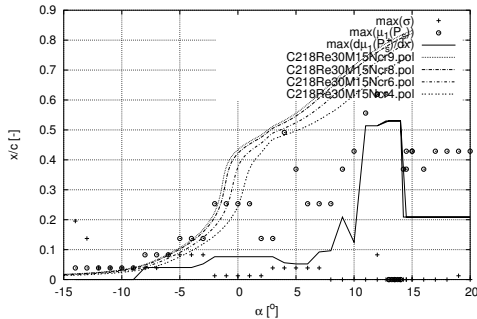


Figure 321: Contours of σ and Xfoil data

C218-C3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-C3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

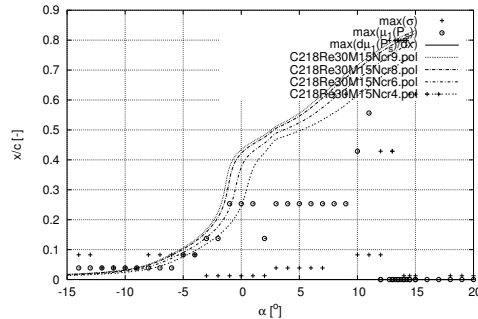
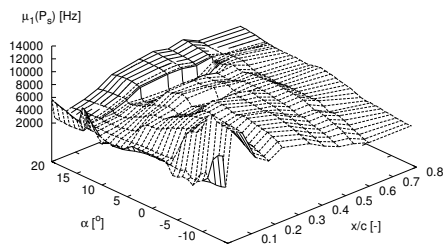


Figure 322: Transition detection

C218-C3a, Pressure side, Re = 3.0e6



C218-C3a, Pressure side, Re = 3.0e6

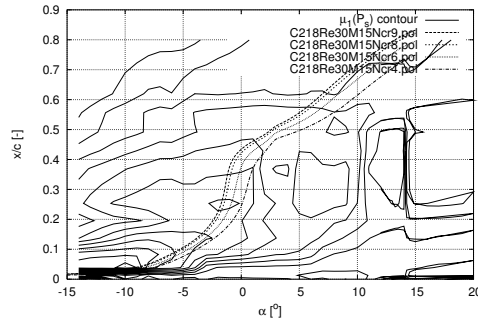


Figure 323: Fourier transform mean, $\mu_1(P_s)$

C218-C3a, Pressure side, Re = 3.0e6

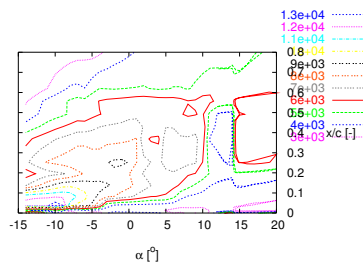


Figure 324: Contours of $\mu_1(P_s)$

C218-C3a
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.5139	22689.4	5761.0
12.75	0.5300	23555.1	5739.4
13.00	0.5300	21990.1	5998.0
13.25	0.5300	23106.8	6263.4
13.50	0.5300	22920.6	6464.2
13.75	0.5300	23463.8	6522.8
14.00	0.5300	22980.9	6523.6
14.25	0.2088	16924.9	6233.7
14.50	0.2088	17507.3	6258.9
15.00	0.2088	18303.6	6417.1
16.00	0.2088	20635.8	6573.6
17.00	0.2088	21778.1	6674.4
18.00	0.2088	21588.3	6712.4
19.00	0.2088	21205.2	6836.1
20.00	0.2088	19952.5	6800.5
15.00	0.2088	17918.0	6540.1
14.50	0.2088	15656.7	6280.0
14.00	0.5300	19443.3	6523.3
13.50	0.5300	22452.3	6500.3
13.00	0.5300	22684.4	6140.1
12.00	0.5139	22148.3	5803.3
11.00	0.5139	18647.2	6198.4
10.00	0.1245	16384.6	6746.7
9.00	0.2088	19528.8	7198.7
8.00	0.0964	21233.6	7288.8
7.00	0.0923	26169.4	7613.0
6.00	0.0522	32860.2	7841.7
5.00	0.0522	35851.4	7542.2
4.00	0.0562	33696.5	6759.9
3.00	0.0763	36098.3	7007.4
2.00	0.0763	40299.7	7462.7
1.00	0.0763	44881.8	8044.3
0.00	0.0763	49485.7	8966.5
-1.00	0.0763	53546.6	9155.9
-2.00	0.0763	55881.6	9138.7
-3.00	0.0522	56531.0	9062.5
-4.00	0.0402	73461.0	9434.7
-5.00	0.0402	80038.7	9468.7
-6.00	0.0402	85561.1	10290.4
-7.00	0.0402	92636.1	10896.2
-8.00	0.0402	108229.9	11624.8
-9.00	0.0000	113732.5	12982.6
-10.00	0.0000	112621.8	13634.6
-11.00	0.0000	112242.5	12852.4
-12.00	0.0000	98407.6	12721.1
-13.00	0.0000	92649.5	12675.3
-14.00	0.0000	87240.0	12541.7

3.2.17 C6a Clean 200x200

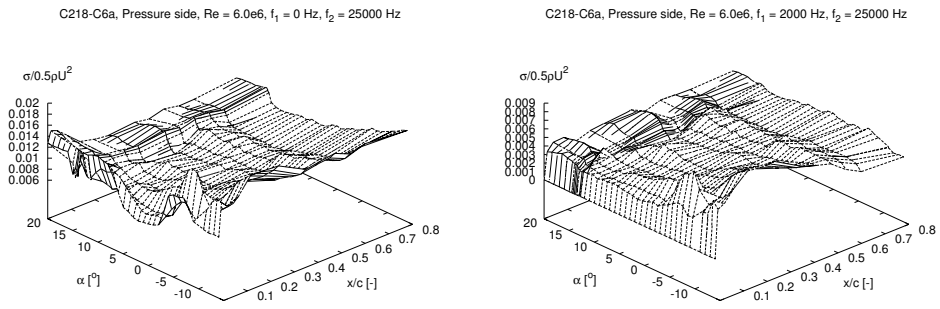


Figure 325: Pressure standard deviations, σ

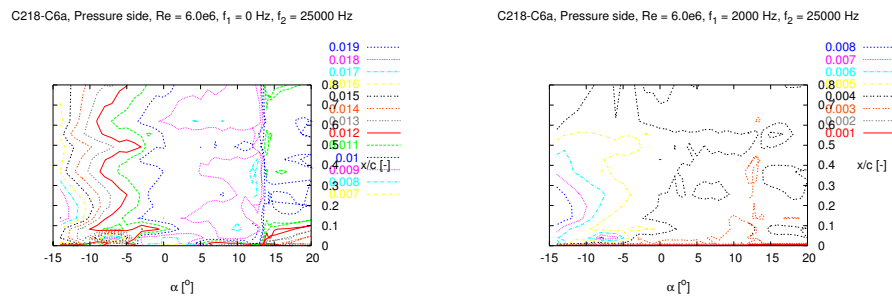


Figure 326: Contours of σ

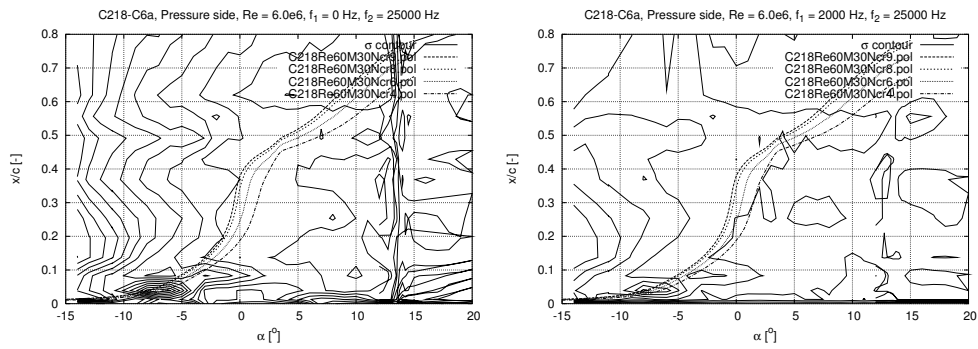


Figure 327: Contours of σ and XFOIL data

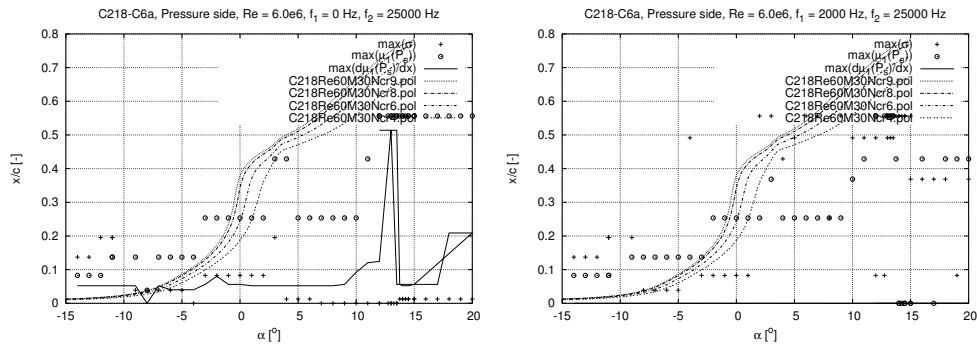


Figure 328: Transition detection

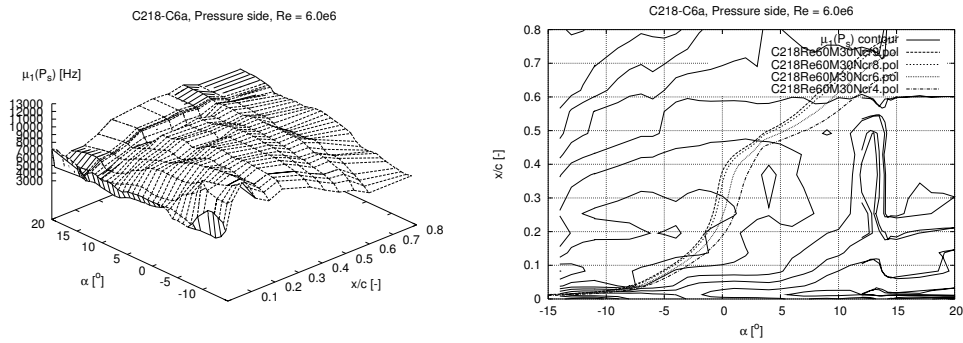


Figure 329: Fourier transform mean, $\mu_1(P_s)$

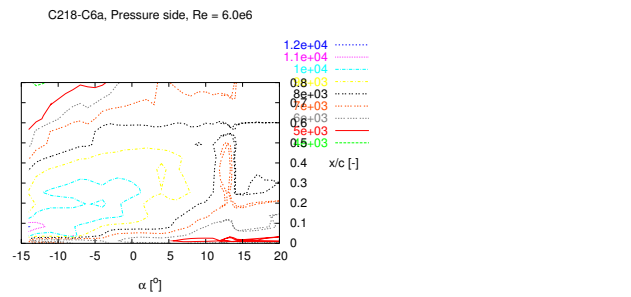


Figure 330: Contours of $\mu_1(P_s)$

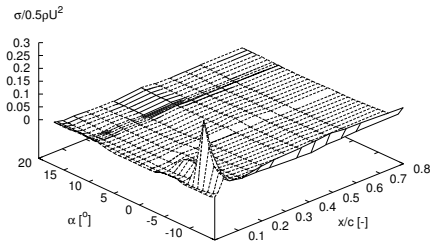
C218-C6a
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.5139	13978.5	8371.0
12.75	0.5139	19859.1	8306.0
13.00	0.5139	17628.6	8249.2
13.25	0.5139	15247.1	8185.1
13.50	0.5139	12750.5	8151.9
13.75	0.0562	15819.1	8128.9
14.00	0.0522	17358.4	8195.2
14.25	0.0522	18439.4	8511.6
14.50	0.0522	18070.5	8461.9
15.00	0.0562	18686.9	8585.3
16.00	0.0562	18218.8	8620.6
17.00	0.0562	16823.9	8657.5
18.00	0.2088	16333.4	8585.3
19.00	0.2088	17395.0	8602.0
20.00	0.2088	18132.9	8573.0
15.00	0.0562	17523.5	8568.2
14.50	0.0562	17756.6	8507.7
14.00	0.0562	16565.5	8455.3
13.50	0.0562	13399.9	8152.1

13.00	0.5139	16974.2	8275.2
12.00	0.1245	15283.1	8419.7
11.00	0.1205	17420.0	8572.5
10.00	0.0923	19852.9	8798.1
9.00	0.0562	22937.3	8909.4
8.00	0.0522	30440.1	8970.1
7.00	0.0522	33072.9	9228.2
6.00	0.0522	32750.8	9489.9
5.00	0.0522	35763.6	9440.3
4.00	0.0522	37401.6	9408.0
3.00	0.0522	39005.3	9507.8
2.00	0.0522	39469.2	9613.1
1.00	0.0522	39979.7	10099.5
0.00	0.0562	39681.8	10332.3
-1.00	0.0562	38308.3	10469.4
-2.00	0.0803	37618.5	10546.3
-3.00	0.0562	34314.5	10413.2
-4.00	0.0402	43009.7	10382.6
-5.00	0.0402	47251.6	10550.0
-6.00	0.0402	51610.0	10661.0
-7.00	0.0522	56486.7	10735.5
-8.00	0.0000	72718.1	11038.8
-9.00	0.0522	61895.0	10906.8
-11.00	0.0522	64807.4	10942.4
-11.00	0.0522	64847.6	10951.4
-12.00	0.0522	67671.3	11052.5
-13.00	0.0522	64701.6	11436.6
-14.00	0.0522	55435.9	12029.9

3.2.18 Z16a ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 200x200

C218-Z16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

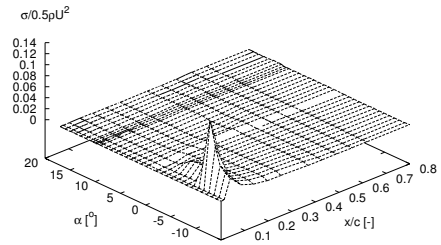
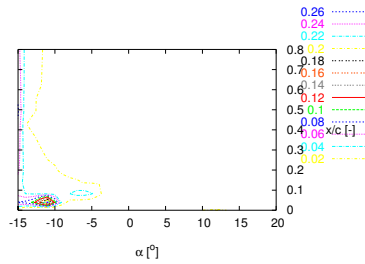


Figure 331: Pressure standard deviations, σ

C218-Z16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

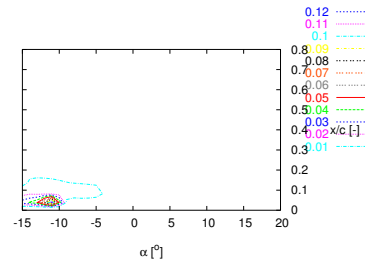


Figure 332: Contours of σ

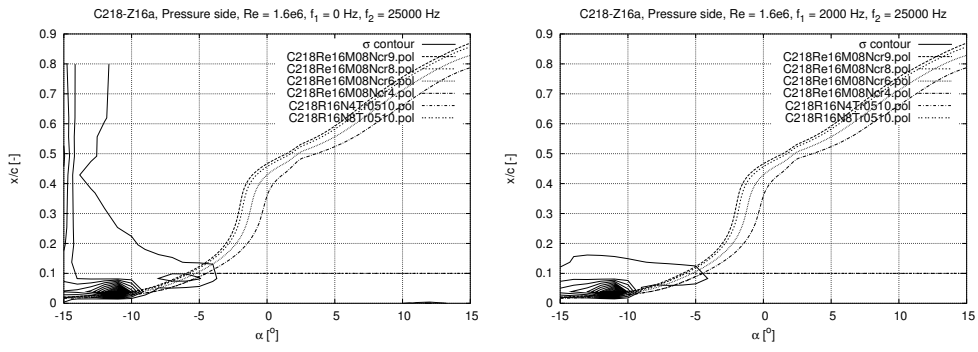


Figure 333: Contours of σ and XFOIL data

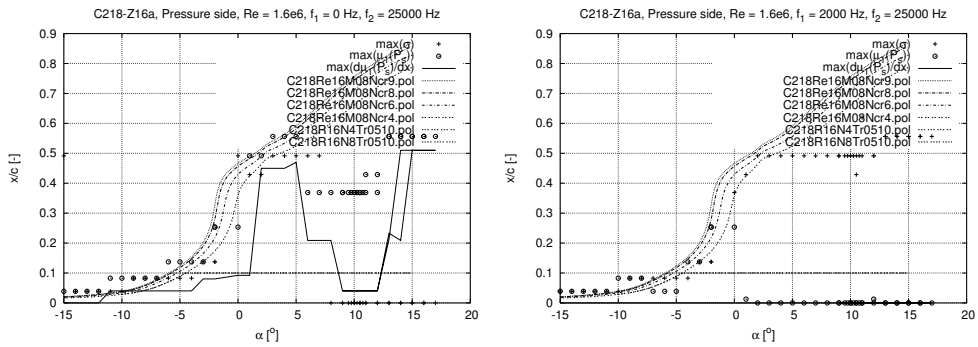


Figure 334: Transition detection

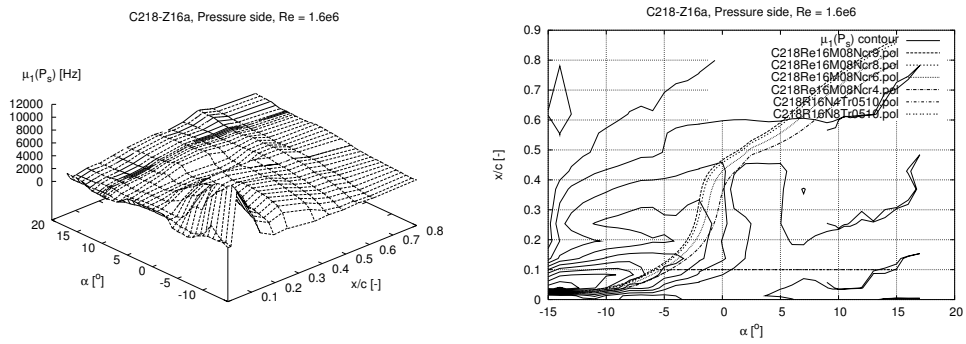


Figure 335: Fourier transform mean, $\mu_1(P_s)$

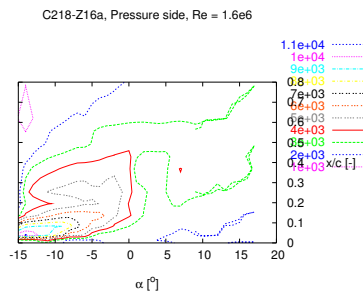


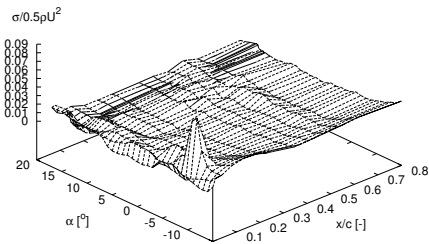
Figure 336: Contours of $\mu_1(P_s)$

C218-Z16a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
9.00	0.0402	11452.3	3434.8
9.75	0.0402	11493.9	3486.4
10.00	0.0402	11740.6	3670.5
10.25	0.0402	11330.0	3641.9
10.50	0.0402	10561.9	3602.6
10.75	0.0402	10736.7	3593.9
11.00	0.0402	10291.8	3539.9
12.00	0.0402	10188.1	3483.8
13.00	0.2128	7511.7	3680.0
14.00	0.5099	8243.8	3885.9
15.00	0.5099	7716.5	3886.6
16.00	0.5099	9277.4	3900.3
17.00	0.5099	11361.2	3927.2
16.00	0.5099	8932.7	3926.9
15.00	0.5099	8423.0	3902.1
14.00	0.2088	7896.1	3812.9
13.00	0.2329	8348.2	3610.6
12.00	0.0402	9663.4	3543.8
11.00	0.0402	10981.1	3674.1
10.50	0.0402	10940.2	3653.6
10.00	0.0402	12084.2	3710.7
9.50	0.0402	12403.0	3668.9
9.00	0.0402	11622.7	3657.2
8.00	0.2088	10634.2	3855.6
7.00	0.2088	11579.9	4022.9
6.00	0.2088	11150.2	3883.5
5.00	0.4698	9166.4	3597.9
4.00	0.4497	11053.0	3556.9
3.00	0.4497	12586.6	3588.8
2.00	0.4497	13556.1	3677.2
1.00	0.0923	13401.2	3734.4
0.00	0.0923	18672.1	4392.3
-2.00	0.0803	29497.8	5733.0
-2.00	0.0803	29897.5	5747.2
-3.00	0.0803	37848.3	5825.8
-4.00	0.0402	46137.2	6331.3
-5.00	0.0402	51893.0	6396.8
-6.00	0.0402	61214.4	6518.2
-7.00	0.0402	72718.4	7291.7
-8.00	0.0402	81271.7	8350.6
-9.00	0.0402	81360.0	8981.0
-10.00	0.0402	78475.1	9105.4
-11.00	0.0402	75045.8	9112.2
-12.00	0.0000	81819.9	9610.6
-13.00	0.0000	99884.3	10637.9
-14.00	0.0000	104434.0	11118.2
-15.00	0.0000	100397.4	10643.5

3.2.19 Z3a ZZ90 x/c=5% suc. x/c=10% press. 200x200

C218-Z3a, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-Z3a, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

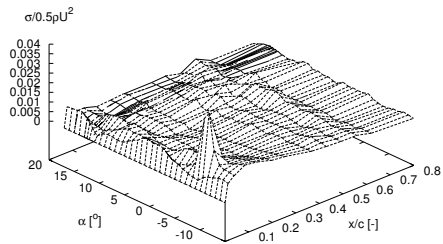
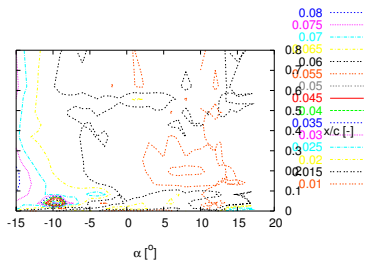


Figure 337: Pressure standard deviations, σ

C218-Z3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

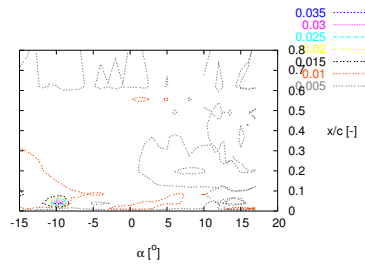
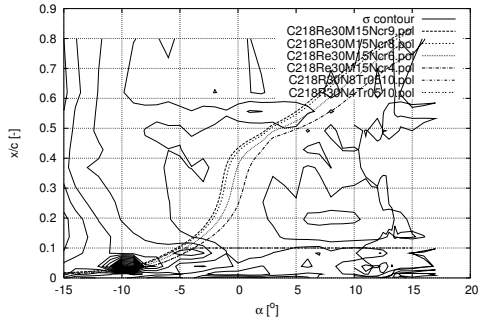


Figure 338: Contours of σ

C218-Z3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

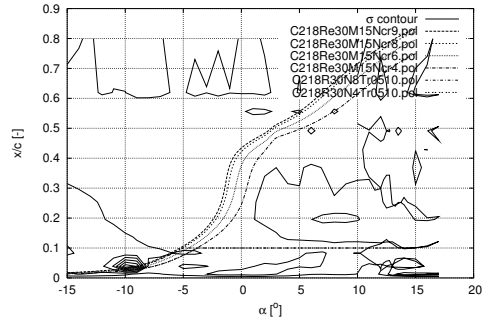
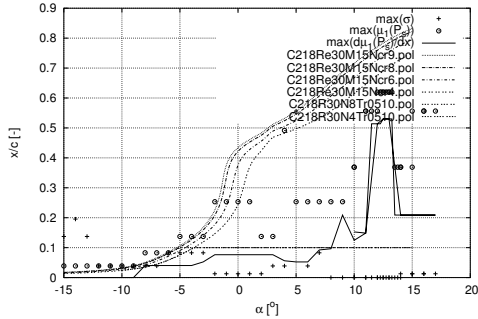


Figure 339: Contours of σ and XFOIL data

C218-Z3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

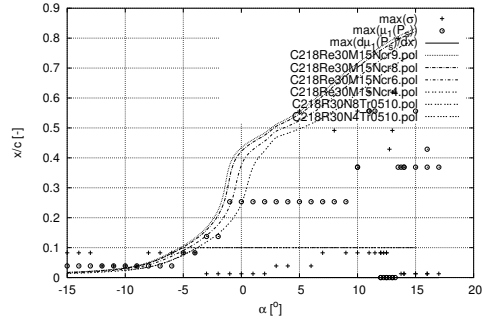
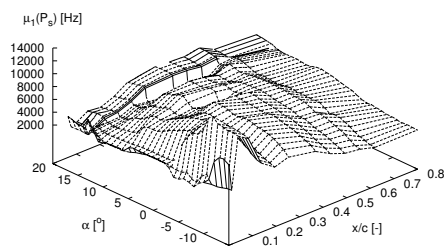


Figure 340: Transition detection

C218-Z3a, Pressure side, Re = 3.0e6



C218-Z3a, Pressure side, Re = 3.0e6

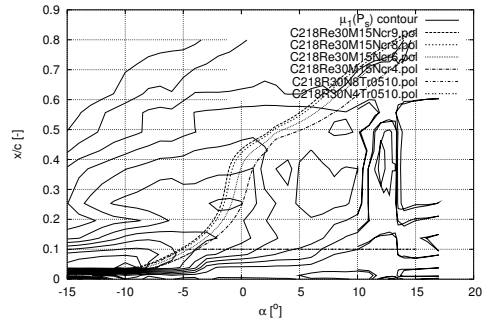


Figure 341: Fourier transform mean, $\mu_1(P_y)$

C218-Z3a, Pressure side, Re = 3.0e6

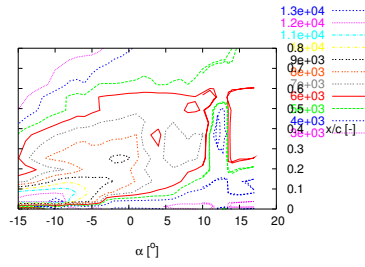


Figure 342: Contours of $\mu_1(P_s)$

C218-Z3a
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.1626	19213.2	7051.5
11.00	0.1486	13501.3	6409.8
12.00	0.5139	21345.9	5911.4
12.25	0.5139	22102.7	5827.3
12.50	0.5300	22572.8	5826.3
12.75	0.5300	23206.1	5811.8
13.00	0.5300	19898.1	5842.4
13.25	0.5300	19657.4	5848.0
13.50	0.2088	18034.1	6585.3
13.75	0.2088	19146.4	6691.2
14.00	0.2088	19812.7	6721.7
15.00	0.2088	19104.4	6825.7
16.00	0.2088	20084.4	6852.9
17.00	0.2088	20188.0	6856.4
16.00	0.2088	20421.8	6814.9
15.00	0.2088	20505.9	6816.3
14.00	0.2088	19552.4	6792.0
13.00	0.5300	20341.9	5896.7
12.50	0.5300	20531.2	5983.3
12.00	0.5139	22632.3	5962.0
11.50	0.5139	18240.7	6217.0
11.00	0.1486	13262.5	6521.9
10.00	0.1245	17512.2	7001.2
9.00	0.2088	19469.2	7137.7
8.00	0.0964	21657.4	7296.3
7.00	0.0923	27221.1	7704.3
6.00	0.0522	33974.6	7891.9
5.00	0.0522	34486.0	7158.3
4.00	0.0562	32137.2	6698.5
3.00	0.0763	36040.9	7071.3
2.00	0.0763	39503.6	7473.4
1.00	0.0763	45237.6	8287.2
0.00	0.0763	50232.2	9063.4
-1.00	0.0763	54103.0	9207.8
-2.00	0.0763	56850.5	9149.5
-3.00	0.0522	57022.2	9151.3
-4.00	0.0402	74297.0	9461.7
-5.00	0.0402	80547.5	9490.7
-6.00	0.0402	85704.1	10330.8
-7.00	0.0402	94385.0	10914.0
-8.00	0.0402	106509.9	11544.1
-9.00	0.0000	113513.0	13010.8
-10.00	0.0000	112602.3	13646.9
-11.00	0.0000	112059.0	12850.2
-12.00	0.0000	97817.6	12687.5
-13.00	0.0000	90115.1	12539.5
-14.00	0.0000	87548.6	12594.4
-15.00	0.0000	85775.0	12391.8

3.2.20 Z6a ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 200x200

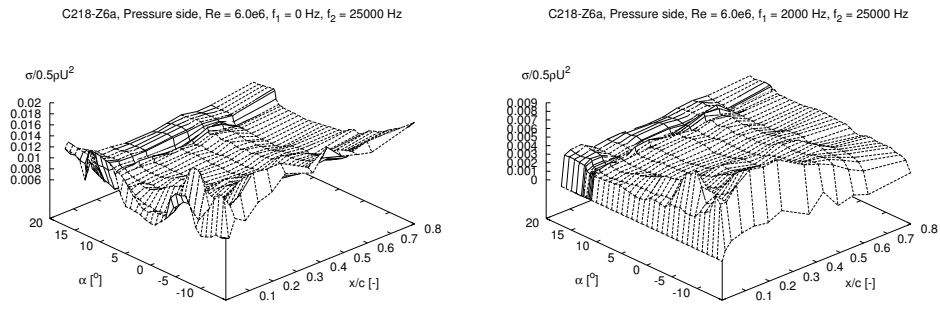


Figure 343: Pressure standard deviations, σ

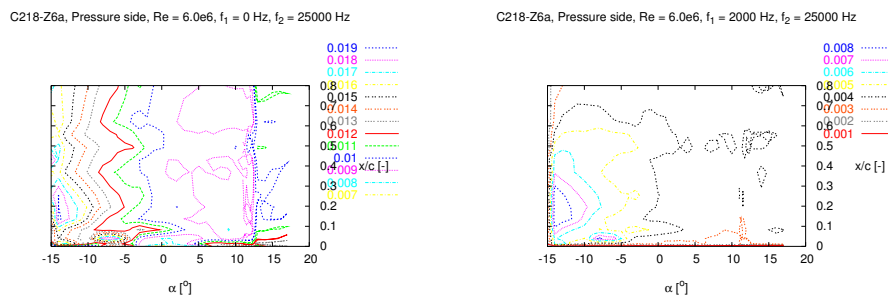


Figure 344: Contours of σ

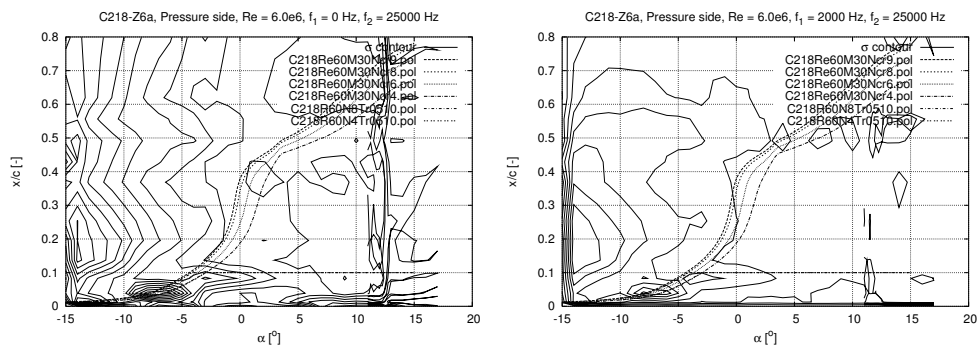


Figure 345: Contours of σ and XFOIL data

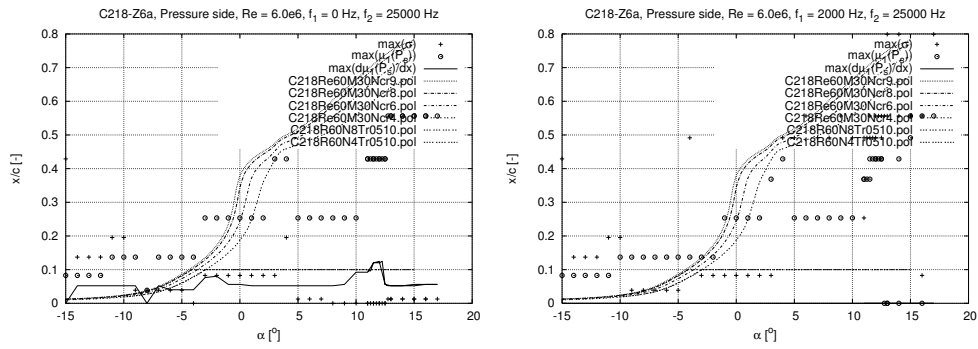


Figure 346: Transition detection

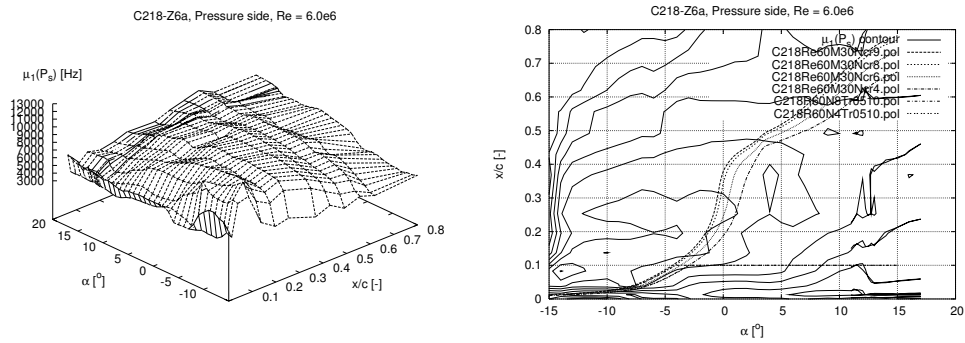


Figure 347: Fourier transform mean, $\mu_1(P_s)$

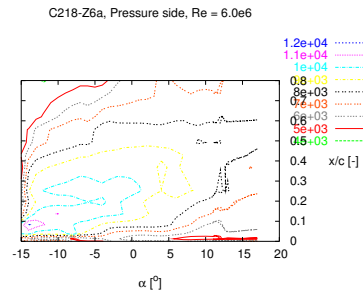


Figure 348: Contours of $\mu_1(P_s)$

C218-Z6a

alpha [degrees] angle of attack

xtr* [-] transition point (x*=x/c) predicted by max[d(mu1(Ps))/dx*]

d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])

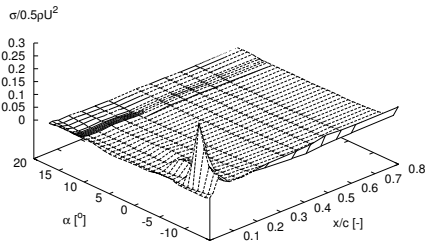
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
11.00	0.0964	17753.4	8593.3
11.25	0.0964	16781.9	8566.6
11.50	0.1205	16627.1	8553.8
11.75	0.1205	16549.6	8483.7
12.00	0.1205	15637.2	8441.5
12.25	0.1245	14325.5	8712.1
12.50	0.0562	17713.5	8629.6
12.75	0.0522	20983.5	8593.5
13.00	0.0522	22324.6	8614.9
14.00	0.0522	21769.8	8677.5
15.00	0.0522	19737.7	8699.4
16.00	0.0562	18580.6	8711.7
17.00	0.0562	18092.0	8744.4
16.00	0.0562	19879.3	8730.3
15.00	0.0562	20108.7	8706.6
14.00	0.0522	21941.4	8693.5
13.00	0.0522	22467.2	8621.8
12.50	0.0562	16020.1	8669.2
12.00	0.1245	14736.3	8817.2

11.50	0.1205	16533.7	8518.3
11.00	0.0923	17811.7	8604.8
10.00	0.0923	19906.1	8814.3
9.00	0.0562	24339.7	8892.9
8.00	0.0522	31377.2	9038.7
7.00	0.0522	33060.8	9282.3
6.00	0.0522	32832.8	9558.5
5.00	0.0522	35946.7	9390.8
4.00	0.0522	37269.6	9457.0
3.00	0.0522	38645.9	9537.7
2.00	0.0522	39479.5	9652.9
1.00	0.0522	39660.5	10107.8
0.00	0.0562	39490.3	10347.6
-1.00	0.0562	37206.2	10435.6
-2.00	0.0803	37855.6	10462.5
-3.00	0.0763	34413.0	10342.2
-4.00	0.0402	48350.5	10350.8
-5.00	0.0402	52870.0	10548.0
-6.00	0.0402	55965.5	10676.4
-7.00	0.0522	57778.9	10726.7
-8.00	0.0000	73317.1	10987.8
-9.00	0.0522	60499.1	10920.1
-10.00	0.0522	63268.6	11009.1
-11.00	0.0522	65013.2	10978.9
-12.00	0.0522	67599.9	11044.7
-13.00	0.0522	65394.2	11554.0
-14.00	0.0522	57771.7	12074.5
-15.00	0.0000	50507.5	10531.7

3.2.21 L16a LM standard LER 200x200

C218-L16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

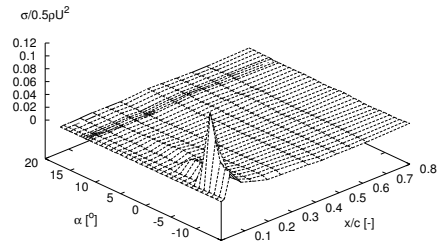
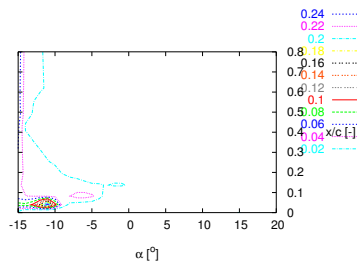


Figure 349: Pressure standard deviations, σ

C218-L16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

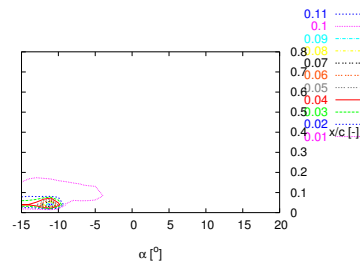


Figure 350: Contours of σ

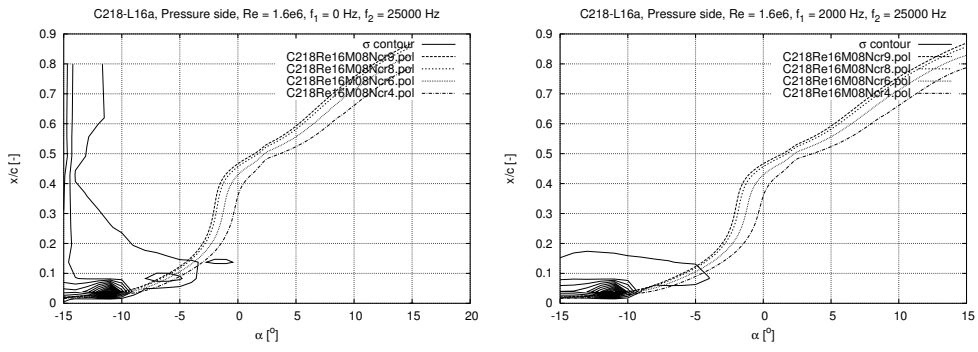


Figure 351: Contours of σ and Xfoil data

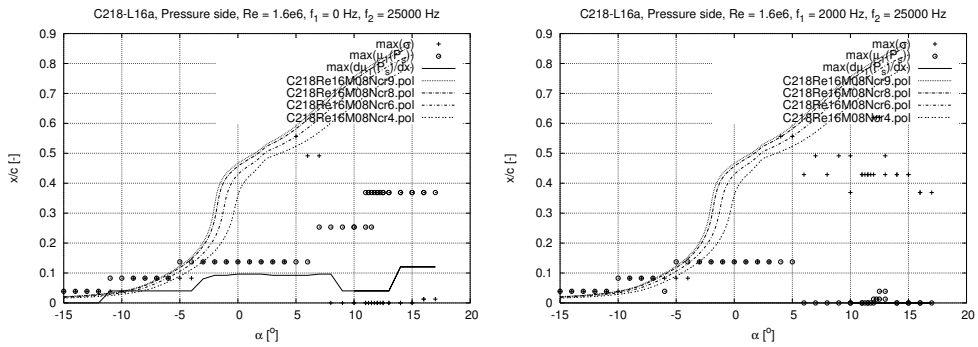


Figure 352: Transition detection

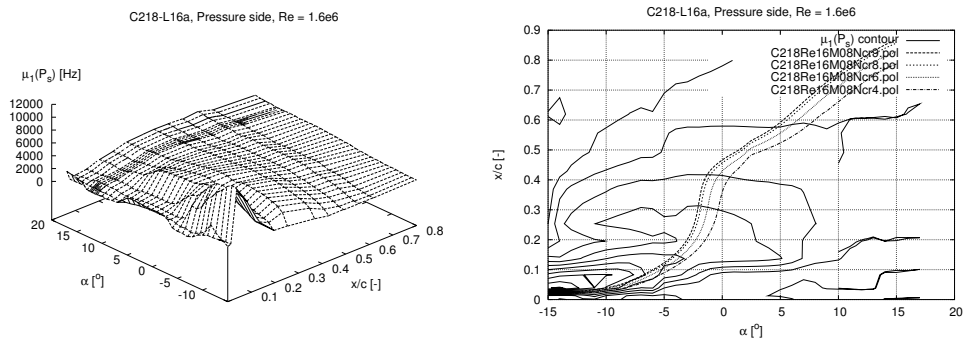


Figure 353: Fourier transform mean, $\mu_1(P_s)$

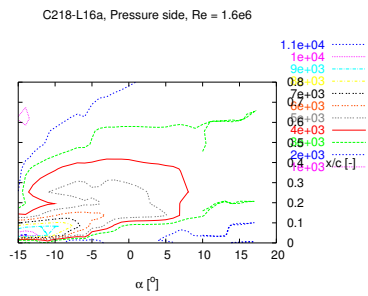


Figure 354: Contours of $\mu_1(P_s)$

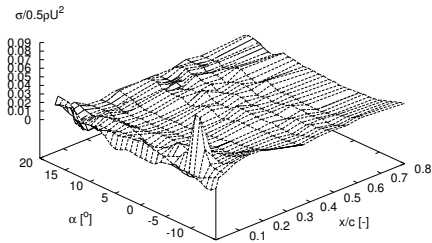
C218-L16a

alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0402	11250.0	3596.4
11.00	0.0402	12890.8	3823.5
11.25	0.0402	12675.4	3800.7
11.50	0.0402	12535.3	3759.9
11.75	0.0402	12521.7	3718.4
12.00	0.0402	12297.3	3719.6
12.25	0.0402	11683.3	3722.5
12.50	0.0402	11580.7	3713.7
13.00	0.0402	11439.4	3679.1
14.00	0.1205	11140.8	3676.1
15.00	0.1205	10696.0	3657.2
16.00	0.1205	10481.6	3713.4
17.00	0.1205	10769.6	3759.7
16.00	0.1205	10615.4	3733.3
15.00	0.1205	10791.4	3720.9
14.00	0.1205	10827.0	3751.6
13.00	0.0402	11427.5	3718.8
12.50	0.0402	11645.7	3756.4
12.00	0.0402	11770.0	3745.7
11.50	0.0402	12937.5	3780.9
11.00	0.0402	12735.5	3830.0
10.00	0.0402	11840.9	3868.6
9.00	0.0402	13337.6	3893.7
8.00	0.0964	16609.8	4009.3
7.00	0.0964	23279.1	4214.5
6.00	0.0923	29726.2	4579.5
5.00	0.0923	33958.9	5063.1
4.00	0.0923	35006.6	5285.3
3.00	0.0923	35869.2	5418.6
2.00	0.0964	35671.3	5465.2
1.00	0.0964	37003.1	5551.7
0.00	0.0964	37212.8	5615.9
-1.00	0.0923	36462.3	5644.6
-2.00	0.0923	34194.2	5675.7
-3.00	0.0803	38565.8	5886.1
-4.00	0.0402	46129.5	6278.1
-5.00	0.0402	51379.2	6303.5
-6.00	0.0402	60765.3	6462.4
-7.00	0.0402	72204.8	7333.4
-8.00	0.0402	80387.4	8365.8
-9.00	0.0402	79587.6	8946.9
-10.00	0.0402	76645.2	9060.1
-11.00	0.0402	72765.2	9050.1
-12.00	0.0000	81579.8	9637.5
-13.00	0.0000	97891.8	10612.9
-14.00	0.0000	102736.7	11147.8
-15.00	0.0000	101276.3	10952.1

3.2.22 L3a LM standard LER 200x200

C218-L3a, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-L3a, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

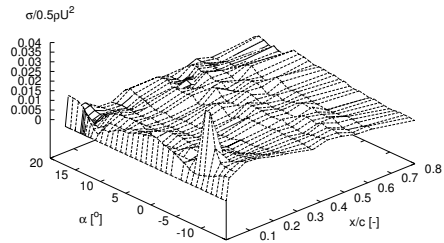
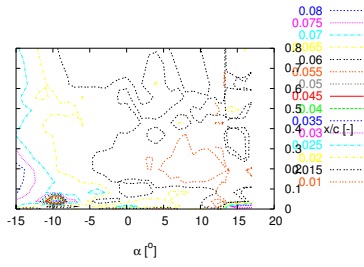


Figure 355: Pressure standard deviations, σ

C218-L3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

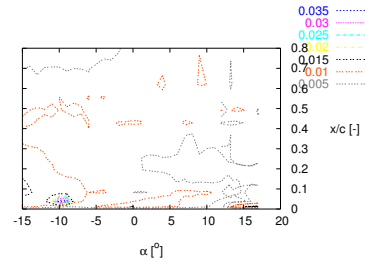
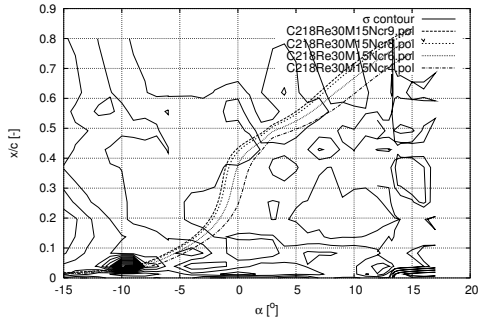


Figure 356: Contours of σ

C218-L3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

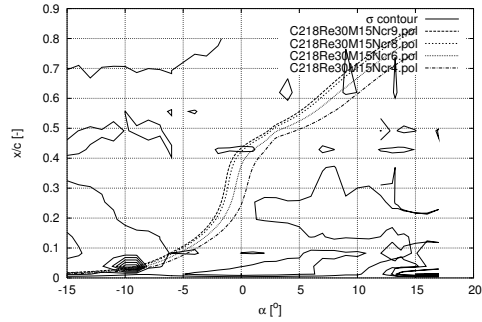
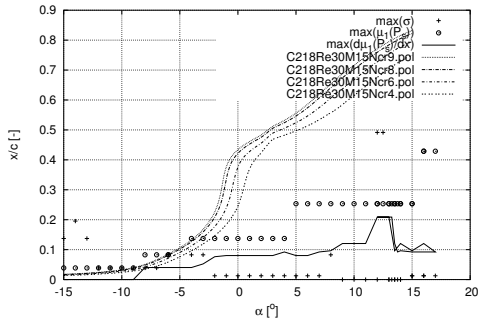


Figure 357: Contours of σ and Xfoil data

C218-L3a, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3a, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

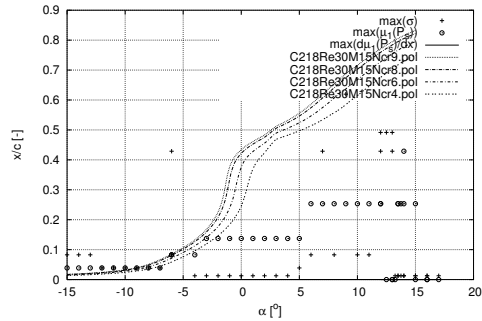
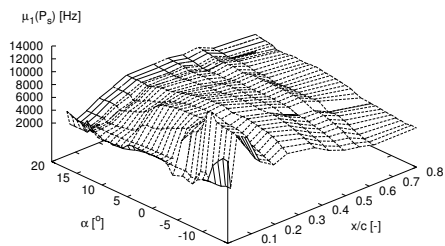


Figure 358: Transition detection

C218-L3a, Pressure side, Re = 3.0e6



C218-L3a, Pressure side, Re = 3.0e6

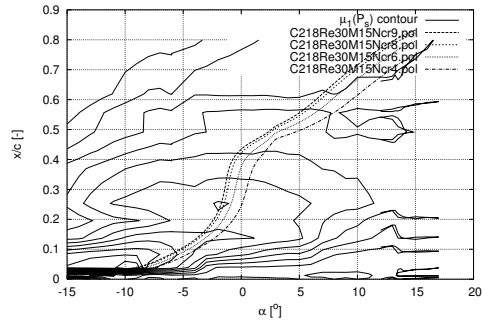


Figure 359: Fourier transform mean, $\mu_1(P_s)$

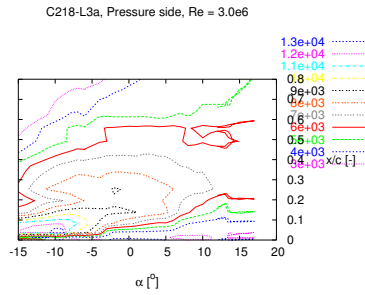


Figure 360: Contours of $\mu_1(P_s)$

C218-L3a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.2088	20394.2	6781.3
13.00	0.2088	20111.6	6566.4
13.25	0.2088	19941.7	6571.2
13.50	0.1205	19730.6	6649.3
13.75	0.0923	20011.1	6684.4
14.00	0.0964	19355.2	6736.1
15.00	0.0923	20981.9	6918.1
16.00	0.0923	19942.0	6775.1
17.00	0.0923	19998.5	6868.2
16.00	0.1205	19792.4	6768.5
15.00	0.0964	19676.7	6713.8
14.00	0.1205	19504.9	6731.3
13.50	0.0964	17998.2	6801.0
13.00	0.2088	20069.9	6582.9
12.50	0.2088	19957.8	6682.4
12.00	0.2088	19940.9	6827.6
11.00	0.1205	21931.2	7129.0
10.00	0.1205	24569.5	7363.7
9.00	0.1205	25659.8	7354.4
8.00	0.0964	29310.9	7512.3
7.00	0.0923	34633.7	7751.0
6.00	0.0803	40789.3	8001.8
5.00	0.0803	46507.2	8241.3
4.00	0.0923	48854.7	8520.8
3.00	0.0803	49880.1	8656.6
2.00	0.0803	51600.1	8869.9
1.00	0.0803	54726.3	9011.7
0.00	0.0803	55062.8	9052.4
-1.00	0.0803	56514.2	9085.6
-2.00	0.0763	57661.1	9123.2
-3.00	0.0522	56399.0	9176.5
-4.00	0.0402	74525.6	9401.8
-6.00	0.0402	85442.0	10379.8
-6.00	0.0402	84492.6	10392.9
-7.00	0.0402	95945.1	10984.4
-8.00	0.0402	105431.9	11630.7
-9.00	0.0000	115759.1	13647.8
-10.00	0.0000	116111.3	13999.6
-11.00	0.0000	112026.9	12738.0
-12.00	0.0000	99559.6	12577.1
-13.00	0.0000	93699.3	12480.3
-14.00	0.0000	84964.1	12339.5
-15.00	0.0000	82055.3	12150.5

3.2.23 L6a LM standard LER 200x200

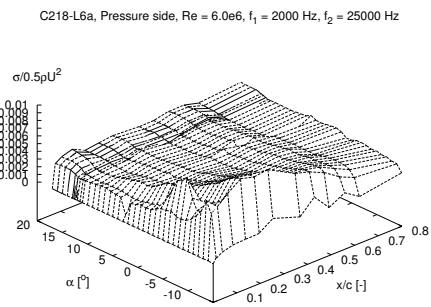
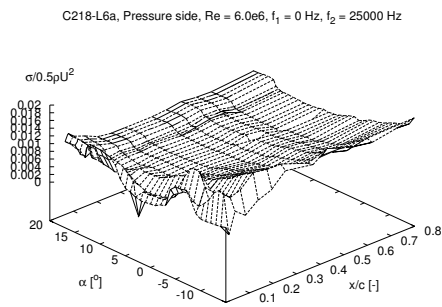
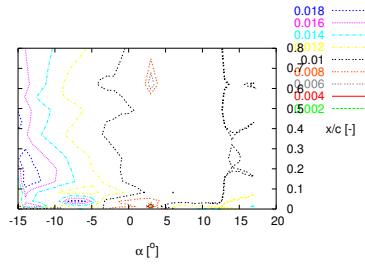


Figure 361: Pressure standard deviations, σ

C218-L6a, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L6a, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

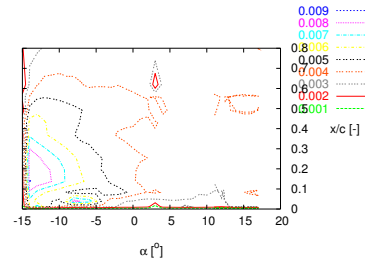


Figure 362: Contours of σ

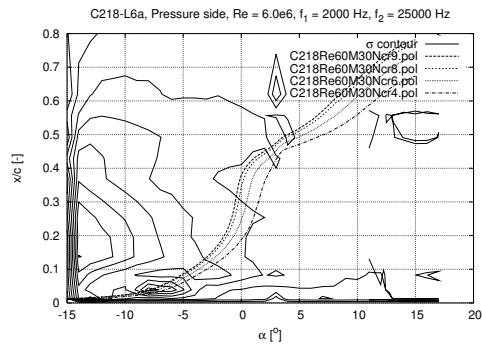
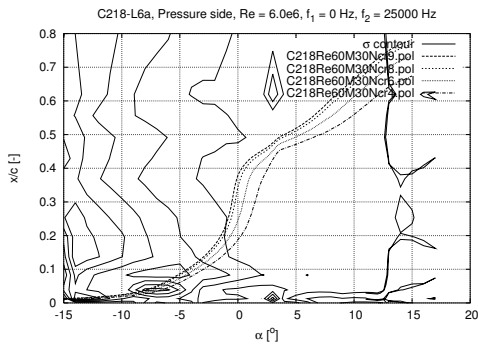


Figure 363: Contours of σ and Xfoil data

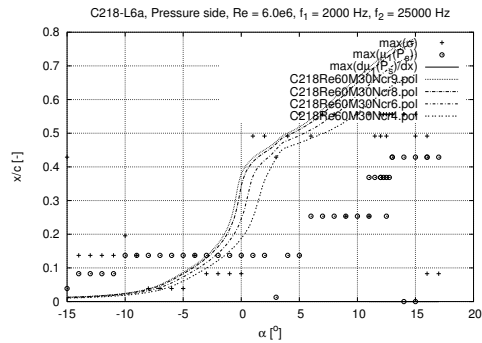
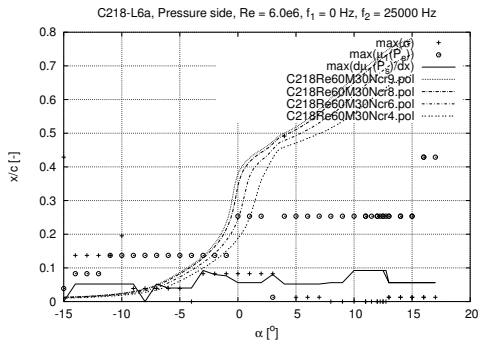


Figure 364: Transition detection

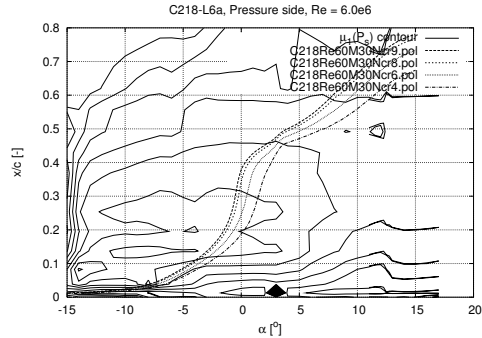
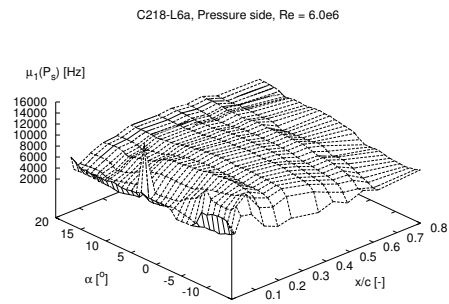


Figure 365: Fourier transform mean, $\mu_1(P_s)$

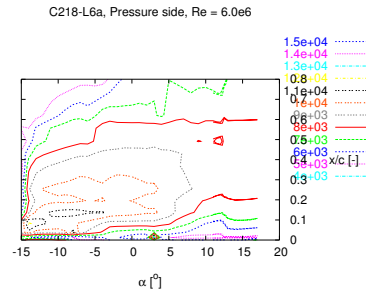


Figure 366: Contours of $\mu_1(P_s)$

C218-L6a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
11.00	0.0923	23304.3	8691.2
12.00	0.0923	21334.1	8499.4
12.25	0.0923	20452.9	8473.2
12.50	0.0923	19286.8	8694.9
12.75	0.0923	19307.8	8670.3
13.00	0.0562	22266.6	8690.9
14.00	0.0562	24073.0	8762.6
15.00	0.0562	24542.7	8758.6
16.00	0.0562	24110.3	8744.3
17.00	0.0562	23686.1	8750.2
16.00	0.0562	24402.7	8761.7
15.00	0.0562	24001.7	8730.4
14.00	0.0562	24403.6	8755.8
13.00	0.0562	22621.0	8711.9
12.50	0.0923	19111.8	8698.2
12.00	0.0923	21024.7	8532.3
11.50	0.0923	22494.9	8584.2
11.00	0.0923	23146.0	8690.2
10.00	0.0923	24925.4	8846.8
9.00	0.0562	25684.3	8912.8
8.00	0.0562	32118.0	9026.3
7.00	0.0522	34020.2	9288.9
6.00	0.0522	35039.4	9569.7
5.00	0.0522	38947.9	9758.8
4.00	0.0522	40904.3	9883.3
3.00	0.0803	35596.2	15452.6
2.00	0.0562	42878.0	10188.8
1.00	0.0562	43267.6	10306.4
0.00	0.0562	42554.0	10420.7
-1.00	0.0763	40404.5	10509.1
-2.00	0.0803	39518.5	10567.7
-3.00	0.0923	38142.2	10750.3
-4.00	0.0402	49629.8	11092.9
-5.00	0.0402	54586.5	11061.9
-6.00	0.0402	56694.6	11100.7
-7.00	0.0522	59847.2	11288.4
-8.00	0.0000	76155.4	11391.2
-9.00	0.0522	61454.3	11377.8
-10.00	0.0522	63248.4	11249.8
-11.00	0.0522	62883.5	11090.2
-12.00	0.0522	65497.6	11128.6
-13.00	0.0522	61926.4	11594.7
-14.00	0.0522	60863.3	12170.9
-15.00	0.0000	33155.4	9412.1

3.2.24 T16a Trip wire. Bump tape 2% 200x200

C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz

C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

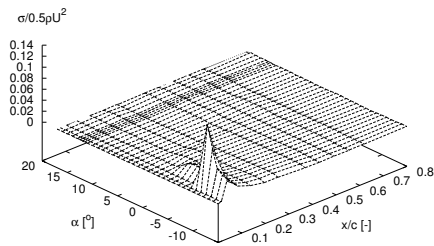
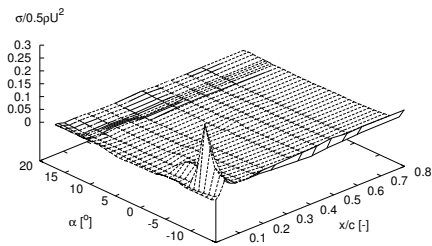
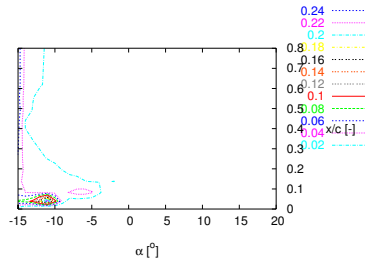


Figure 367: Pressure standard deviations, σ

C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

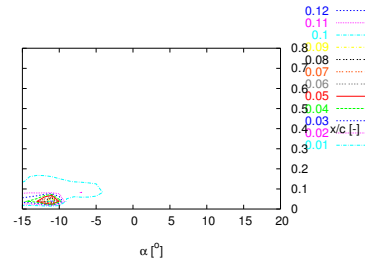
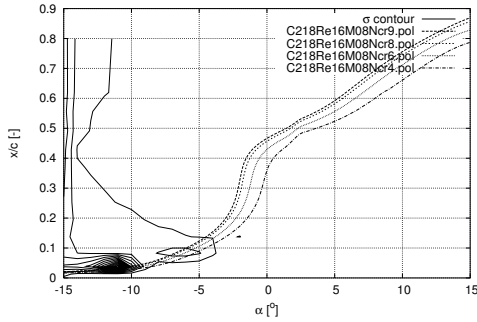


Figure 368: Contours of σ

C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

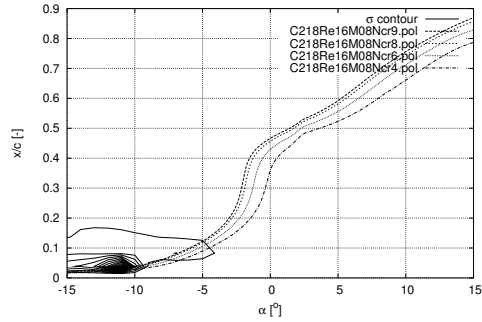
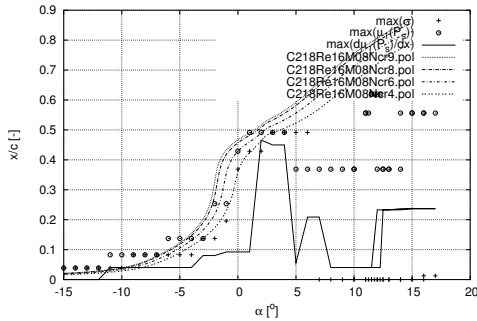


Figure 369: Contours of σ and Xfoil data

C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16a, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

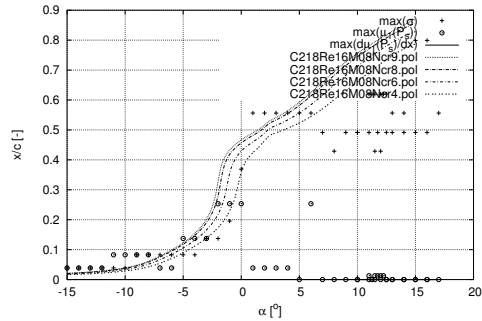
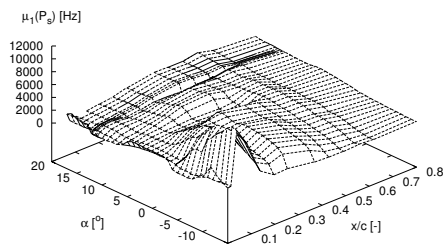


Figure 370: Transition detection

C218-T16a, Pressure side, Re = 1.6e6



C218-T16a, Pressure side, Re = 1.6e6

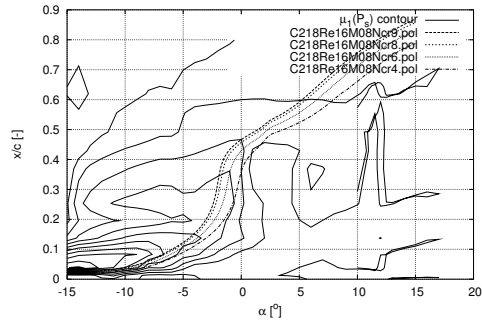


Figure 371: Fourier transform mean, $\mu_1(P_s)$

C218-T16a, Pressure side, Re = 1.6e6

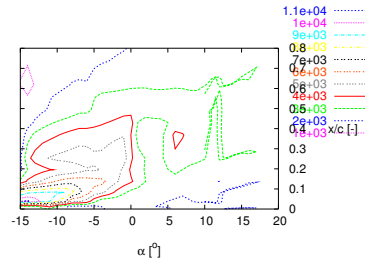


Figure 372: Contours of $\mu_1(P_s)$

C218-T16a
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
10.00	0.0402	12177.5	3266.9
11.00	0.0402	11846.5	3319.2
11.25	0.0402	12178.3	3266.0
11.50	0.0402	12368.0	3118.1
11.75	0.0402	12403.8	3152.9
12.00	0.0402	12401.3	3141.7
12.25	0.0402	9894.2	3085.3
12.50	0.2328	7923.1	3553.5
13.00	0.2328	7814.0	3627.4
14.00	0.2328	7502.0	3587.9
15.00	0.2369	7454.7	3619.0
16.00	0.2369	7534.5	3645.9
17.00	0.2369	8124.7	3816.5
16.00	0.2369	8442.1	3740.6
15.00	0.2369	7539.1	3597.7
14.00	0.2369	7917.2	3610.0
13.00	0.2328	8384.2	3679.1
12.50	0.2328	8746.2	3680.9
12.00	0.2328	8505.4	3680.3
11.50	0.0402	12754.8	3147.5
11.00	0.0402	13123.8	3300.4
10.00	0.0402	12805.4	3606.1
9.00	0.0402	13120.7	3794.5
8.00	0.0402	10430.1	3803.4
7.00	0.2088	11375.9	4042.0
6.00	0.2088	11228.7	4147.8
5.00	0.0562	8529.1	3678.6
4.00	0.4497	10422.3	3553.6
3.00	0.4497	12035.8	3613.8
2.00	0.4658	14784.4	3713.1
1.00	0.0923	13194.2	3839.9
0.00	0.0923	19240.3	4356.4
-1.00	0.0923	23128.9	5543.9
-2.00	0.0803	28758.0	5783.1
-3.00	0.0803	37198.5	5761.5
-4.00	0.0402	45556.6	6280.3
-5.00	0.0402	51286.9	6384.2
-6.00	0.0402	60363.7	6483.2
-7.00	0.0402	71270.1	7290.1
-8.00	0.0402	81000.9	8335.5
-9.00	0.0402	80711.7	8998.2
-10.00	0.0402	77536.4	9098.4
-11.00	0.0402	73723.0	9088.5
-12.00	0.0000	82202.3	9637.3
-13.00	0.0000	99256.9	10641.4
-14.00	0.0000	103787.9	11150.8
-15.00	0.0000	102223.0	10963.1

3.2.25 T3a Trip wire. Bump tape 2% 200x200

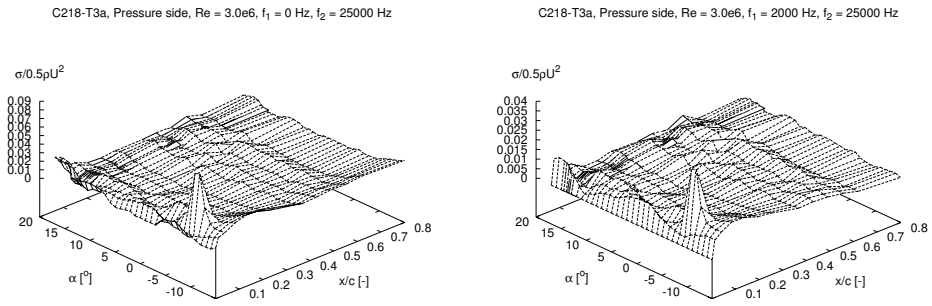


Figure 373: Pressure standard deviations, σ

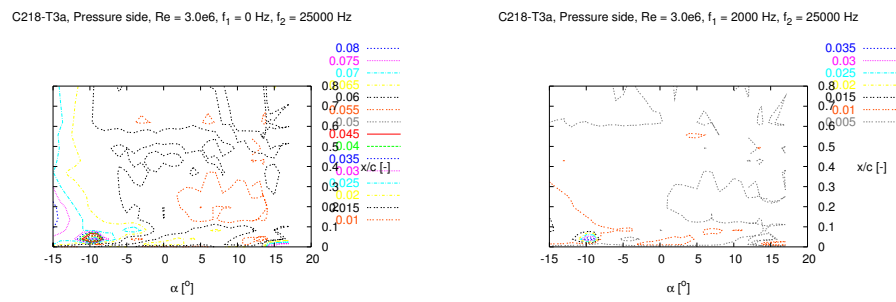


Figure 374: Contours of σ

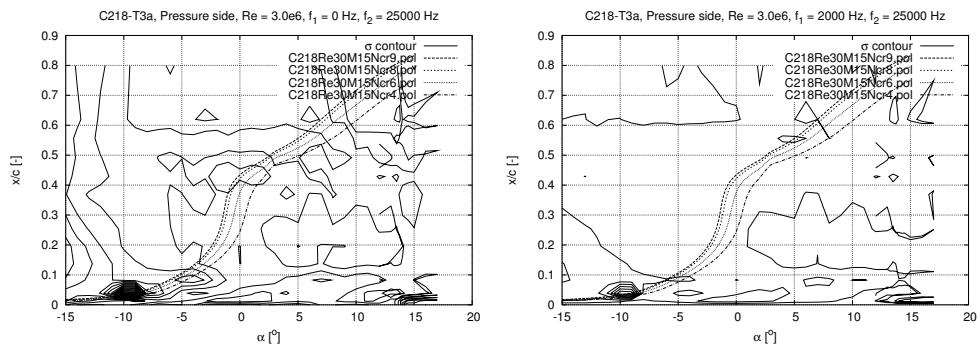


Figure 375: Contours of σ and XFOIL data

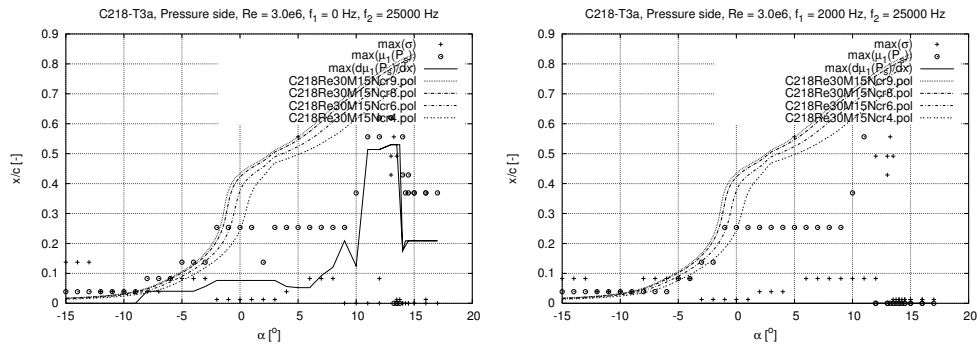


Figure 376: Transition detection

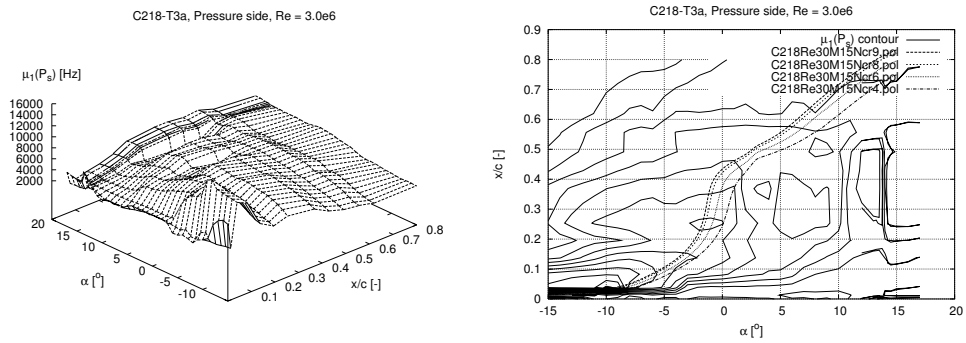


Figure 377: Fourier transform mean, $\mu_1(P_s)$

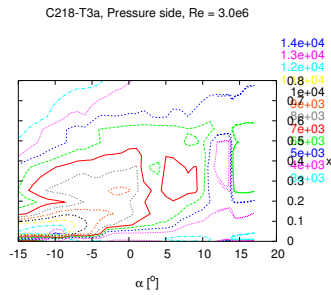


Figure 378: Contours of $\mu_1(P_s)$

C218-T3a

alpha	[degrees]	angle of attack
xtr*	-	transition point (x**=x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx*	[Hz/-]	d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1)	[Hz]	max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.5139	22819.0	5806.0
13.00	0.5300	22930.5	5759.4
13.25	0.5300	22410.0	5931.5
13.50	0.5300	22541.3	6173.9
13.75	0.5300	22477.9	6281.4
14.00	0.1767	13941.4	5893.4
14.25	0.2088	17228.3	6376.4
14.50	0.2088	17349.7	6400.0
15.00	0.2088	19018.8	6660.3
16.00	0.2088	19537.8	6715.9
17.00	0.2088	19962.5	6654.7
16.00	0.2088	19953.5	6704.3
15.00	0.2088	18324.1	6546.4
14.50	0.2088	18026.9	6489.7
14.00	0.1767	15253.4	6123.5
13.50	0.5300	21848.9	6186.3
13.00	0.5300	22658.3	5840.8
12.00	0.5139	22549.0	5908.7
11.00	0.5139	14094.5	6254.1

10.00	0.1245	17111.9	6805.9
9.00	0.2088	20139.1	7227.9
8.00	0.1205	21473.5	7289.4
7.00	0.0923	25975.6	7721.9
6.00	0.0522	32608.3	7933.5
5.00	0.0522	35380.6	7481.0
4.00	0.0562	32649.1	6724.3
3.00	0.0763	35335.3	7012.6
2.00	0.0763	38491.5	7399.4
1.00	0.0763	44203.5	8211.2
0.00	0.0763	49255.9	9075.9
-1.00	0.0763	54501.7	9210.7
-2.00	0.0763	55891.3	9148.9
-3.00	0.0562	56632.6	9109.2
-4.00	0.0402	72515.0	9415.9
-5.00	0.0402	78933.4	9467.1
-6.00	0.0402	85127.3	10344.5
-7.00	0.0402	93903.7	10893.3
-8.00	0.0402	106411.5	11590.0
-9.00	0.0000	118665.6	13752.6
-10.00	0.0000	117841.3	14206.5
-11.00	0.0000	112978.4	12888.6
-12.00	0.0000	99610.4	12717.2
-13.00	0.0000	91136.1	12555.6
-14.00	0.0000	85059.7	12407.7
-15.00	0.0000	82919.6	12241.0

3.2.26 T6a Trip wire. Bump tape 2% 200x200

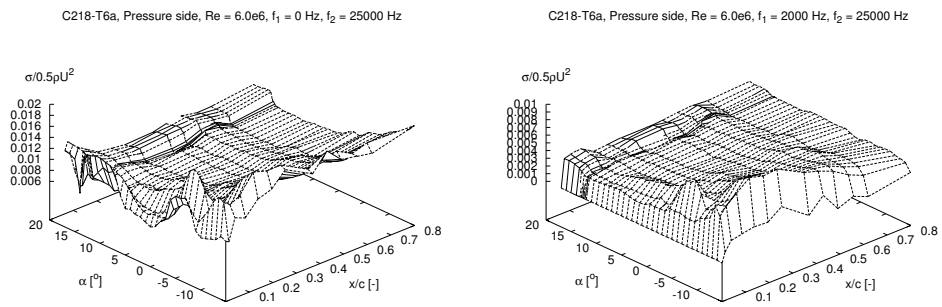


Figure 379: Pressure standard deviations, σ

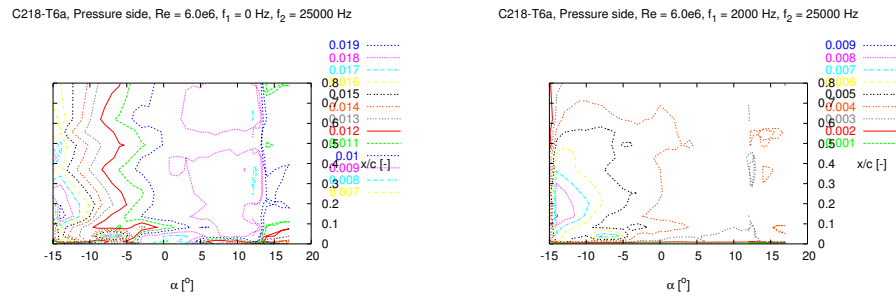


Figure 380: Contours of σ

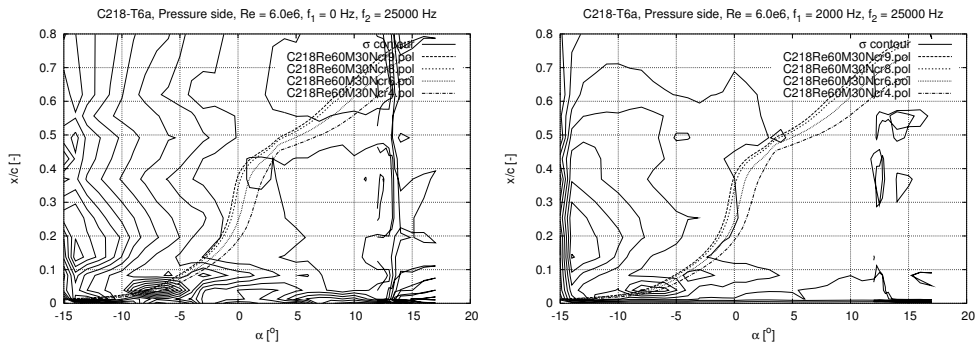


Figure 381: Contours of σ and XFoil data

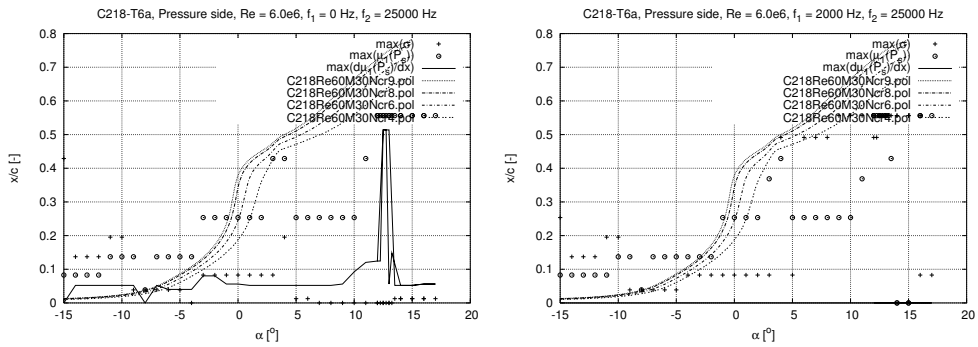


Figure 382: Transition detection

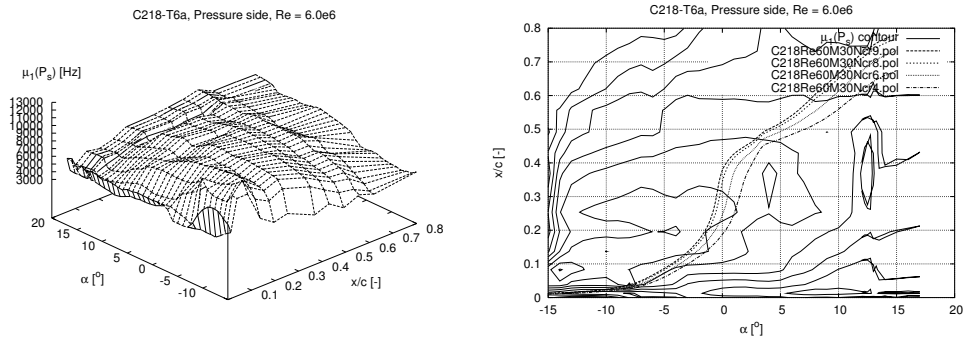


Figure 383: Fourier transform mean, $\mu_1(P_s)$

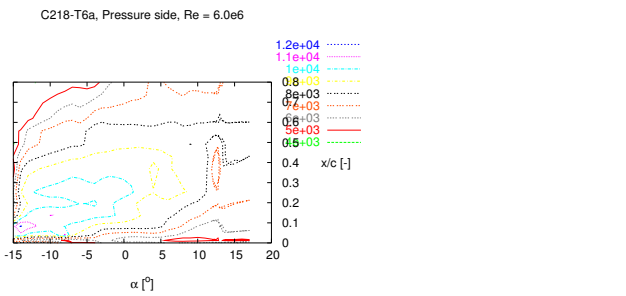


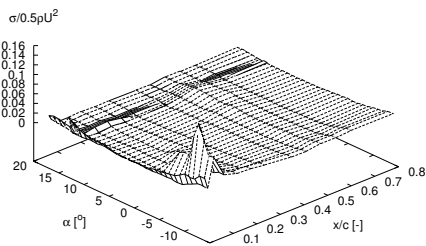
Figure 384: Contours of $\mu_1(P_s)$

C218-T6a
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.1245	15412.2	8411.7
12.25	0.1245	15106.5	8382.2
12.50	0.5139	14666.4	8344.1
12.75	0.5139	16132.1	8312.2
13.00	0.0562	12414.1	8496.1
13.25	0.1486	11982.5	8456.4
14.00	0.0522	20228.5	8633.3
15.00	0.0522	20443.1	8703.6
16.00	0.0562	17461.9	8659.1
17.00	0.0562	17248.0	8668.6
16.00	0.0562	19539.5	8708.8
15.00	0.0522	19983.0	8667.2
14.00	0.0522	20643.9	8625.0
13.50	0.0522	20132.7	8604.3
13.00	0.5139	15582.1	8563.2
12.50	0.5139	15545.6	8398.3
12.00	0.1245	15709.6	8432.2
11.00	0.1205	17061.1	8518.3
10.00	0.0923	20058.3	8821.1
9.00	0.0562	23679.7	8944.1
8.00	0.0522	30820.5	9060.9
7.00	0.0522	33424.1	9304.0
6.00	0.0522	33073.3	9574.2
5.00	0.0522	35714.5	9455.6
4.00	0.0522	37669.4	9409.8
3.00	0.0522	38102.0	9466.0
2.00	0.0522	39700.1	9651.1
1.00	0.0522	39366.8	10134.4
0.00	0.0562	39411.6	10369.8
-1.00	0.0562	37116.1	10447.9
-2.00	0.0803	37169.9	10507.5
-3.00	0.0803	34526.3	10418.6
-4.00	0.0402	47255.7	10356.3
-5.00	0.0402	52267.4	10541.8
-6.00	0.0402	56314.9	10661.7
-7.00	0.0522	57183.8	10707.0
-8.00	0.0000	74996.4	11137.7
-9.00	0.0522	61479.1	10916.3
-10.00	0.0522	63797.8	11003.1
-11.00	0.0522	65407.2	10973.4
-12.00	0.0522	67777.2	11033.1
-13.00	0.0522	64547.7	11506.8
-14.00	0.0522	61060.2	12118.5
-15.00	0.0000	48923.6	10673.9

3.2.27 C16b Clean 100x100

C218-C16b, Pressure side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C16b, Pressure side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

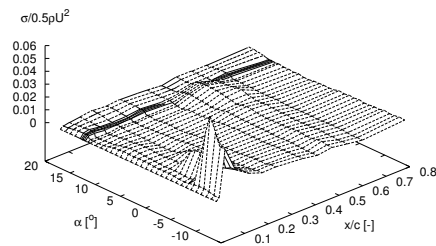
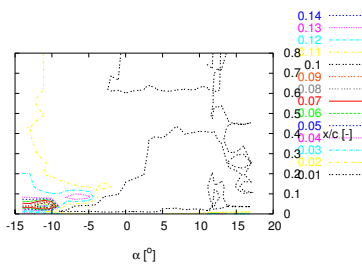


Figure 385: Pressure standard deviations, σ

C218-C16b, Pressure side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C16b, Pressure side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

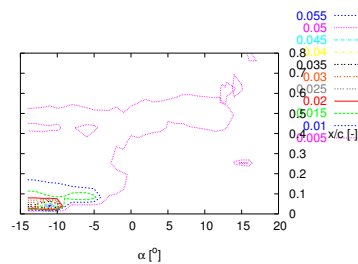


Figure 386: Contours of σ

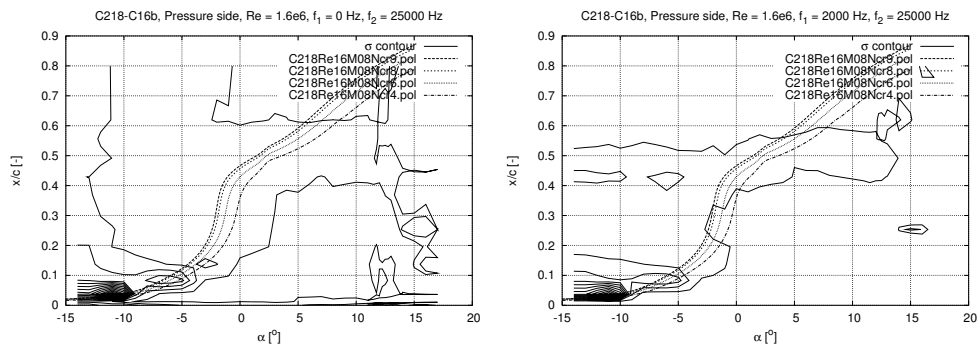


Figure 387: Contours of σ and Xfoil data

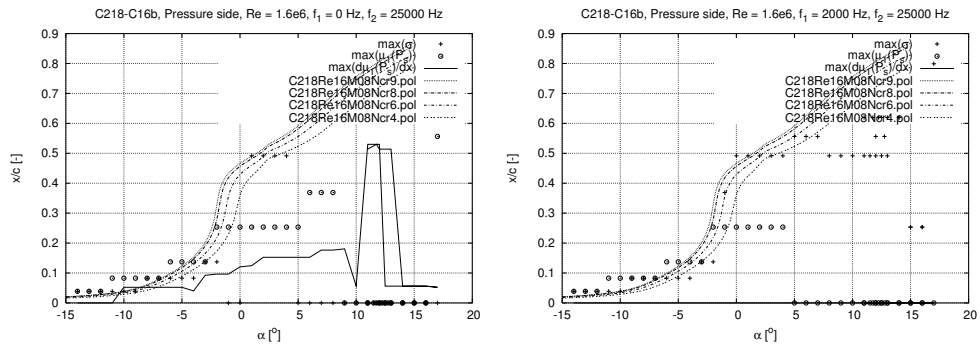


Figure 388: Transition detection

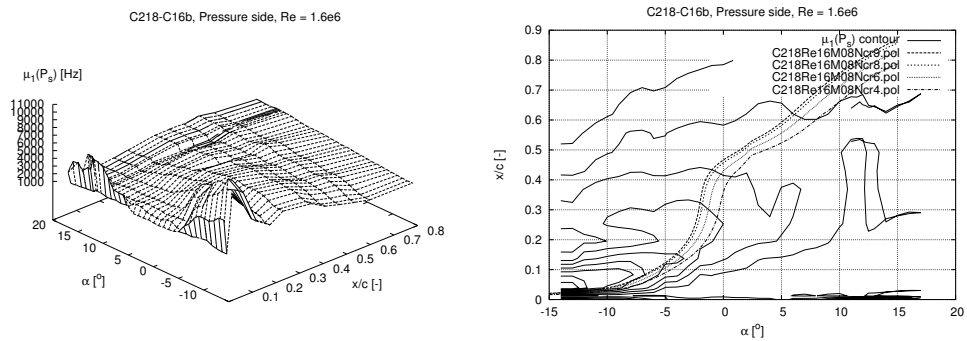


Figure 389: Fourier transform mean, $\mu_1(P_s)$

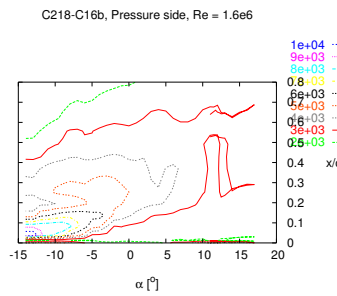


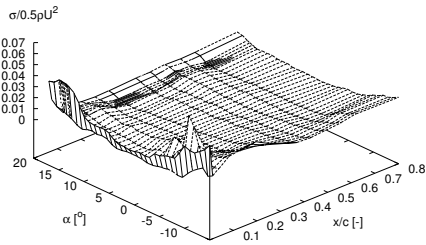
Figure 390: Contours of $\mu_1(P_s)$

C218-C16b
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
11.00	0.5139	5854.2	6301.4
11.75	0.5300	6749.4	6240.4
12.00	0.5139	5808.6	6467.3
12.25	0.5139	5541.4	6622.9
12.50	0.5139	5376.3	6571.2
12.75	0.5139	5561.8	6660.7
13.00	0.5139	5566.9	6637.6
14.00	0.0562	7840.6	4022.7
15.00	0.0562	7515.7	5029.9
16.00	0.0562	8289.4	4044.8
17.00	0.0522	9741.6	3556.0
16.00	0.0562	8257.1	4813.4
15.00	0.0562	7520.3	4884.3
14.00	0.0562	7583.6	4229.1
13.00	0.0562	7416.9	4933.5
12.50	0.0562	7596.8	4741.3
12.00	0.5300	7052.3	6379.5
11.50	0.5300	7309.7	6285.5
11.00	0.5300	6916.6	6268.2
10.00	0.0562	5823.7	5904.1
9.00	0.1807	7532.7	4860.8
8.00	0.1767	8268.7	3836.9
7.00	0.1767	9724.5	3933.5
6.00	0.1526	12519.8	4134.7
5.00	0.1526	13914.5	4097.0
4.00	0.1526	14773.8	4139.4
3.00	0.1526	15144.1	4369.8
2.00	0.1526	15027.9	4843.7
1.00	0.1245	16122.2	4896.6
0.00	0.1205	18703.0	4999.4
-1.00	0.0964	21858.3	5173.2
-2.00	0.0964	24121.5	5336.9
-3.00	0.0923	31327.7	5804.2
-4.00	0.0402	41224.1	6290.4
-5.00	0.0522	43551.9	6291.1
-6.00	0.0522	53126.5	6541.1
-7.00	0.0522	61179.1	7209.1
-8.00	0.0522	67323.2	8238.6
-9.00	0.0522	70663.3	8854.6
-10.00	0.0522	69229.9	8904.3
-11.00	0.0000	71696.3	8829.7
-12.00	0.0000	81707.7	9261.1
-13.00	0.0000	96898.7	10871.0
-14.00	0.0000	96646.8	10864.8

3.2.28 C3b Clean 100x100

C218-C3b, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C3b, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

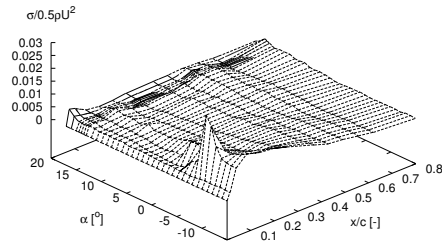
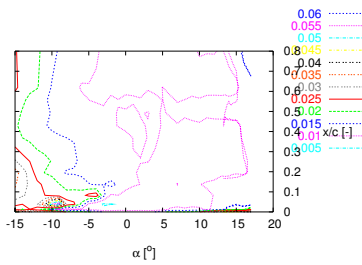


Figure 391: Pressure standard deviations, σ

C218-C3b, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C3b, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

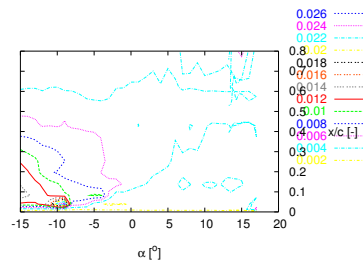


Figure 392: Contours of σ

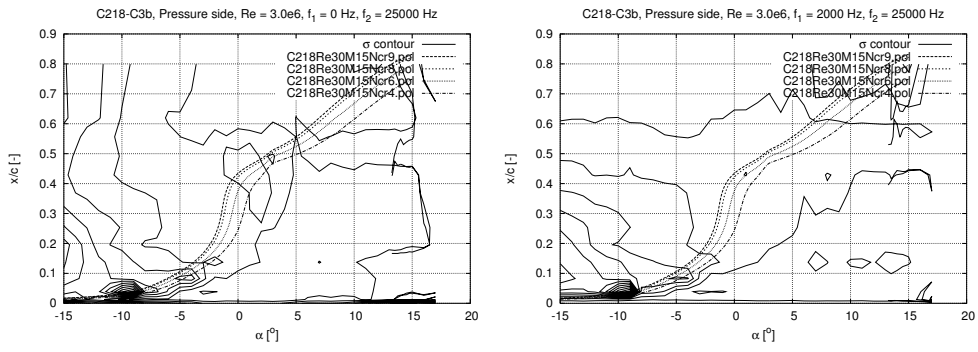


Figure 393: Contours of σ and Xfoil data

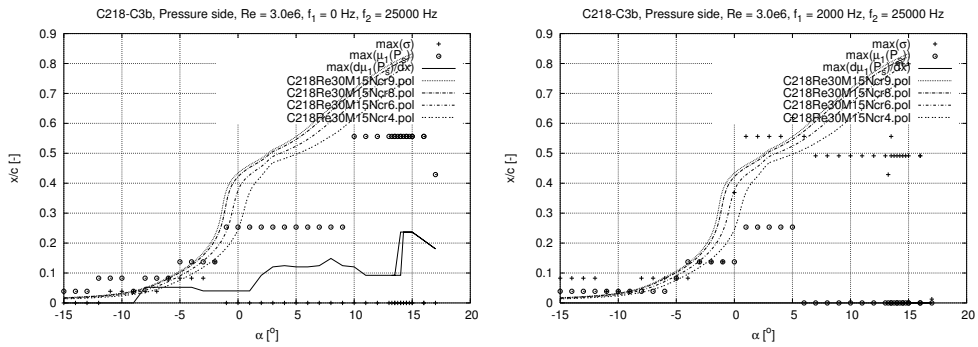


Figure 394: Transition detection

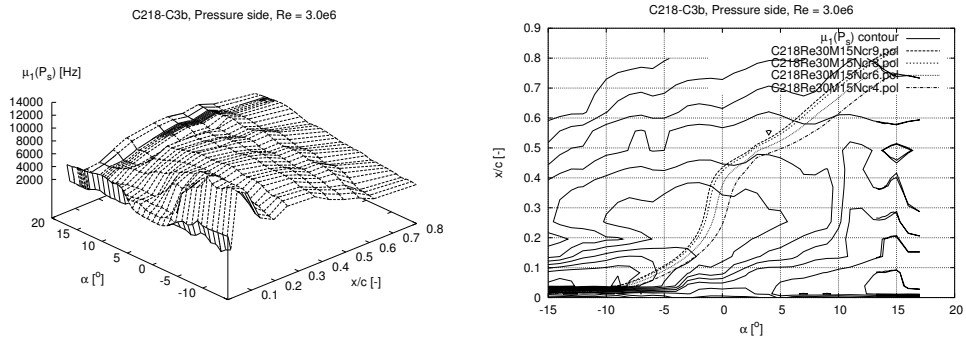


Figure 395: Fourier transform mean, $\mu_1(P_s)$

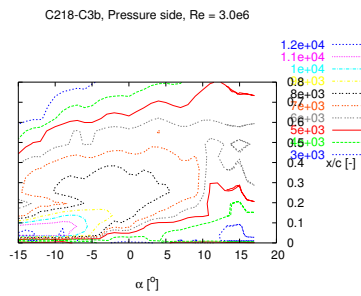


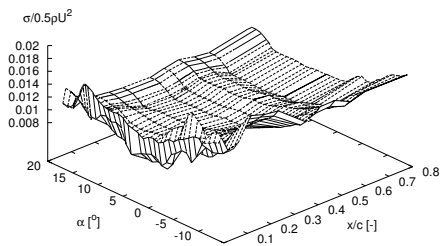
Figure 396: Contours of $\mu_1(P_s)$

C218-C3b
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
13.25	0.0923	15167.4	6533.3
13.50	0.0923	14568.4	6541.7
13.75	0.0923	13894.9	6439.6
14.00	0.0923	13621.3	6396.3
14.25	0.2369	12996.1	6448.6
14.50	0.2369	12836.7	6400.5
14.75	0.2369	12741.3	6375.9
15.00	0.2369	12917.9	6363.7
16.00	0.2088	16488.1	6464.2
17.00	0.1807	18429.6	6507.7
16.00	0.2088	17168.2	6430.8
15.00	0.2369	13101.6	6297.7
14.50	0.2369	13689.7	6344.2
14.00	0.2369	13854.5	6410.8
13.50	0.0923	14208.6	6434.8
13.00	0.0923	14944.3	6504.1
12.00	0.0923	17085.8	6619.3
11.00	0.0923	18506.3	6733.9
10.00	0.1205	19679.8	6799.8
9.00	0.1245	21185.6	7416.2
8.00	0.1486	22496.6	7527.0
7.00	0.1245	24511.1	7653.5
6.00	0.1205	28950.1	7926.1
5.00	0.1205	32971.5	8110.5
4.00	0.1245	36838.4	8300.6
3.00	0.1205	37425.4	8566.8
2.00	0.0923	38146.3	8651.7
1.00	0.0402	39736.1	8577.7
0.00	0.0402	54981.7	8584.8
-1.00	0.0402	60211.1	8639.0
-2.00	0.0402	53678.7	8818.9
-3.00	0.0402	59952.9	9571.8
-4.00	0.0522	62561.2	9679.1
-5.00	0.0522	71336.5	9641.3
-6.00	0.0522	79930.8	10334.7
-7.00	0.0522	90221.1	10912.2
-8.00	0.0522	93784.7	11643.1
-9.00	0.0000	100722.1	12478.7
-10.00	0.0000	93861.8	11756.3
-11.00	0.0000	98083.1	11724.5
-12.00	0.0000	98800.6	11685.6
-13.00	0.0000	112051.1	12149.6
-14.00	0.0000	108808.8	12426.0
-15.00	0.0000	102677.1	12267.0

3.2.29 C6b Clean 100x100

C218-C6b, Pressure side, Re = 6.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C6b, Pressure side, Re = 6.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

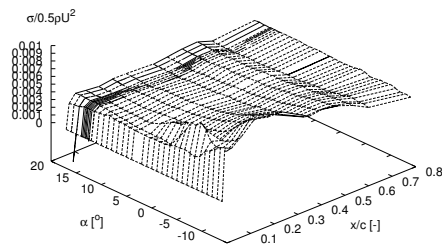
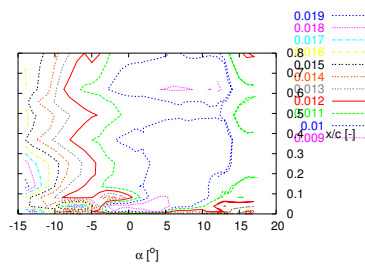


Figure 397: Pressure standard deviations, σ

C218-C6b, Pressure side, Re = 6.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-C6b, Pressure side, Re = 6.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

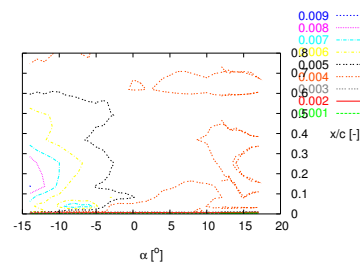


Figure 398: Contours of σ

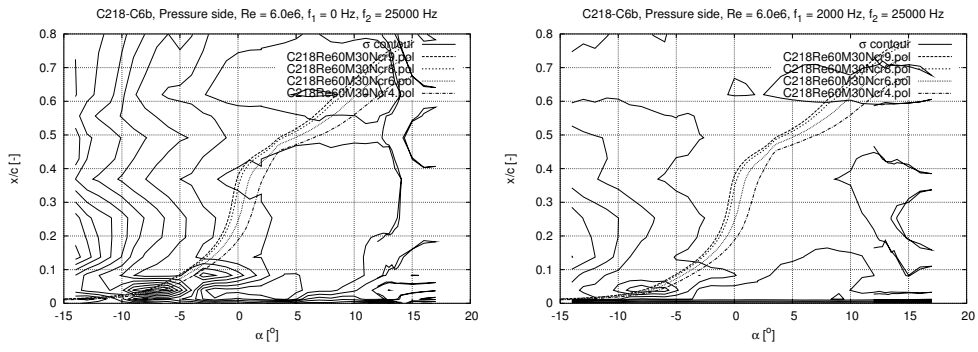


Figure 399: Contours of σ and Xfoil data

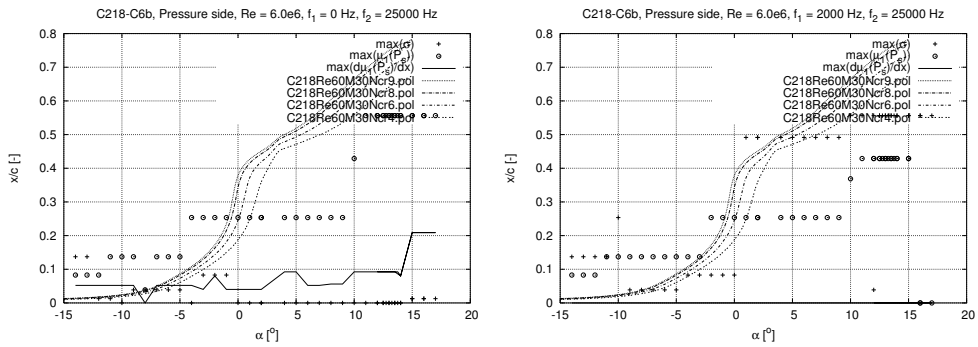


Figure 400: Transition detection

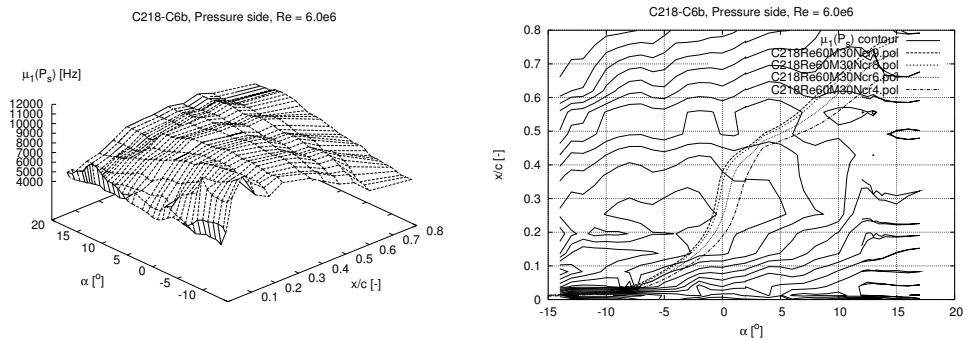


Figure 401: Fourier transform mean, $\mu_1(P_s)$

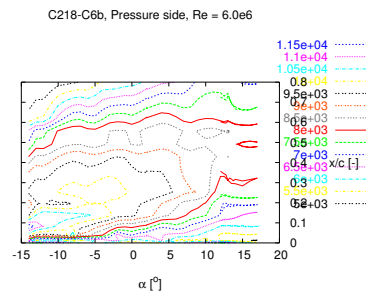


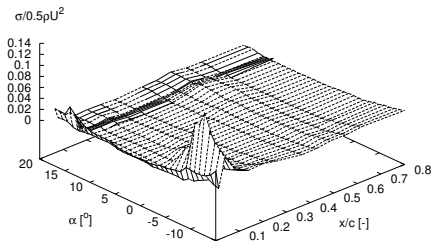
Figure 402: Contours of $\mu_1(P_s)$

C218-C6b
alpha [degrees] angle of attack
xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0923	15778.3	8516.2
12.50	0.0923	15423.9	8461.9
12.75	0.0923	15023.0	8459.3
13.00	0.0923	14986.2	8533.2
13.25	0.0923	14273.1	8501.4
13.50	0.0923	13805.0	8450.4
13.75	0.0923	13508.6	8419.7
14.00	0.0803	12588.7	8356.8
15.00	0.2088	13095.4	8315.2
16.00	0.2088	13914.7	8281.5
17.00	0.2088	13928.5	8319.6
16.00	0.2088	13968.1	8282.4
15.00	0.2088	13514.3	8304.7
14.00	0.0803	12657.4	8384.8
13.50	0.0923	13696.5	8455.6
13.00	0.0923	15195.1	8550.5
12.50	0.0923	15417.2	8507.2
12.00	0.0923	15905.2	8577.4
11.00	0.0923	16752.8	8650.2
10.00	0.0923	18053.4	8869.2
9.00	0.0562	18324.4	8988.2
8.00	0.0562	19770.3	9024.6
7.00	0.0522	24578.9	9140.2
6.00	0.0522	25243.0	9400.6
5.00	0.0923	21804.0	9593.1
4.00	0.0923	23337.7	9768.9
2.00	0.0402	28893.1	9915.0
2.00	0.0402	29288.6	9893.3
1.00	0.0402	31771.8	9896.9
0.00	0.0402	36765.8	9951.9
-1.00	0.0402	35905.1	10047.9
-2.00	0.0803	35826.8	10190.5
-3.00	0.0402	34893.4	10337.7
-4.00	0.0522	36039.7	10369.9
-5.00	0.0522	40838.8	10435.2
-6.00	0.0522	46535.9	10546.1
-7.00	0.0522	52783.6	10608.0
-8.00	0.0000	66385.1	10810.0
-9.00	0.0522	56760.7	10773.2
-10.00	0.0522	56577.2	10863.1
-11.00	0.0522	60142.3	10950.0
-12.00	0.0522	62313.8	10969.5
-13.00	0.0522	67596.3	11308.6
-14.00	0.0522	53156.4	11898.8

3.2.30 Z16b ZZ90 x/c=5% suc. x/c=10% press. 100x100

C218-Z16b, Pressure side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-Z16b, Pressure side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

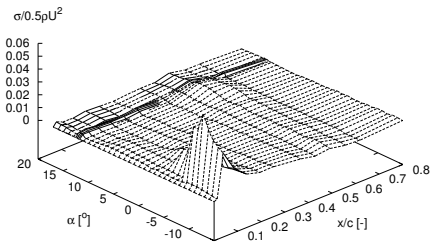
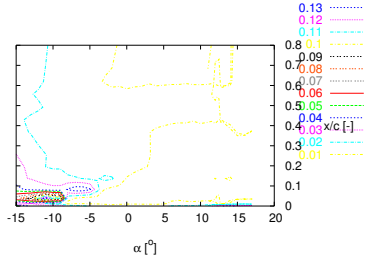


Figure 403: Pressure standard deviations, σ

C218-Z16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

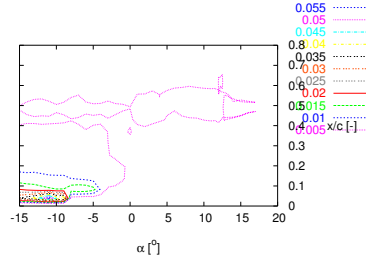
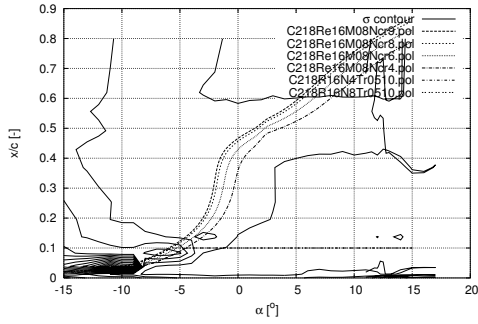


Figure 404: Contours of σ

C218-Z16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

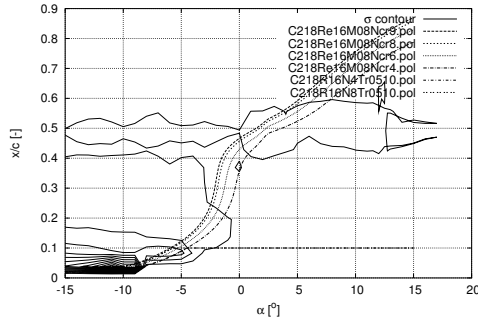
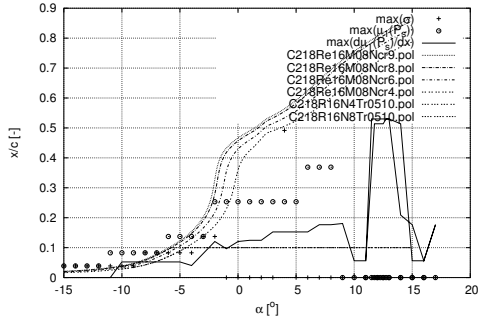


Figure 405: Contours of σ and XFOIL data

C218-Z16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

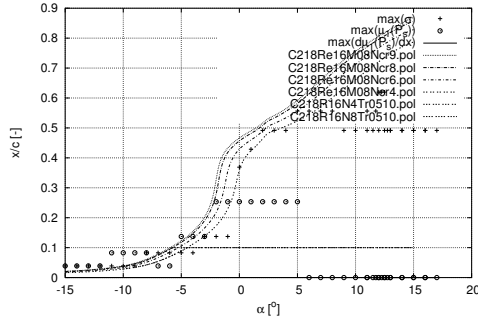
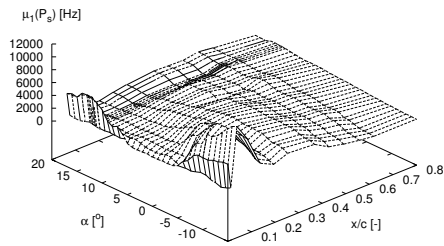


Figure 406: Transition detection

C218-Z16b, Pressure side, Re = 1.6e6



C218-Z16b, Pressure side, Re = 1.6e6

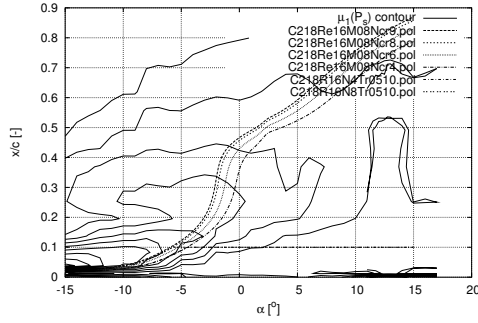


Figure 407: Fourier transform mean, $\mu_1(P_y)$

C218-Z16b, Pressure side, Re = 1.6e6

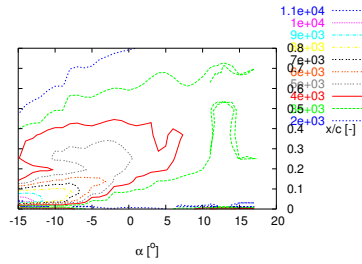


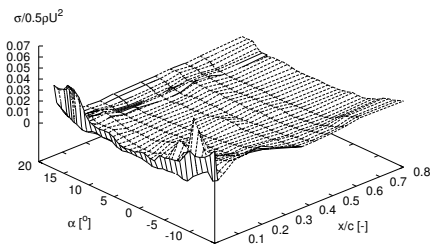
Figure 408: Contours of $\mu_1(P_s)$

C218-Z16b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
11.00	0.0562	6015.4	5848.6
11.75	0.5139	4844.5	6389.9
12.00	0.5139	6175.0	6658.4
12.25	0.5139	6419.5	6594.9
12.50	0.5139	7300.2	6598.5
12.75	0.5300	7603.7	6615.2
13.00	0.5300	7738.2	6503.4
14.00	0.2088	5529.1	6288.8
15.00	0.1767	7188.2	5579.8
16.00	0.0562	6931.6	5469.2
17.00	0.1767	7343.1	5394.6
16.00	0.0562	6524.7	5712.7
15.00	0.0562	7124.6	5552.0
14.00	0.5139	6841.8	6531.7
13.00	0.5300	6852.3	6630.3
12.50	0.5300	7105.3	6607.3
12.00	0.5300	6984.8	6387.6
11.50	0.5300	5883.6	6298.1
11.00	0.0562	5504.5	6053.4
10.00	0.0562	7180.7	5423.0
9.00	0.1807	7556.4	4126.7
8.00	0.1767	8149.4	3877.6
7.00	0.1767	11160.5	4054.0
6.00	0.1526	13671.0	4228.9
5.00	0.1526	14585.5	4110.0
4.00	0.1526	15756.4	4254.3
3.00	0.1526	14975.5	4559.3
2.00	0.1245	15005.3	4919.1
1.00	0.1245	16205.7	4889.3
0.00	0.1205	19889.8	5111.7
-1.00	0.0964	21826.3	5273.5
-2.00	0.1205	24392.8	5427.5
-3.00	0.0803	32778.8	5936.0
-4.00	0.0402	41880.1	6326.7
-5.00	0.0522	44507.3	6337.3
-6.00	0.0522	54188.2	6580.1
-7.00	0.0522	62243.6	7309.7
-8.00	0.0522	67662.7	8287.5
-9.00	0.0522	68697.5	8947.2
-10.00	0.0522	69327.8	8950.9
-11.00	0.0000	72887.5	8872.5
-12.00	0.0000	81314.3	9238.7
-13.00	0.0000	93271.9	10107.1
-14.00	0.0000	98203.9	10920.4
-15.00	0.0000	98470.1	11309.9

3.2.31 Z3b ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 100x100

C218-Z3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

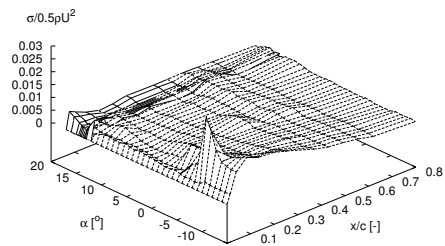
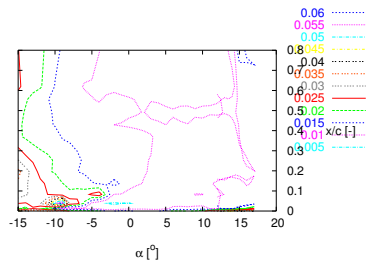


Figure 409: Pressure standard deviations, σ

C218-Z3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

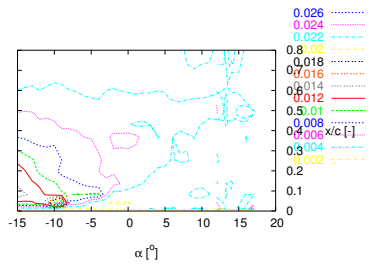


Figure 410: Contours of σ

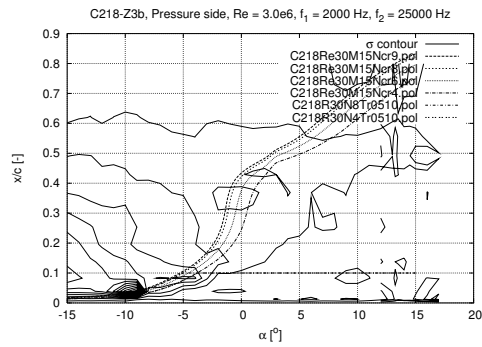
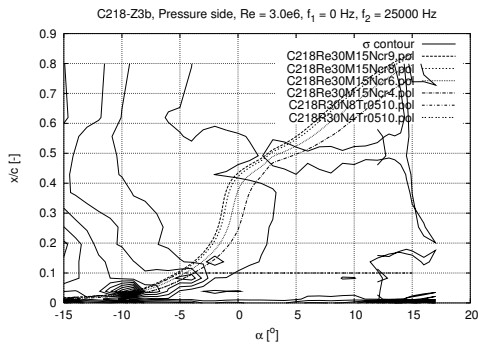


Figure 411: Contours of σ and XFOIL data

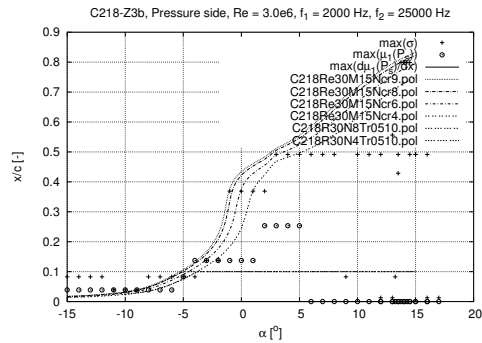
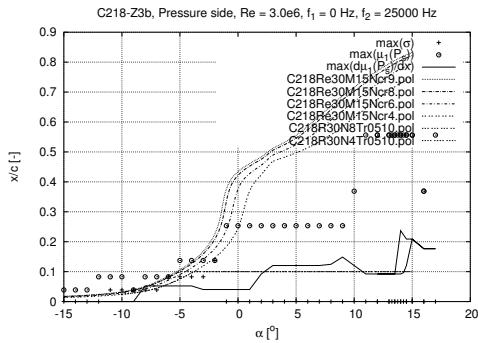


Figure 412: Transition detection

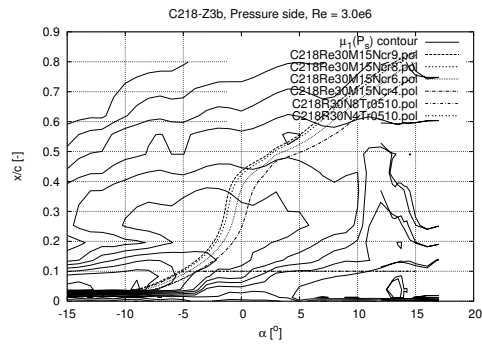
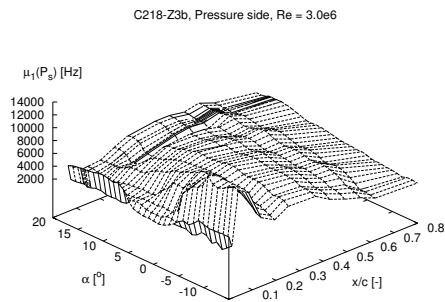


Figure 413: Fourier transform mean, $\mu_1(P_y)$

C218-Z3b, Pressure side, Re = 3.0e6

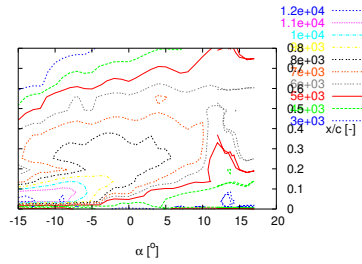


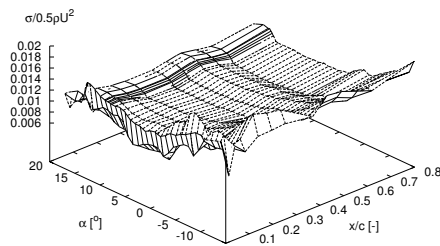
Figure 414: Contours of $\mu_1(P_s)$

C218-Z3b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0923	16055.7	6485.7
13.00	0.0923	15371.2	6644.7
13.25	0.0923	14927.9	6558.0
13.50	0.0923	14983.8	6597.2
13.75	0.0923	14329.5	6621.5
14.00	0.0923	12424.7	6619.2
14.25	0.0964	12010.2	6596.7
14.50	0.1205	11583.0	6592.4
15.00	0.2088	15291.9	6582.5
16.00	0.1767	19082.0	6707.4
17.00	0.1767	18230.2	6646.0
16.00	0.1767	18552.6	6759.2
15.00	0.2088	16152.8	6545.5
14.50	0.2088	15296.5	6536.2
14.00	0.2369	11467.9	6590.4
13.50	0.0923	14641.3	6555.0
13.00	0.0923	15541.0	6607.8
12.00	0.0923	17308.9	6732.7
11.00	0.0923	18592.6	6833.0
10.00	0.1205	20689.0	7184.8
9.00	0.1486	22093.3	7442.2
8.00	0.1245	23295.2	7435.0
7.00	0.1205	26695.3	7605.4
6.00	0.1205	29866.0	7972.0
5.00	0.1205	34500.2	8120.4
4.00	0.1205	36220.2	8362.7
3.00	0.1205	37972.3	8601.9
2.00	0.0923	37569.9	8607.6
1.00	0.0402	40943.0	8470.0
0.00	0.0402	55720.5	8533.2
-1.00	0.0402	58416.9	8618.3
-2.00	0.0402	53561.5	8894.2
-3.00	0.0402	60181.6	9588.2
-4.00	0.0522	62028.0	9616.9
-5.00	0.0522	71912.6	9584.6
-6.00	0.0522	79203.7	10280.3
-7.00	0.0522	90595.9	10890.8
-8.00	0.0522	93038.1	11611.4
-9.00	0.0000	101244.5	12495.7
-10.00	0.0000	92884.5	11706.7
-11.00	0.0000	98715.6	11653.5
-12.00	0.0000	96429.0	11626.2
-13.00	0.0000	109348.3	12138.0
-14.00	0.0000	108155.7	12549.7
-15.00	0.0000	100439.2	12429.4

3.2.32 Z6b ZZ90 $x/c=5\%$ suc. $x/c=10\%$ press. 100x100

C218-Z6b, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z6b, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

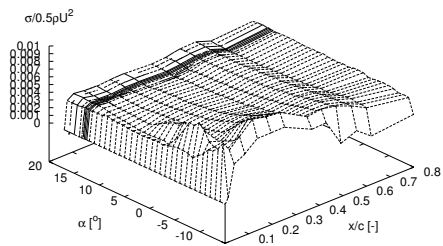
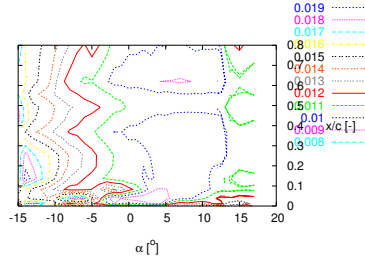


Figure 415: Pressure standard deviations, σ

C218-Z6b, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-Z6b, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

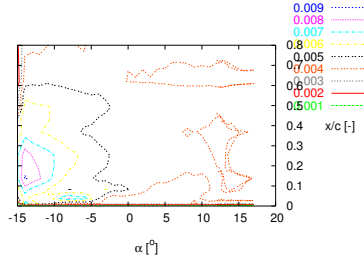


Figure 416: Contours of σ

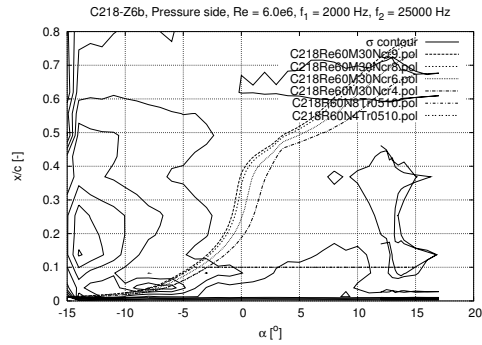
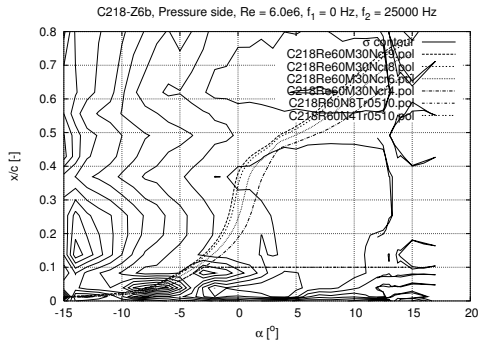


Figure 417: Contours of σ and XFOIL data

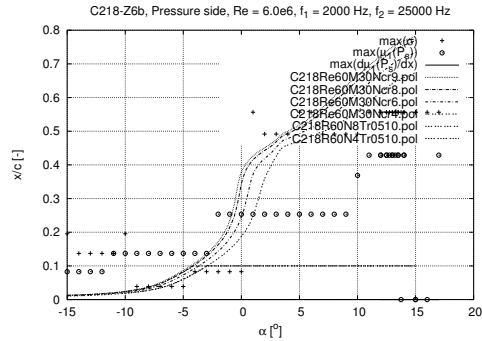
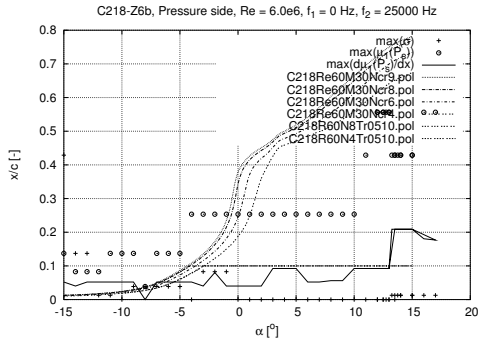
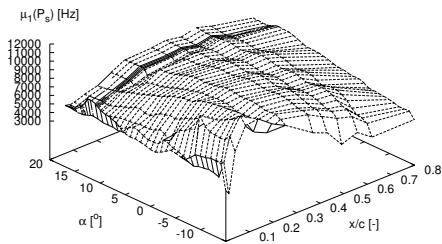


Figure 418: Transition detection

C218-Z6b, Pressure side, Re = 6.0e6



C218-Z6b, Pressure side, Re = 6.0e6

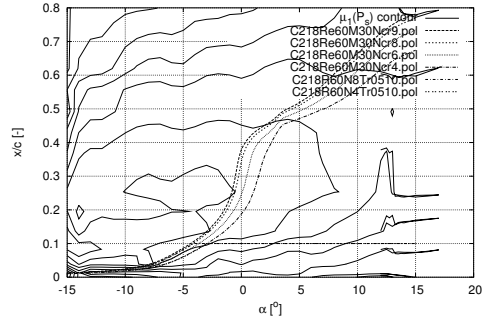


Figure 419: Fourier transform mean, $\mu_1(P_y)$

C218-Z6b, Pressure side, Re = 6.0e6

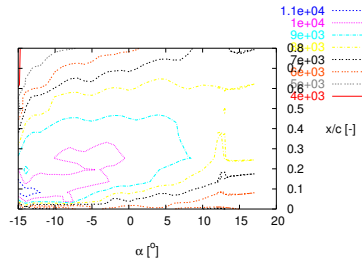


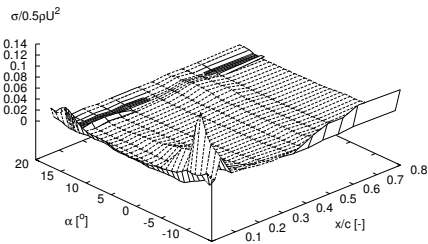
Figure 420: Contours of $\mu_1(P_s)$

C218-Z6b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0923	15497.2	8511.1
12.50	0.0923	15012.4	8481.1
12.75	0.0923	14448.9	8434.1
13.00	0.0923	13261.4	8333.7
13.25	0.2088	12357.7	8421.2
13.50	0.2088	12793.4	8408.4
13.75	0.2088	13360.6	8434.2
14.00	0.2088	13488.3	8448.5
15.00	0.2088	13663.7	8396.6
17.00	0.1767	15308.2	8532.2
16.00	0.1807	14759.1	8506.4
15.00	0.2088	14090.2	8464.4
14.00	0.2088	13382.4	8393.8
13.50	0.2088	12680.9	8400.2
13.00	0.0923	13369.2	8458.4
12.50	0.0923	15267.0	8532.7
12.00	0.0923	15727.1	8567.7
11.00	0.0923	16552.1	8733.7
10.00	0.0923	17208.1	8904.8
9.00	0.0562	18388.4	8966.4
8.00	0.0562	20388.8	9019.6
7.00	0.0522	25088.6	9163.5
6.00	0.0522	24564.3	9394.6
5.00	0.0923	22173.0	9612.8
4.00	0.0923	23400.9	9766.2
3.00	0.0923	25793.2	9898.3
2.00	0.0402	29426.8	9907.7
1.00	0.0402	32030.1	9880.6
0.00	0.0402	36903.9	9946.0
-1.00	0.0402	35836.6	10049.8
-2.00	0.0803	36312.7	10198.1
-3.00	0.0402	35635.9	10340.4
-4.00	0.0522	35869.0	10370.4
-5.00	0.0522	40913.8	10444.5
-6.00	0.0522	46528.1	10542.3
-7.00	0.0522	53188.6	10618.5
-8.00	0.0000	66465.1	10833.3
-9.00	0.0522	56798.4	10779.0
-10.00	0.0522	57958.5	10854.7
-11.00	0.0522	59433.5	10939.1
-12.00	0.0522	63222.5	10974.7
-13.00	0.0522	67947.5	11322.5
-14.00	0.0402	54170.7	11899.4
-15.00	0.0522	85775.9	11251.6

3.2.33 L16b LM standard LER 100x100

C218-L16b, Pressure side, Re = 1.6e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-L16b, Pressure side, Re = 1.6e6, f₁ = 2000 Hz, f₂ = 25000 Hz

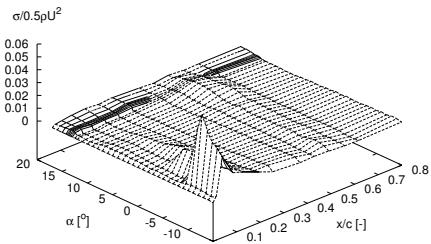
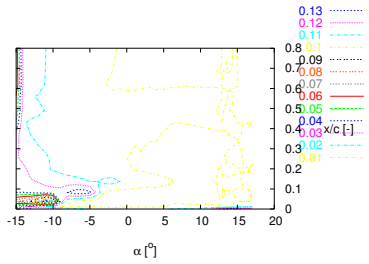


Figure 421: Pressure standard deviations, σ

C218-L16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

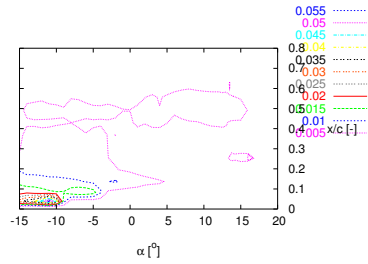


Figure 422: Contours of σ

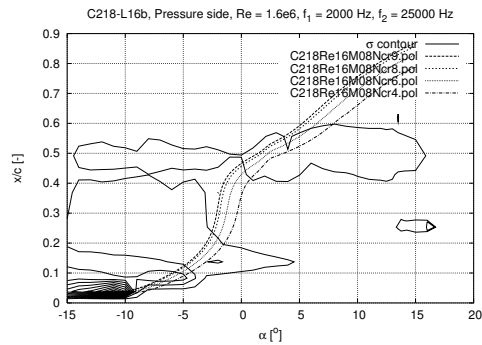
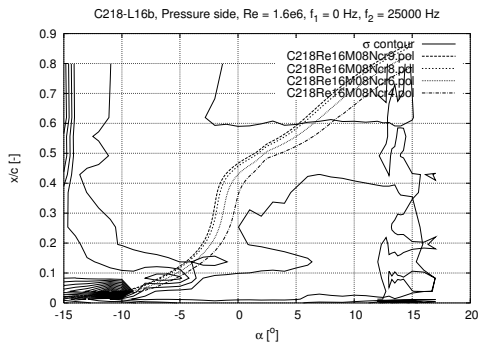


Figure 423: Contours of σ and XFOIL data

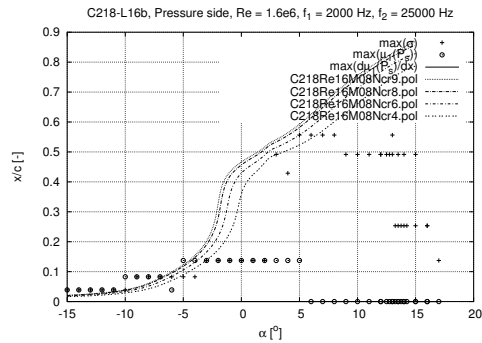
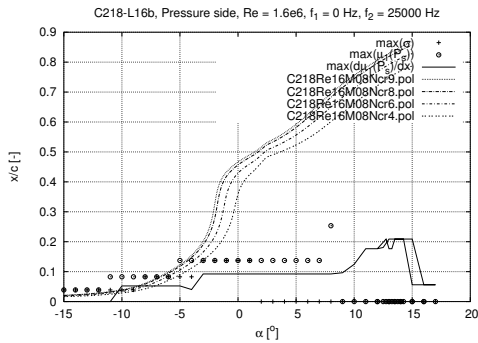


Figure 424: Transition detection

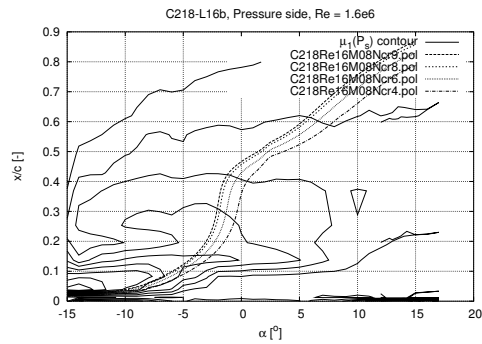
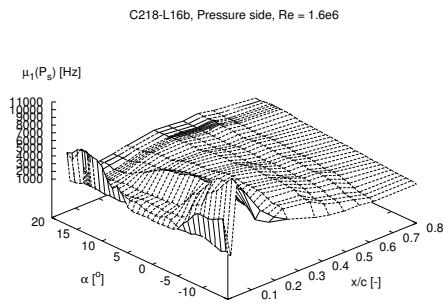


Figure 425: Fourier transform mean, $\mu_1(P_y)$

C218-L16b, Pressure side, Re = 1.6e6

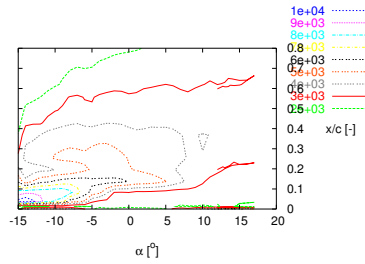


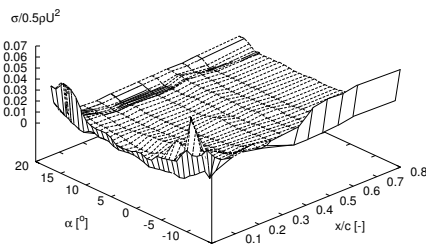
Figure 426: Contours of $\mu_1(P_s)$

C218-L16b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max(d(mu1(Ps))/dx*))
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.1767	9717.7	6401.8
12.75	0.2088	9712.7	6479.5
13.00	0.1767	9047.0	6617.7
13.25	0.1767	8536.2	6679.4
13.50	0.2088	8283.9	6619.7
13.75	0.2088	8027.3	6625.1
14.00	0.2088	7660.4	6696.7
14.25	0.2088	7498.7	6617.8
15.00	0.0562	6518.6	5697.8
16.00	0.0562	9302.0	4736.5
17.00	0.0562	8987.1	5353.2
16.00	0.0562	8518.1	5554.3
15.00	0.2088	7493.4	6332.9
14.00	0.2088	8684.0	6528.9
13.50	0.2088	8809.0	6541.5
13.00	0.2088	9290.2	6545.0
12.50	0.1807	9782.6	6424.5
12.00	0.1767	10421.2	6335.9
11.00	0.1767	10966.4	6162.5
10.00	0.1245	9879.2	5654.5
9.00	0.0964	11795.7	4264.4
8.00	0.0923	15305.6	3955.9
7.00	0.0923	21259.9	4208.9
6.00	0.0923	25008.1	4593.6
5.00	0.0923	28248.9	5033.8
4.00	0.0923	30038.0	5304.0
3.00	0.0923	32214.5	5522.1
2.00	0.0923	33393.4	5592.2
1.00	0.0923	34922.1	5701.4
0.00	0.0923	37287.3	5925.1
-1.00	0.0923	41242.9	6219.6
-2.00	0.0923	40784.4	6352.7
-3.00	0.0923	36967.1	6342.1
-4.00	0.0402	41677.3	6290.5
-5.00	0.0522	44766.7	6277.7
-6.00	0.0522	53947.5	6517.8
-7.00	0.0522	61365.8	7327.9
-8.00	0.0522	66361.0	8310.3
-9.00	0.0522	69452.1	8873.6
-10.00	0.0522	69645.4	8899.9
-11.00	0.0000	72063.8	8847.5
-12.00	0.0000	83105.8	9309.7
-13.00	0.0000	93297.1	10148.2
-14.00	0.0000	97209.1	10919.7
-15.00	0.0000	110022.9	10355.4

3.2.34 L3b LM standard LER 100x100

C218-L3b, Pressure side, Re = 3.0e6, f₁ = 0 Hz, f₂ = 25000 Hz



C218-L3b, Pressure side, Re = 3.0e6, f₁ = 2000 Hz, f₂ = 25000 Hz

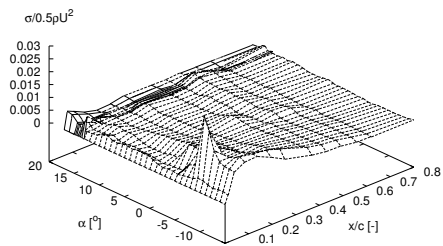
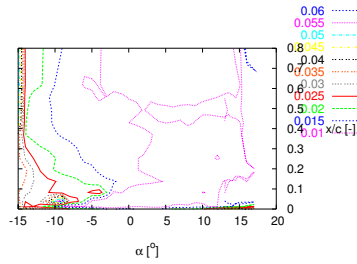


Figure 427: Pressure standard deviations, σ

C218-L3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

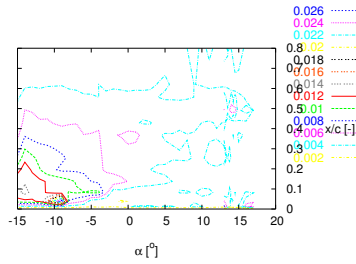
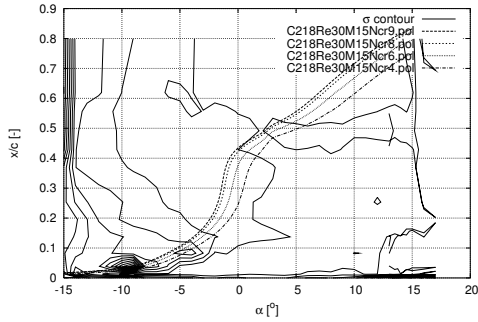


Figure 428: Contours of σ

C218-L3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

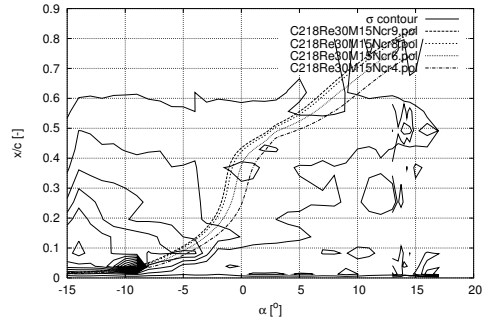
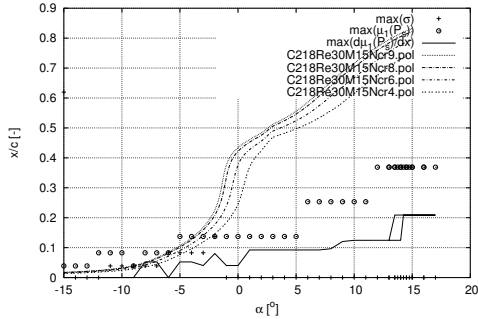


Figure 429: Contours of σ and XFOIL data

C218-L3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

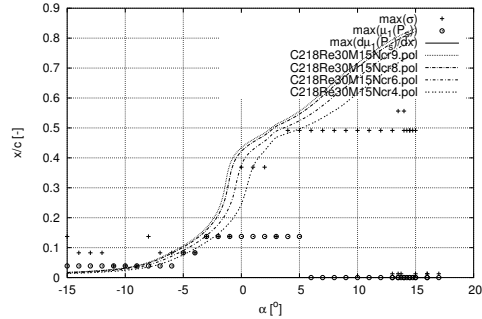
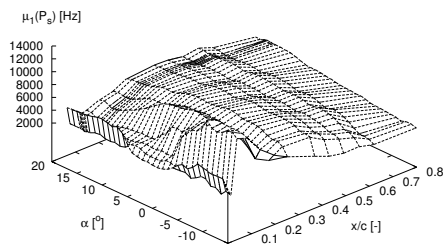


Figure 430: Transition detection

C218-L3b, Pressure side, Re = 3.0e6



C218-L3b, Pressure side, Re = 3.0e6

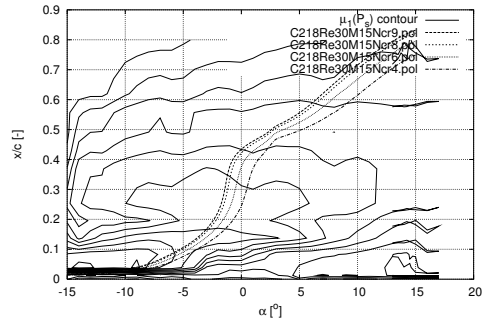


Figure 431: Fourier transform mean, $\mu_1(P_y)$

C218-L3b, Pressure side, Re = 3.0e6

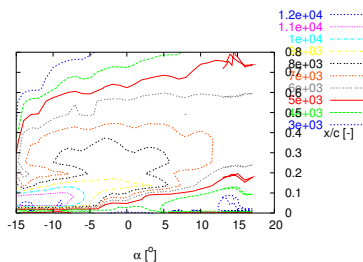


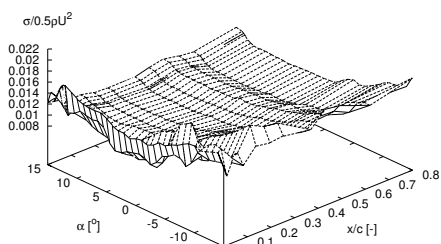
Figure 432: Contours of $\mu_1(P_s)$

C218-L3b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
13.00	0.1245	21620.4	6714.9
13.50	0.1245	22020.9	6722.7
13.75	0.1245	21561.7	6758.7
14.00	0.1245	21224.6	6696.6
14.25	0.2088	20728.3	6656.3
14.50	0.2088	20371.7	6711.9
14.75	0.2088	20213.7	6670.5
15.00	0.2088	20411.6	6620.4
16.00	0.2088	16859.3	6708.7
17.00	0.2088	15605.7	6654.3
16.00	0.2088	15957.3	6735.5
15.00	0.2088	19522.8	6736.3
14.50	0.2088	21459.9	6734.0
14.00	0.2088	20834.3	6801.4
13.50	0.2088	20984.7	6805.8
13.00	0.1245	22373.7	6854.3
12.00	0.1245	23902.7	6956.3
11.00	0.1245	26076.7	7169.8
10.00	0.1245	27901.0	7452.9
9.00	0.1205	29492.5	7493.0
8.00	0.0964	32188.0	7429.6
7.00	0.0923	39174.7	7594.5
6.00	0.0923	45369.2	7956.8
5.00	0.0923	50607.8	8348.5
4.00	0.0923	53405.6	8775.2
3.00	0.0923	55478.4	9048.5
2.00	0.0923	54099.8	9161.5
1.00	0.0923	52642.2	9233.6
0.00	0.0402	56487.6	9376.8
-1.00	0.0402	59277.2	9666.8
-2.00	0.0803	58294.8	9865.0
-3.00	0.0402	60230.3	9792.8
-4.00	0.0522	61889.1	9612.3
-5.00	0.0522	70637.2	9532.7
-6.00	0.0000	77591.3	10261.1
-7.00	0.0522	88965.6	10849.0
-8.00	0.0522	90274.2	11562.2
-9.00	0.0000	99441.0	12411.7
-10.00	0.0000	90795.1	11648.6
-11.00	0.0000	96453.6	11598.9
-12.00	0.0000	98541.4	11565.1
-13.00	0.0000	110673.4	12164.1
-14.00	0.0000	105167.4	12374.9
-15.00	0.0000	106165.8	11701.1

3.2.35 L6b LM standard LER 100x100

C218-L6b, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L6b, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

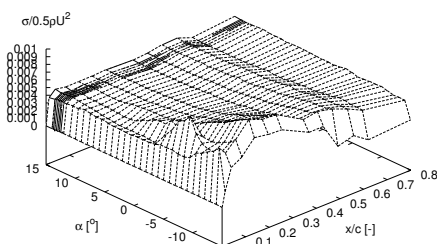
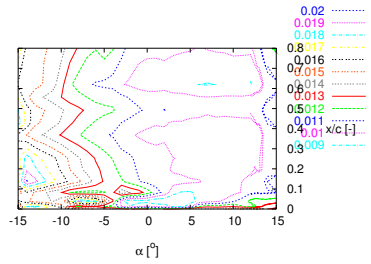


Figure 433: Pressure standard deviations, σ

C218-L6b, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-L6b, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

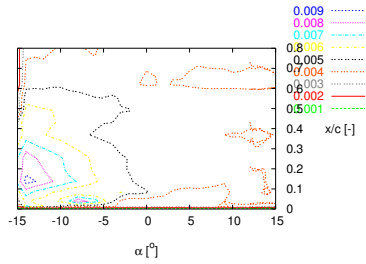


Figure 434: Contours of σ

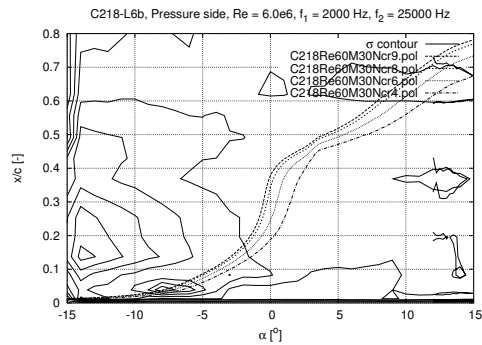
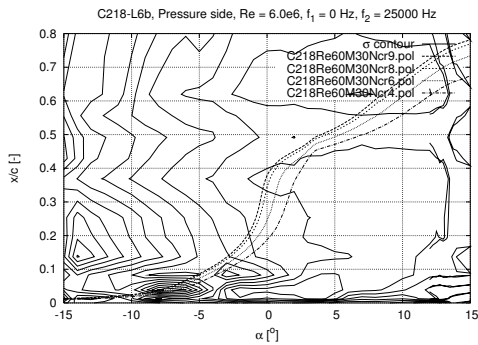


Figure 435: Contours of σ and XFOIL data

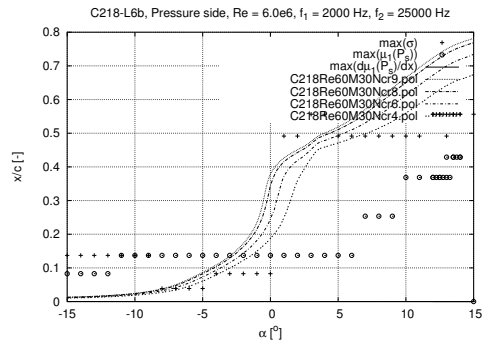
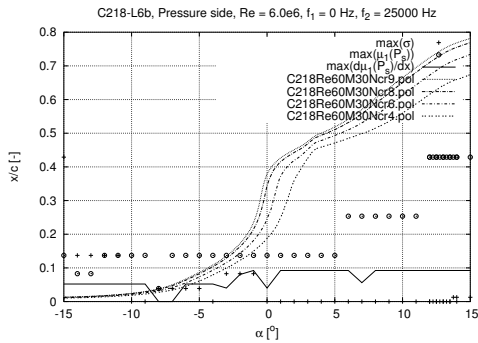


Figure 436: Transition detection

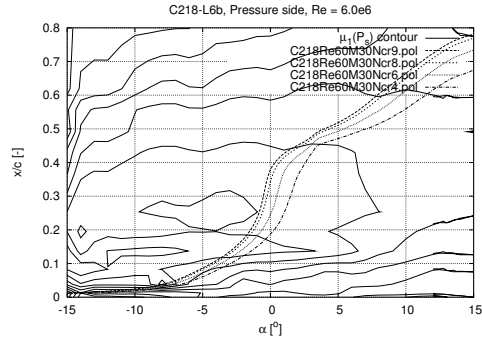
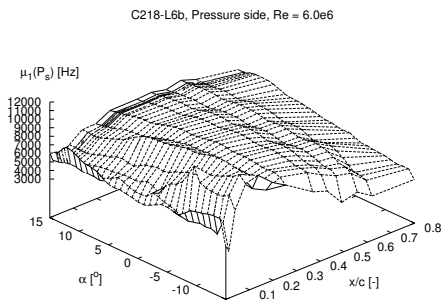


Figure 437: Fourier transform mean, $\mu_1(P_s)$

C218-L6b, Pressure side, Re = 6.0e6

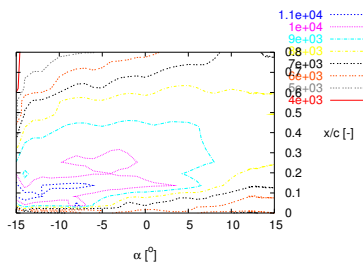


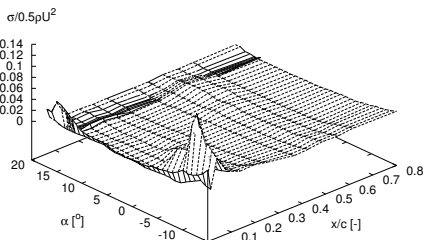
Figure 438: Contours of $\mu_1(P_s)$

C218-L6b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.0923	18070.8	8585.6
12.25	0.0923	17738.2	8567.0
12.50	0.0923	17464.5	8539.7
12.75	0.0923	17232.3	8501.5
13.00	0.0923	17191.2	8585.4
13.25	0.0923	16718.8	8544.3
13.50	0.0923	17091.7	8462.8
13.75	0.0923	17255.1	8427.4
14.00	0.0923	17358.5	8445.7
14.25	0.0923	17847.4	8357.0
14.50	0.0923	17877.9	8422.4
14.75	0.0923	17026.4	8474.4
13.00	0.0923	17561.1	8597.5
12.50	0.0923	17668.8	8552.6
12.00	0.0923	18294.9	8651.0
11.00	0.0923	19608.1	8777.5
10.00	0.0923	20248.1	8916.8
9.00	0.0923	21070.5	8983.5
8.00	0.0923	22249.1	9001.6
7.00	0.0562	27644.0	9143.1
6.00	0.0923	30691.3	9371.1
5.00	0.0923	35082.2	9614.2
4.00	0.0923	37632.1	9917.4
3.00	0.0923	37741.0	10032.1
2.00	0.0923	37183.7	10094.1
1.00	0.0923	35958.4	10138.2
0.00	0.0402	37349.5	10242.6
-1.00	0.0923	38100.5	10430.1
-2.00	0.0803	43783.5	10598.0
-3.00	0.0402	35518.9	10748.4
-4.00	0.0522	37407.0	10684.7
-5.00	0.0522	42331.6	10803.5
-6.00	0.0522	48777.3	10980.1
-7.00	0.0000	58383.9	11201.8
-8.00	0.0000	72582.1	11407.3
-9.00	0.0522	58712.6	11318.1
-10.00	0.0522	57779.2	11214.4
-11.00	0.0522	61186.9	11123.6
-12.00	0.0522	62538.8	11034.8
-13.00	0.0522	67582.2	11308.1
-14.00	0.0522	50115.3	11812.6
-15.00	0.0522	84817.3	11430.8

3.2.36 T16b Trip wire. Bump tape 2% 100x100

C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

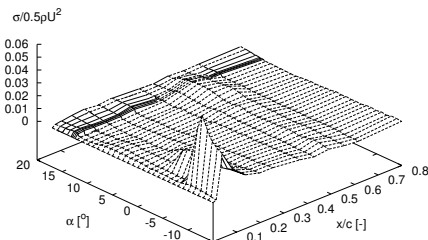
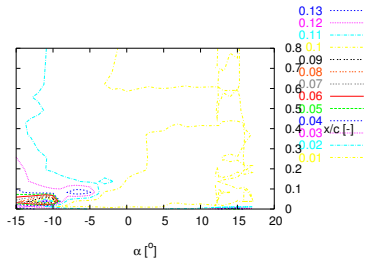


Figure 439: Pressure standard deviations, σ

C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

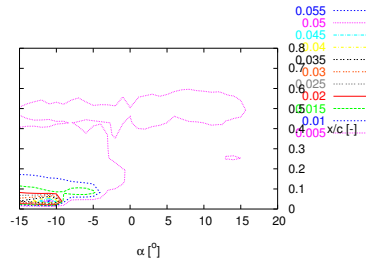
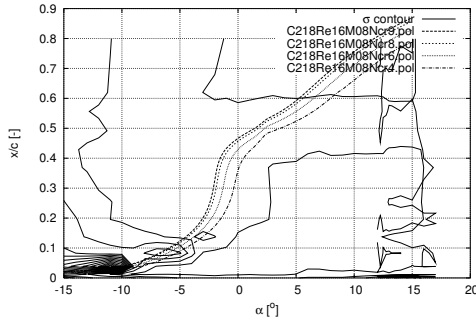


Figure 440: Contours of σ

C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

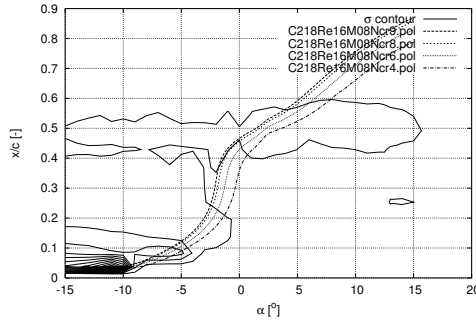
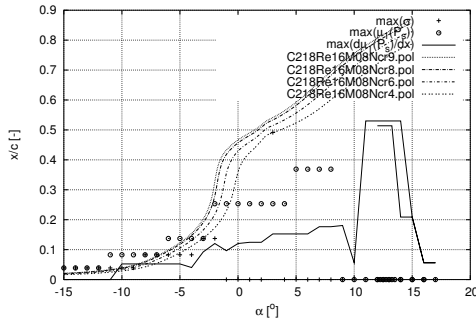


Figure 441: Contours of σ and XFOIL data

C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T16b, Pressure side, Re = 1.6e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

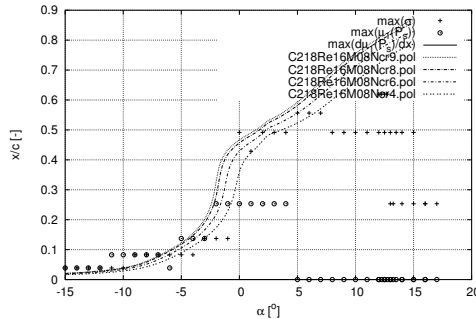
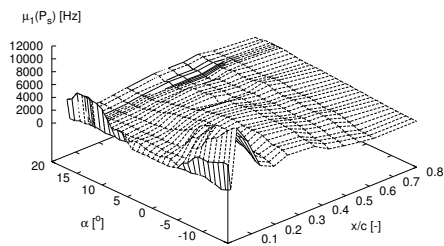


Figure 442: Transition detection

C218-T16b, Pressure side, Re = 1.6e6



C218-T16b, Pressure side, Re = 1.6e6

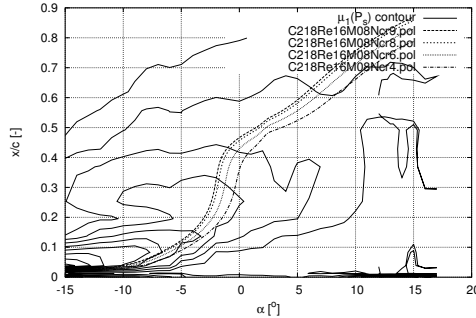


Figure 443: Fourier transform mean, $\mu_1(P_y)$

C218-T16b, Pressure side, Re = 1.6e6

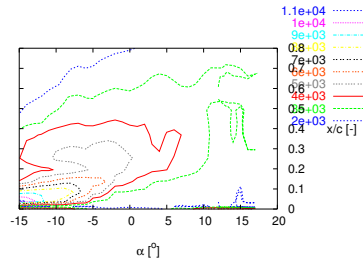


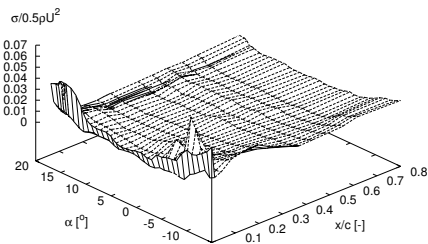
Figure 444: Contours of $\mu_1(P_s)$

C218-T16b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max[d(mu1(Ps))/dx*])
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.00	0.5139	5662.3	6427.6
12.25	0.5139	7311.2	6362.4
12.50	0.5139	6572.7	6590.2
12.75	0.5139	5982.3	6694.2
13.00	0.5139	5529.2	6607.2
13.25	0.5139	5596.8	6620.6
14.00	0.2088	4839.9	6432.7
15.00	0.2088	5180.9	6524.4
16.00	0.0562	7533.2	5279.3
17.00	0.0562	7986.2	4788.6
16.00	0.0562	7428.1	5206.0
15.00	0.2088	5896.6	6499.5
14.00	0.5300	6159.4	6546.3
13.50	0.5300	6268.2	6505.8
13.00	0.5300	6957.3	6475.7
12.50	0.5300	7079.2	6463.0
12.00	0.5300	7354.2	6416.0
11.00	0.5300	6472.1	6249.1
10.00	0.0562	6751.7	5785.1
9.00	0.1807	7668.1	4596.5
8.00	0.1767	7964.2	3856.1
7.00	0.1767	10183.6	3991.8
6.00	0.1526	12756.0	4184.9
5.00	0.1526	14380.1	4122.4
4.00	0.1526	15103.5	4219.7
3.00	0.1526	15132.9	4396.3
2.00	0.1245	14580.3	4877.0
1.00	0.1245	16387.5	4895.5
0.00	0.1205	18682.4	5063.2
-1.00	0.0964	23110.6	5235.5
-2.00	0.1205	24586.7	5381.7
-3.00	0.0923	31329.5	5833.7
-4.00	0.0402	40820.3	6341.9
-5.00	0.0522	44533.4	6335.4
-6.00	0.0522	53798.6	6580.0
-7.00	0.0522	62230.9	7297.7
-8.00	0.0522	67563.6	8279.6
-9.00	0.0522	71415.5	8947.8
-10.00	0.0522	69845.5	8939.7
-11.00	0.0000	72500.4	8874.9
-12.00	0.0000	82111.8	9301.4
-13.00	0.0000	93099.5	10124.1
-14.00	0.0000	97268.3	10941.1
-15.00	0.0000	97799.8	11323.8

3.2.37 T3b Trip wire. Bump tape 2% 100x100

C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

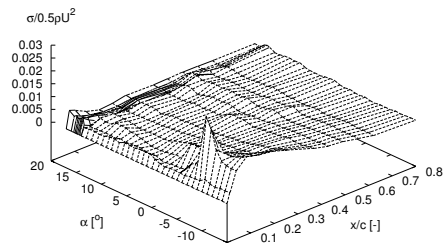
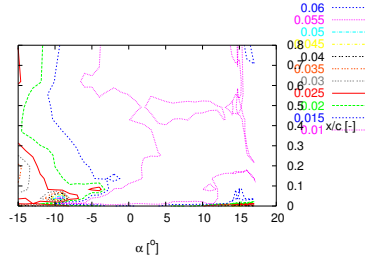


Figure 445: Pressure standard deviations, σ

C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

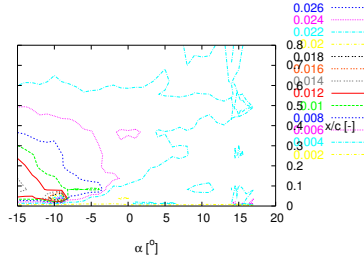
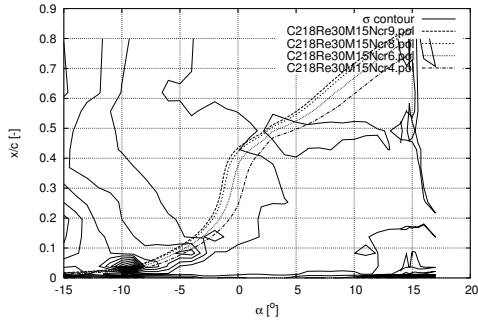


Figure 446: Contours of σ

C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

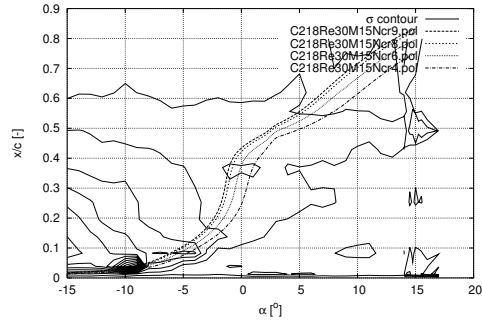
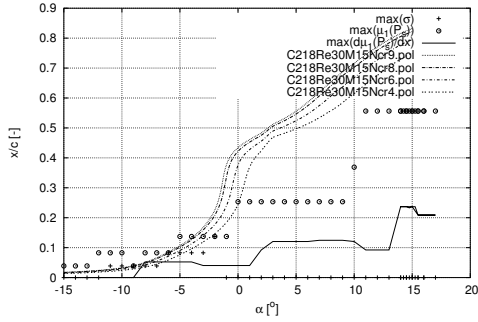


Figure 447: Contours of σ and XFOIL data

C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T3b, Pressure side, Re = 3.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

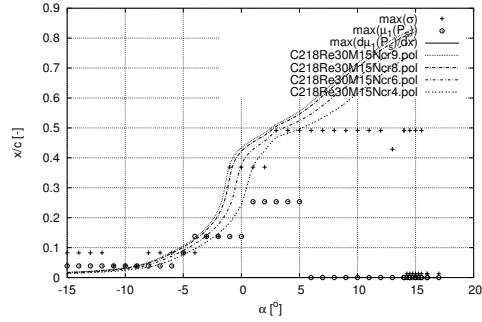
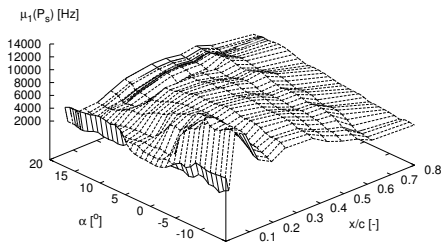


Figure 448: Transition detection

C218-T3b, Pressure side, Re = 3.0e6



C218-T3b, Pressure side, Re = 3.0e6

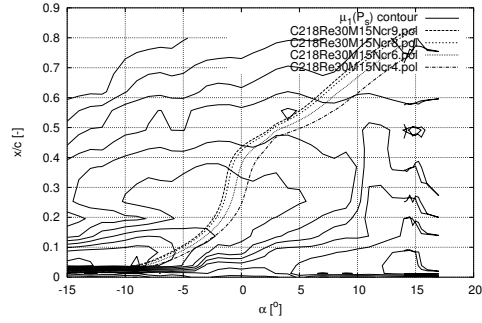


Figure 449: Fourier transform mean, $\mu_1(P_y)$

C218-T3b, Pressure side, Re = 3.0e6

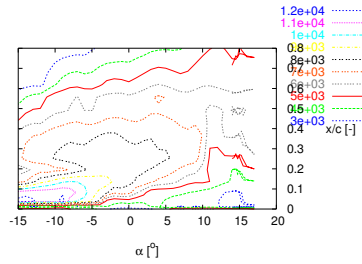


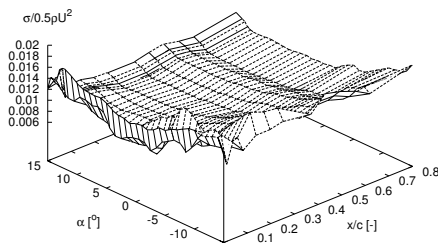
Figure 450: Contours of $\mu_1(P_s)$

C218-T3b
 alpha [degrees] angle of attack
 xtr* [-] transition point ($x^*=x/c$) predicted by $\max[d(\mu_1(P_s))/dx^*]$
 $d(\mu_1)/dx^*$ [Hz/-] $d(\mu_1(P_s))/dx^*$ evaluated at xtr^* ($=\max[d(\mu_1(P_s))/dx^*]$)
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	$d(\mu_1)/dx^*$	max(mu1)
14.00	0.2369	15084.5	6318.9
14.25	0.2369	15245.5	6410.2
14.50	0.2369	13760.5	6405.7
14.75	0.2329	13051.8	6360.0
15.00	0.2369	12391.9	6407.7
15.25	0.2369	12216.6	6360.1
15.50	0.2088	11996.1	6440.2
16.00	0.2088	15749.7	6513.6
17.00	0.2088	16660.1	6550.1
16.00	0.2088	15390.6	6505.9
15.50	0.2088	15449.7	6466.6
15.00	0.2369	12855.2	6429.8
14.50	0.2369	14083.3	6349.8
14.00	0.2369	13870.0	6477.3
13.00	0.0923	15511.5	6644.5
12.00	0.0923	17353.8	6774.1
11.00	0.0923	18801.3	6847.3
10.00	0.1205	20217.9	6967.7
9.00	0.1245	22004.8	7405.6
8.00	0.1245	23231.6	7482.9
7.00	0.1245	26434.1	7588.0
6.00	0.1205	30073.2	7936.0
5.00	0.1205	33645.2	8084.6
4.00	0.1205	35696.1	8272.3
3.00	0.1205	37863.5	8553.0
2.00	0.0923	38245.0	8615.2
1.00	0.0402	40999.2	8520.1
0.00	0.0402	55875.7	8528.1
-1.00	0.0402	59017.0	8619.0
-2.00	0.0402	53411.7	8814.4
-3.00	0.0402	59888.1	9552.0
-4.00	0.0522	62698.4	9619.9
-5.00	0.0522	71111.6	9576.1
-6.00	0.0522	78412.1	10254.9
-7.00	0.0522	89622.9	10850.7
-8.00	0.0522	93470.0	11598.1
-9.00	0.0000	101143.7	12468.5
-10.00	0.0000	91982.0	11681.9
-11.00	0.0000	97351.4	11645.6
-12.00	0.0000	99638.1	11618.3
-13.00	0.0000	110951.5	12136.7
-14.00	0.0000	108107.7	12460.9
-15.00	0.0000	102514.3	12337.2

3.2.38 T6b Trip wire. Bump tape 2% 100x100

C218-T6b, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T6b, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

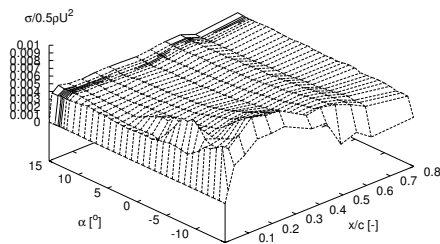
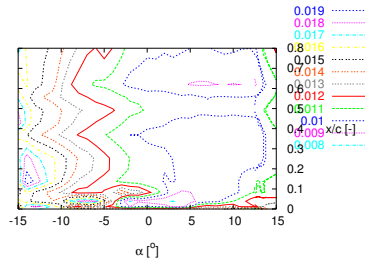


Figure 451: Pressure standard deviations, σ

C218-T6b, Pressure side, Re = 6.0e6, $f_1 = 0$ Hz, $f_2 = 25000$ Hz



C218-T6b, Pressure side, Re = 6.0e6, $f_1 = 2000$ Hz, $f_2 = 25000$ Hz

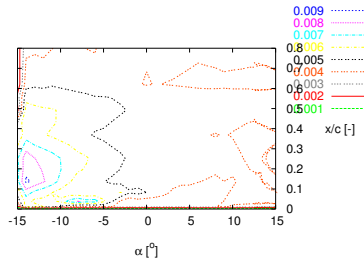


Figure 452: Contours of σ

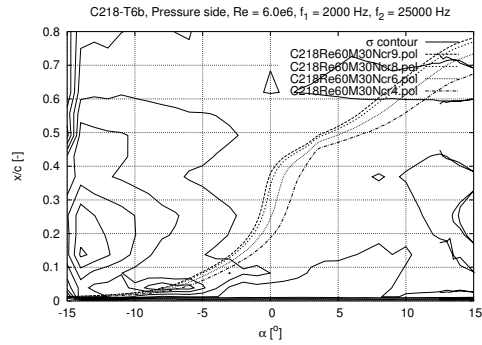
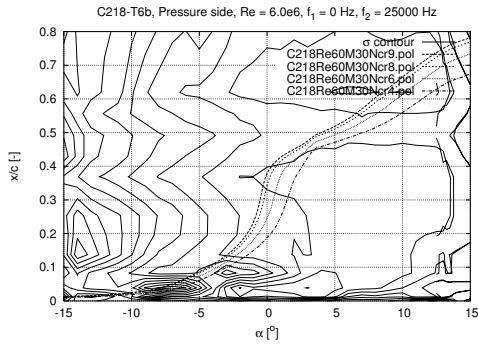


Figure 453: Contours of σ and XFOIL data

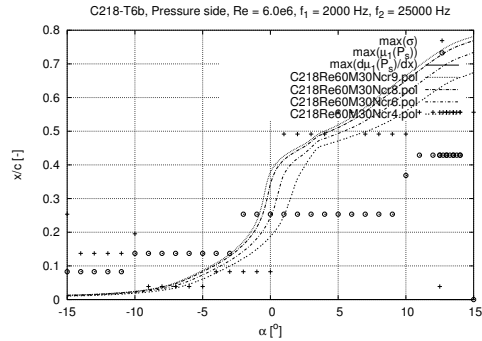
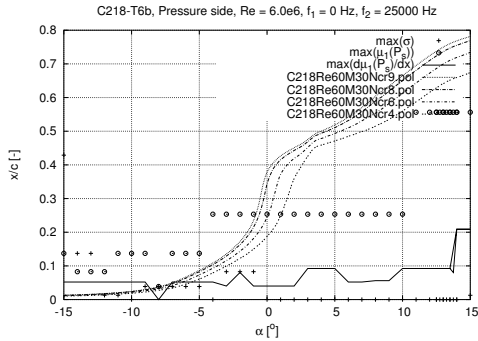


Figure 454: Transition detection

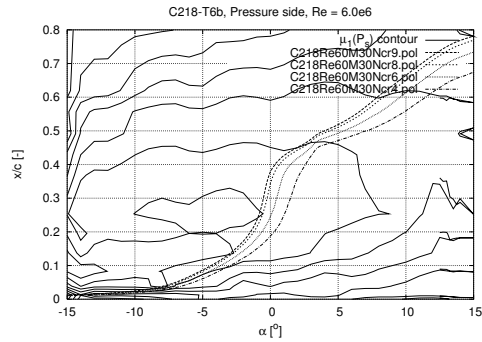
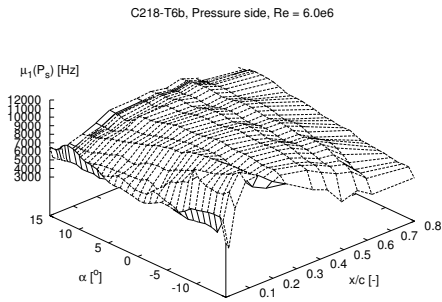


Figure 455: Fourier transform mean, $\mu_1(P_y)$

C218-T6b, Pressure side, Re = 6.0e6

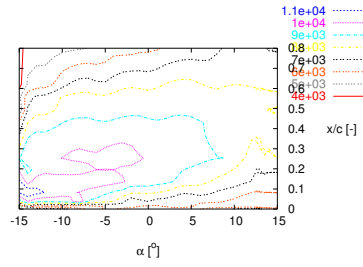


Figure 456: Contours of $\mu_1(P_s)$

C218-T6b
 alpha [degrees] angle of attack
 xtr* [-] transition point (x**x/c) predicted by max[d(mu1(Ps))/dx*]
 d(mu1)/dx* [Hz/-] d(mu1(Ps))/dx* evaluated at xtr* (=max(d(mu1(Ps))/dx*))
 max(mu1) [Hz] max mu1 of all chordwise positions

alpha	xtr*	d(mu1)/dx*	max(mu1)
12.50	0.0923	16040.6	8463.0
12.75	0.0923	14772.6	8440.4
13.00	0.0923	14252.0	8374.6
13.25	0.0923	14211.8	8441.9
13.50	0.0923	13103.3	8415.7
13.75	0.0803	12767.7	8393.0
14.00	0.2088	12472.9	8323.9
15.00	0.2088	13719.0	8381.9
14.00	0.2088	12211.1	8375.7
13.50	0.0923	12966.7	8410.3
13.00	0.0923	14706.2	8519.9
12.50	0.0923	15255.3	8517.6
12.00	0.0923	15622.0	8563.7
11.00	0.0923	16613.7	8639.4
10.00	0.0923	17554.8	8843.5
9.00	0.0562	18539.6	8994.8
8.00	0.0562	19823.1	9015.8
7.00	0.0522	24798.2	9153.8
6.00	0.0522	25159.0	9376.1
5.00	0.0923	21947.4	9600.0
4.00	0.0923	23376.8	9758.5
3.00	0.0923	25866.5	9899.5
2.00	0.0402	30127.7	9878.4
1.00	0.0402	32737.3	9873.4
0.00	0.0402	37663.2	9945.2
-1.00	0.0402	38528.5	10043.5
-2.00	0.0803	35698.1	10181.1
-3.00	0.0402	35385.2	10329.6
-4.00	0.0522	36299.7	10373.5
-5.00	0.0522	40808.2	10450.6
-6.00	0.0522	46963.7	10546.3
-7.00	0.0522	53697.2	10620.7
-8.00	0.0000	66428.1	10800.3
-9.00	0.0522	57527.6	10766.8
-10.00	0.0522	58100.8	10852.2
-11.00	0.0522	59369.2	10939.3
-12.00	0.0522	62523.4	10981.8
-13.00	0.0522	67744.2	11314.5
-14.00	0.0522	51069.8	11853.3
-15.00	0.0522	83035.1	11195.0

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- [1] Døssing M. High Frequency Microphone Measurements for Transition Detection on Airfoils. Risø R-report ISBN 978-87-550-3674-1, Risø DTU, Wind Energy Department, 2008.
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Risø's research is aimed at solving concrete problems in the society.

Research targets are set through continuous dialogue with business, the political system and researchers.

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