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THE APPROXIMATE DISTRIBUTION OF THE LIKELIHOOD RATIO TEST
FOR TESTING THE EQUALITY OF TWO MEANS
WITH EQUAL COEFFICIENTS OF VARIATION

par

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Août 1975

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THE APPROXIMATE DISTRIBUTION OF THE LIKELIHOOD RATIO TEST
FOR TESTING THE EQUALITY OF TWO MEANS WITH EQUAL COEFFICIENTS OF VARIATION

by

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Ecole Polytechnique

SUMMARY

-dm-
This technical report contains the results of simulation studies directed at finding the approximate distribution of the likelihood ratio test, under the null hypothesis, for the problem of testing the equality of two means with equal coefficients of variation and unequal sample sizes. These results generalize those of Lohrding's (1969) for the equal sample sizes case. Special attention has been given to the problem of finding the critical points (0.10, 0.05, 0.025, 0.01) by fitting a two stage model.

**A CONSULTER
SUR PLACE**

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INTRODUCTION

There has been considerable amount of work in the literature on the Behrens-Fisher problem. Behrens (1929), Fisher (1939), Welch (1937), Gronow (1951), David and Johnson (1951), Box (1954), to name only a few, have contributed significantly towards examining and discussing various aspects of this problem. Lately, Lohrding (1969) derived the likelihood ratio test for this problem with equal sample sizes under the assumption of equal coefficients of variation. This assumption is valid in many types of agricultural, biological and psychological experimentation, because quite often the treatment that yields a larger mean also has a larger standard deviation.

Recently, Clement and Sinha (1975), have generalized the results of Lohrding to the unequal sample sizes case. It is known (Wilks, 1963) that in large samples, the distribution of the likelihood ratio (after transformation) is a central χ^2 variable. However, for small samples, the distribution is not known and seems to be very complicated. Hence we have adopted the method of simulation in order to find the approximate distribution and a two-stage smoothing model is use to find the critical points of the test.

THEORY

We shall present a brief summary in this section and more details can be found in Clement and Sinha (1975).

Let $\{X_{ij}, j = 1, \dots, n_i\}$ a random sample of size n_i from a univariate normal population $N(\mu_i, \beta^2 \mu_i^2)$ $i = 1, 2$. Let non-restrictive parameter space be $\Omega = \{(\mu_1, \mu_2, \beta) : 0 < \mu_1 < \infty, 0 < \mu_2 < \infty, 0 < \beta < \infty\}$ and $\omega = \{(\mu, \beta) : 0 < \mu < \infty, 0 < \beta < \infty\}$ the restrictive parameter space corresponding to the null hypothesis $H_0 : \mu_1 = \mu_2 = \mu$.

In Ω the maximum likelihood estimators are

$$\begin{aligned} \hat{\mu}_2 = & [\{ (n_1 n_2 + 2n_2^2 - n_1^2) \bar{X}_1^2 + 2n_2 (n_1 + n_2) S_1^2 \} \\ & + n_1 \sqrt{n_1 + n_2} \bar{X}_1 \{ (n_1 + n_2) \bar{X}_1 \bar{X}_2^2 \\ & + 4n_1 \bar{X}_2 S_1^2 + 4n_2 \bar{X}_1 S_2^2 + 4(n_1 + n_2) S_1^2 S_2^2 \}^{\frac{1}{2}}] \\ & / [2(n_1 + n_2) \{ (n_2 \bar{X}_1^2 + (n_1 + n_2) S_1^2 \}] \end{aligned} \quad (1)$$

$$\hat{\mu}_1 = n_1 \bar{X}_1 \hat{\mu}_2 / \{ (n_1 + n_2) \hat{\mu}_2 - \mu_2 \bar{X}_2 \} \quad (2)$$

$$\begin{aligned} \hat{\beta}^2 = & n_1 \{ S_1^2 + (\bar{X}_1 - \hat{\mu}_1)^2 \} / \hat{\mu}_1^2 (n_1 + n_2) \\ & + n_2 \{ S_2^2 + (\bar{X}_2 - \hat{\mu}_2)^2 \} / \hat{\mu}_2^2 (n_1 + n_2) \end{aligned} \quad (3)$$

where $\bar{X}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} X_{ij}$, $S_i^2 = \frac{1}{n_i} \sum_{j=1}^{n_i} (X_{ij} - \bar{X}_i)^2 / n_i$, $i = 1, 2$ (4)

In ω , the maximum likelihood estimators are

$$\hat{\mu} = (n_1 \bar{X}_1 + n_2 \bar{X}_2) / n_1 + n_2 \quad (5)$$

$$\hat{\beta} = S / \bar{X} \quad (6)$$

where
$$(n_1 + n_2) S^2 = n_1 S_1^2 + n_2 S_2^2 + n_1 n_2 (\bar{X}_1 - \bar{X}_2)^2 / (n_1 + n_2) \quad (7)$$

Therefore the likelihood ratio statistic for testing $H_0: \mu_1 = \mu_2$ against $H_1: \mu_1 \neq \mu_2$ under the assumption of equal coefficients of variation is given by

$$\lambda = [S_1^2 + A_1]^{n_1/2} [S_2^2 + A_2]^{n_2/2} [S^2]^{-(n_1 + n_2)/2} \quad (8)$$

where

$$A_1 = n_2 [(n_1 + n_2) \bar{X}_1^2 (\bar{X}_2^2 + 2S_2^2) - \sqrt{n_1 + n_2} \bar{X}_1 \bar{X}_2 B] / 2(n_1 + n_2) \{n_1 \bar{X}_2^2 + (n_1 + n_2) S_2^2\}$$

$$A_2 = n_1 [(n_1 + n_2) \bar{X}_2^2 (\bar{X}_1^2 + 2S_1^2) - \sqrt{n_1 + n_2} \bar{X}_1 \bar{X}_2 B] / 2(n_1 + n_2) \{n_2 \bar{X}_1^2 + (n_1 + n_2) S_1^2\}$$

$$B = \{(n_1 + n_2) \bar{X}_1^2 \bar{X}_2^2 + 4n_2 \bar{X}_2^2 S_1^2 + 4n_1 \bar{X}_1^2 S_2^2 + 4(n_1 + n_2) S_1^2 S_2^2\}^{1/2}$$

In particular, when the sample sizes are equal $n_1 = n_2 = n$, λ is reduced to

$$[\{ (\bar{X}_1^2 + 2S_1^2) (\bar{X}_2^2 + 2S_2^2) \}^{1/2} - \bar{X}_1 \bar{X}_2] / (2S^2)]^n,$$

as obtained by Lohrding (1969).

The large sample $(n_1, n_2 \rightarrow \infty)$ distribution of $-2 \log \lambda$ is a central χ^2 variable with 1 d.f. However, for small samples, this distribution is not known and seems to be very complicated in view of (8). Therefore a simulation approach was adopted.

SIMULATION AND TABLES

To investigate the small sample distribution of $-2 \log \lambda$, 10,000 values of $-2 \log \lambda$ were computed for random samples of various sizes assuming the null hypothesis H_0 to be true. These have been obtained by using the Gauss subroutine generating $N(\mu, \sigma^2)$ variates from SSP subroutine package. The empirical distribution function of $-2 \log \lambda$ has first been obtained for values from 0 to 15 at intervals of 0.1.

25 tables corresponding to the following sample sizes are presented.

$$\begin{aligned} (n_1, n_2) = & (2,2), (2,4), (2,6), (2,10), (2,15), (2,20), (2,30) \\ & (4,4), (4,6), (4,10), (4,15), (4,20), (4,30) \\ & (6,10), (6,15), (6,20), (6,30) \\ & (10,10), (10,15), (10,20), (10,30) \\ & (15,15), (15,20), (15,30) \\ & (20,30) \end{aligned}$$

In each table we find with the upper limit (BORNE) of each class, the number of observations in the class (NBR) and the cumulative number of observations (CUMUL) below the upper limit. The last class $[15, \infty)$ correspond to 15.10.

Included, at the end of each table, are the results of a least-square fit assuming an exponential model in the tail for the cumulative function $F(x)$ of $X = -2 \log \lambda$

$$F(x) = 1 - \alpha_1 e^{-\beta x}, \quad \beta > 0 \quad (9)$$

Equation (9) can be written

$$X = A + BZ \quad (10)$$

where

$$B = 1/\beta$$

$$A = \ln(\alpha_1/\beta)$$

$$Z = -\ln(1-F(x))$$

Since we were especially interested in the tail of the distribution, we fitted model (10) based on the following points (x_i, z_i) $i = 1, \dots, 15$ where

$$z_i = -\ln(1-F_i)$$

$$F_i = 0.87(0.01) \ 0.99, \ 0.995, \ 0.999$$

are fixed throughout in each table, except for the case $n_1 = n_2 = 2$ where the last two values of F_i are replaced by 0.991 and 0.992. Now the x_i 's were identified as the first class where the simulated cumulative function was greater or equal to F_i . The values of A and B are printed. In addition, the value of the squared correlation coefficient (R^2) is given. As it can be seen, R^2 is equal to 1, except in a few tables where R^2 is equal to 0.99.

Finally, using the regression equation (10), four critical values are computed and printed. These are

90	CENTILE	or	$\alpha = 0.10$
95	"	or	$\alpha = 0.05$
97.5	"	or	$\alpha = 0.025$
99	"	or	$\alpha = 0.01$

Combining all these critical values for different values of (n_1, n_2) and adding values already obtained by Lohrding (1969) for the equal sample sizes case, 28 critical points (for each value of α) were obtained. In a few specific cases of (n_1, n_2) , a second simulation was made in order to achieve a sequence of values

satisfying the following conditions:

$$\begin{aligned} n_2 < n'_2 & \quad X(n_1, n_2, \alpha) \geq X(n_1, n'_2, \alpha) \\ n_1 < n'_1 & \quad X(n_1, n_2, \alpha) \geq X(n'_1, n_2, \alpha) \end{aligned} \quad (11)$$

$X(n_1, n_2, \alpha)$ being the critical point at the corresponding α -level. The results of these additional simulations are not included in this report.

As a final stage two possible models were contemplated for the critical points $X(n_1, n_2, \alpha)$

$$X(n_1, n_2, \alpha) - \chi_{1, \alpha}^2 = \zeta_1 / n_1 + \zeta_2 / n_2 \quad (12)$$

$$X(n_1, n_2, \alpha) - \chi_{1, \alpha}^2 = \zeta_0 + \zeta_1 / n_1 + \zeta_2 / n_2 \quad (13)$$

Although model (12) satisfied the condition of limiting $\chi_{1, \alpha}^2$ value as $n_1, n_2 \rightarrow \infty$, model (13) was retained since it gaved a better fit.

Using model (13), the least square normal equations are

$$\begin{bmatrix} 28 & 6.57 & 2.77 \\ 6.57 & 2.33 & 0.86 \\ 2.77 & 0.86 & 0.54 \end{bmatrix} \begin{bmatrix} \zeta_0 \\ \zeta_1 \\ \zeta_2 \end{bmatrix} = \begin{bmatrix} \Sigma y_i \\ \frac{\Sigma y_i}{n_1} \\ \frac{\Sigma y_i}{n_2} \end{bmatrix} \quad (14)$$

where

$$\begin{aligned} 28 &= n & , & \quad 6.57 = \Sigma \frac{1}{n_1} & , & \quad 2.77 = \Sigma \frac{1}{n_2} \\ 2.33 &= \Sigma \frac{1}{n_1^2} & , & \quad 0.86 = \Sigma \frac{1}{n_1 n_2} & , & \quad 0.54 = \Sigma \frac{1}{n_2^2} \end{aligned}$$

$$y_i = X(n_1, n_2, \alpha) - \chi_{1, \alpha}^2$$

and $X(n_1, n_2, \alpha)$ is the corresponding value of the first stage smoothing by the exponential model.

The resulting prediction equations are

$$X(n_1, n_2, 0.10) = 2.49 + \frac{1.27}{n_1} + \frac{4.50}{n_2} \quad (15)$$

$$n_1 \leq n_2 \leq 27$$

$$X(n_1, n_2, 0.05) = 3.59 + \frac{1.60}{n_1} + \frac{6.45}{n_2} \quad (16)$$

$$n_1 \leq n_2 \leq 32$$

$$X(n_1, n_2, 0.025) = 4.71 + \frac{1.61}{n_1} + \frac{9.05}{n_2} \quad (17)$$

$$n_1 \leq n_2 \leq 34$$

$$X(n_1, n_2, 0.01) = 6.18 + \frac{1.99}{n_1} + \frac{11.84}{n_2} \quad (18)$$

$$n_1 \leq n_2 \leq 30$$

In all of these equations,

$$X(n_1 \leq 4, n_2 = \infty, \alpha) \geq \chi^2_{1, \alpha}$$

but we have no way of knowing if the fitted models are satisfactory outside their restrictive regions in (n_1, n_2) space.

The values of $X(n_1, n_2, \alpha)$ are given in table A to table D. There are a few exceptions on the diagonal $(n_1 = n_2)$ where the first stage value was retained because it was greater than the corresponding value given by the second stage equations. The tables are therefore conservative.

TABLE A: SMOOTHED APPROXIMATE CRITICAL VALUES FOR
THE TEST STATISTIC $-2 \log \lambda$ ($\alpha = 0.10$)

$n_1 \backslash n_2$	2	4	6	10	15	20	30
2	5.60	4.25	3.87	3.57	3.42	3.35	3.27
4		3.93	3.56	3.26	3.11	3.03	2.96
6			3.45	3.15	3.00	2.93	2.85
10				3.07	2.92	2.85	2.77
15					2.87	2.80	2.72
20						2.78	2.71
30							2.70

For intermediate values use $\chi = 2.49 + \frac{1.27}{n_1} + \frac{4.50}{n_2}$ where
 $n_1 \leq n_2$ and χ is the critical value of $-2 \log \lambda$ at
 $\alpha = 0.10$.

TABLE B: SMOOTHED APPROXIMATE CRITICAL VALUES FOR
THE TEST STATISTIC $-2 \log \lambda$ ($\alpha = 0.05$)

$n_1 \backslash n_2$	2	4	6	10	15	20	30
2	8.03	6.00	5.46	5.03	4.82	4.71	4.60
4		5.60	5.06	4.63	4.42	4.31	4.21
6			3.93	4.50	4.29	4.18	4.07
10				4.39	4.18	4.07	3.96
15					4.13	4.02	3.92
20						3.99	3.88
30							3.86

For intermediate values use $X = 3.59 + \frac{1.60}{n_1} + \frac{6.45}{n_2}$ where
 $n_1 \leq n_2$ and X is the critical value of $-2 \log \lambda_1$ at
 $\alpha = 0.05$.

TABLE C: SMOOTHED APPROXIMATE CRITICAL VALUES FOR
THE TEST STATISTIC $-2 \log \lambda$ ($\alpha = 0.025$)

$n_1 \backslash n_2$	2	4	6	10	15	20	30
2	10.57	7.78	7.02	6.42	6.12	5.97	5.82
4		7.37	6.62	6.01	5.71	5.56	5.41
6			6.49	5.88	5.58	5.43	5.28
10				5.78	5.47	5.32	5.17
15					5.42	5.27	5.12
20						5.24	5.09
30							5.06

For intermediate values use $X = 4.71 + \frac{1.61}{n_1} + \frac{9.05}{n_2}$ where
 $n_1 \leq n_2$ and X is the critical value of $-2 \log \lambda_1$ at
 $\alpha = 0.025$.

TABLE D: SMOOTHED APPROXIMATE CRITICAL VALUES FOR
THE TEST STATISTIC $-2 \log \lambda$ ($\alpha = 0.01$)

$n_1 \backslash n_2$	2	4	6	10	15	20	30
2	13.82	10.14	9.15	8.36	7.97	7.77	7.57
4		9.64	8.65	7.86	7.47	7.27	7.07
6			8.48	7.69	7.30	7.10	6.90
10				7.56	7.17	6.97	6.77
15					7.10	6.90	6.71
20						6.87	6.70
30							6.64

For intermediate values use $\chi = 6.18 + \frac{1.99}{n_1} + \frac{11.84}{n_2}$ where
 $n_1 \leq n_2$ and χ is the critical value of $-2 \log \lambda_1$ at
 $\alpha = 0.01$.

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FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 2

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	1722	1722	0.20	716	2438	0.30	533	2971	0.40	458	3429	0.50	348	3777
0.60	307	4084	0.70	276	4360	0.80	258	4618	0.90	232	4850	1.00	226	5076
1.10	214	5290	1.20	189	5479	1.30	202	5681	1.40	187	5868	1.50	151	6019
1.60	169	6188	1.70	168	6356	1.80	146	6502	1.90	120	6622	2.00	129	6751
2.10	119	6870	2.20	114	6984	2.30	104	7088	2.40	109	7197	2.50	107	7304
2.60	104	7408	2.70	84	7492	2.80	90	7582	2.90	74	7656	3.00	81	7737
3.10	80	7817	3.20	76	7893	3.30	71	7964	3.40	56	8020	3.50	61	8081
3.60	57	8138	3.70	67	8205	3.80	51	8256	3.90	69	8325	4.00	44	8369
4.10	55	8424	4.20	60	8484	4.30	54	8538	4.40	56	8594	4.50	40	8634
4.60	49	8683	4.70	33	8716	4.80	36	8752	4.90	46	8798	5.00	24	8822
5.10	32	8854	5.20	33	8887	5.30	33	8920	5.40	32	8952	5.50	22	8974
5.60	27	9001	5.70	22	9023	5.80	22	9045	5.90	35	9080	6.00	20	9100
6.10	18	9118	6.20	34	9152	6.30	22	9174	6.40	28	9202	6.50	22	9224
6.60	24	9248	6.70	22	9270	6.80	15	9285	6.90	22	9307	7.00	26	9333
7.10	18	9351	7.20	18	9369	7.30	15	9384	7.40	20	9404	7.50	19	9423
7.60	13	9426	7.70	16	9452	7.80	14	9466	7.90	13	9479	8.00	16	9495
8.10	11	9506	8.20	14	9520	8.30	19	9539	8.40	6	9545	8.50	6	9551
8.60	18	9569	8.70	12	9581	8.80	18	9599	8.90	7	9606	9.00	12	9618
9.10	16	9634	9.20	9	9643	9.30	11	9654	9.40	13	9667	9.50	8	9675
9.60	11	9686	9.70	3	9689	9.80	8	9697	9.90	7	9704	10.00	8	9712
10.10	7	9719	10.20	5	9724	10.30	3	9727	10.40	14	9741	10.50	9	9750
10.60	5	9755	10.70	9	9764	10.80	6	9770	10.90	11	9781	11.00	6	9787
11.10	5	9792	11.20	8	9800	11.30	7	9807	11.40	3	9810	11.50	5	9815
11.60	3	9818	11.70	8	9826	11.80	3	9829	11.90	9	9838	12.00	4	9842
12.10	6	9848	12.20	8	9856	12.30	4	9860	12.40	4	9864	12.50	4	9868

12.60	2	9870	12.70	3	9873	12.80	3	9876	12.90	3	9879	13.00	3	9882
13.10	5	9887	13.20	0	9887	13.30	3	9890	13.40	6	9896	13.50	1	9897
13.60	1	9898	13.70	0	9898	13.80	2	9900	13.90	2	9902	14.00	0	9902
14.10	2	9904	14.20	2	9906	14.30	1	9907	14.40	1	9908	14.50	3	9911
14.60	0	9911	14.70	1	9912	14.80	2	9914	14.90	5	9919	15.00	0	9919
15.10	81	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.992

$B = 3.54$

$A = -2.53$

$R^2 = 1.00$

90 CENTILE = 5.61

95 CENTILE = 8.09

97.5 CENTILE = 10.53

99 CENTILE = 13.78

FIN DES DONNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 4

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BCRNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	1994	1994	0.20	771	2765	0.30	586	3351	0.40	488	3839	0.50	387	4226
0.60	358	4584	0.70	334	4918	0.80	289	5207	0.90	278	5485	1.00	253	5738
1.10	250	5988	1.20	209	6197	1.30	164	6361	1.40	177	6538	1.50	159	6697
1.60	155	6852	1.70	151	7003	1.80	157	7160	1.90	132	7292	2.00	138	7430
2.10	120	7550	2.20	109	7659	2.30	125	7784	2.40	113	7897	2.50	91	7988
2.60	87	8075	2.70	99	8174	2.80	67	8241	2.90	85	8326	3.00	68	8394
3.10	63	8457	3.20	63	8520	3.30	57	8577	3.40	51	8628	3.50	43	8671
3.60	66	8737	3.70	49	8786	3.80	45	8831	3.90	50	8881	4.00	49	8930
4.10	38	8968	4.20	35	9003	4.30	37	9040	4.40	46	9086	4.50	49	9135
4.60	35	9170	4.70	34	9204	4.80	34	9238	4.90	32	9270	5.00	27	9297
5.10	13	9310	5.20	29	9339	5.30	33	9372	5.40	20	9392	5.50	26	9418
5.60	22	9440	5.70	13	9453	5.80	10	9463	5.90	29	9492	6.00	15	9507
6.10	22	9529	6.20	13	9542	6.30	15	9557	6.40	12	9569	6.50	21	9590
6.60	14	9604	6.70	17	9621	6.80	13	9634	6.90	8	9642	7.00	19	9661
7.10	10	9671	7.20	14	9685	7.30	8	9693	7.40	18	9711	7.50	11	9722
7.60	8	9730	7.70	11	9741	7.80	15	9756	7.90	9	9765	8.00	18	9783
8.10	8	9791	8.20	6	9797	8.30	3	9800	8.40	7	9807	8.50	4	9811
8.60	6	9817	8.70	4	9821	8.80	4	9825	8.90	7	9832	9.00	9	9841
9.10	3	9844	9.20	7	9851	9.30	7	9858	9.40	3	9861	9.50	7	9868
9.60	4	9872	9.70	2	9874	9.80	11	9885	9.90	6	9891	10.00	0	9891
10.10	10	9901	10.20	1	9902	10.30	6	9908	10.40	3	9911	10.50	4	9915
10.60	3	9918	10.70	4	9922	10.80	4	9926	10.90	3	9929	11.00	3	9932
11.10	5	9937	11.20	2	9939	11.30	2	9941	11.40	5	9946	11.50	5	9951
11.60	3	9954	11.70	2	9956	11.80	3	9959	11.90	2	9961	12.00	1	9962
12.10	0	9962	12.20	3	9965	12.30	1	9966	12.40	2	9968	12.50	2	9970
12.60	1	9971	12.70	0	9971	12.80	0	9971	12.90	0	9971	13.00	3	9974

13.10	1	9975	13.20	0	9975	13.30	1	9976	13.40	0	9976	13.50	1	9977
13.60	1	9978	13.70	0	9978	13.80	0	9978	13.90	3	9981	14.00	0	9981
14.10	1	9982	14.20	1	9983	14.30	0	9983	14.40	1	9984	14.50	1	9985
14.60	2	9987	14.70	2	9989	14.80	0	9989	14.90	0	9989	15.00	2	9991
15.10	9	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL
POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 2.39

A = -1.21

R2 = 1.00

90 CENTILE = 4.29

95 CENTILE = 5.97

97.5 CENTILE = 7.62

99 CENTILE = 9.82

FIN DES DONNÉES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 6

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2174	2174	0.20	809	2983	0.30	623	3606	0.40	511	4117	0.50	429	4546
0.60	354	4900	0.70	304	5204	0.80	293	5497	0.90	249	5746	1.00	246	5992
1.10	240	6232	1.20	220	6452	1.30	193	6645	1.40	170	6815	1.50	192	7007
1.60	159	7166	1.70	146	7312	1.80	127	7439	1.90	116	7555	2.00	124	7679
2.10	116	7795	2.20	114	7909	2.30	132	8041	2.40	97	8138	2.50	87	8225
2.60	96	8321	2.70	83	8404	2.80	85	8489	2.90	67	8556	3.00	71	8627
3.10	54	8681	3.20	61	8742	3.30	66	8808	3.40	42	8850	3.50	51	8901
3.60	57	8958	3.70	40	8998	3.80	45	9043	3.90	48	9091	4.00	41	9132
4.10	32	9164	4.20	34	9198	4.30	34	9232	4.40	40	9272	4.50	37	9309
4.60	27	9336	4.70	32	9368	4.80	20	9388	4.90	31	9419	5.00	22	9441
5.10	27	9468	5.20	21	9489	5.30	21	9510	5.40	23	9533	5.50	23	9556
5.60	25	9581	5.70	17	9598	5.80	16	9614	5.90	22	9636	6.00	18	9654
6.10	15	9669	6.20	13	9682	6.30	10	9692	6.40	21	9713	6.50	9	9722
6.60	8	9730	6.70	9	9739	6.80	3	9742	6.90	11	9753	7.00	7	9760
7.10	10	9770	7.20	11	9781	7.30	7	9788	7.40	11	9799	7.50	7	9806
7.60	8	9814	7.70	11	9825	7.80	8	9833	7.90	9	9842	8.00	9	9851
8.10	11	9862	8.20	7	9869	8.30	3	9872	8.40	12	9884	8.50	6	9890
8.60	2	9892	8.70	6	9898	8.80	5	9903	8.90	1	9904	9.00	3	9907
9.10	9	9916	9.20	4	9920	9.30	5	9925	9.40	3	9928	9.50	3	9931
9.60	3	9934	9.70	2	9936	9.80	6	9942	9.90	3	9945	10.00	3	9948
10.10	5	9953	10.20	2	9955	10.30	1	9956	10.40	0	9956	10.50	2	9958
10.60	1	9959	10.70	2	9961	10.80	1	9962	10.90	0	9962	11.00	2	9964
11.10	1	9965	11.20	1	9966	11.30	2	9968	11.40	1	9969	11.50	2	9971
11.60	4	9975	11.70	2	9977	11.80	2	9979	11.90	0	9979	12.00	0	9979
12.10	1	9980	12.20	1	9981	12.30	1	9982	12.40	0	9982	12.50	0	9982
12.60	0	9982	12.70	0	9982	12.80	0	9982	12.90	3	9985	13.00	2	9987

13.10	2	9999	13.20	0	9989	13.30	1	9990	13.40	0	9990	13.50	0	9990
13.60	0	9990	13.70	0	9990	13.80	0	9990	13.90	1	9991	14.00	0	9991
14.10	0	9991	14.20	0	9991	14.30	0	9991	14.40	0	9991	14.50	0	9991
14.60	0	9991	14.70	0	9991	14.80	1	9992	14.90	0	9992	15.00	1	9993
15.10	7	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL
POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 2.10

A = -1.04

R2 = 1.00

90 CENTILE = 3.81

95 CENTILE = 5.28

97.5 CENTILE = 6.73

99 CENTILE = 8.67

FIN DES DONNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 10

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2179	2179	0.20	858	3037	0.30	634	3671	0.40	511	4182	0.50	442	4624
0.60	381	5005	0.70	349	5354	0.80	291	5645	0.90	261	5906	1.00	253	6159
1.10	252	6411	1.20	199	6610	1.30	196	6806	1.40	201	7007	1.50	159	7166
1.60	154	7320	1.70	150	7470	1.80	146	7616	1.90	123	7739	2.00	136	7875
2.10	101	7976	2.20	110	8086	2.30	102	8188	2.40	83	8271	2.50	83	8354
2.60	84	8438	2.70	72	8510	2.80	76	8586	2.90	73	8659	3.00	69	8728
3.10	67	8795	3.20	56	8851	3.30	57	8908	3.40	45	8953	3.50	52	9005
3.60	46	9051	3.70	49	9100	3.80	39	9139	3.90	40	9179	4.00	44	9223
4.10	38	9261	4.20	31	9292	4.30	36	9328	4.40	34	9362	4.50	32	9394
4.60	23	9417	4.70	26	9443	4.80	29	9472	4.90	30	9502	5.00	29	9531
5.10	13	9544	5.20	21	9565	5.30	19	9584	5.40	20	9604	5.50	13	9617
5.60	23	9640	5.70	13	9653	5.80	18	9671	5.90	14	9685	6.00	14	9699
6.10	13	9712	6.20	12	9724	6.30	8	9732	6.40	16	9748	6.50	14	9762
6.60	11	9773	6.70	4	9777	6.80	13	9790	6.90	13	9803	7.00	9	9812
7.10	5	9817	7.20	10	9827	7.30	7	9834	7.40	6	9840	7.50	6	9846
7.60	3	9849	7.70	2	9851	7.80	3	9854	7.90	8	9862	8.00	6	9868
8.10	6	9874	8.20	8	9882	8.30	2	9884	8.40	2	9886	8.50	2	9888
8.60	4	9892	8.70	6	9898	8.80	6	9904	8.90	4	9908	9.00	2	9910
9.10	4	9914	9.20	6	9920	9.30	4	9924	9.40	7	9931	9.50	4	9935
9.60	1	9936	9.70	4	9940	9.80	3	9943	9.90	3	9946	10.00	2	9948
10.10	0	9948	10.20	2	9950	10.30	3	9953	10.40	0	9953	10.50	4	9957
10.60	2	9959	10.70	0	9959	10.80	5	9964	10.90	1	9965	11.00	1	9966
11.10	1	9967	11.20	2	9969	11.30	2	9971	11.40	1	9972	11.50	1	9973
11.60	2	9975	11.70	2	9977	11.80	0	9977	11.90	0	9977	12.00	0	9977
12.10	2	9979	12.20	2	9981	12.30	4	9985	12.40	1	9986	12.50	1	9987

12.60	0	9987	12.70	3	9990	12.80	0	9990	12.90	0	9990	13.00	2	9992
13.10	0	9992	13.20	0	9992	13.30	0	9992	13.40	0	9992	13.50	0	9992
13.60	0	9992	13.70	1	9993	13.80	0	9993	13.90	0	9993	14.00	1	9994
14.10	1	9995	14.20	1	9996	14.30	0	9996	14.40	1	9997	14.50	0	9997
14.60	0	9997	14.70	1	9998	14.80	0	9998	14.90	0	9998	15.00	0	9998
15.10	2	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 2.08

A = -1.24

R2 = 0.99

90 CENTILE = 3.55

95 CENTILE = 5.01

97.5 CENTILE = 6.45

99 CENTILE = 8.37

FIN DES DONNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 15

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2224	2224	0.20	876	3100	0.30	651	3751	0.40	520	4271	0.50	459	4730
0.60	403	5133	0.70	333	5466	0.80	305	5771	0.90	313	6084	1.00	276	6360
1.10	205	6565	1.20	215	6780	1.30	195	6975	1.40	175	7150	1.50	172	7322
1.60	153	7475	1.70	127	7602	1.80	119	7721	1.90	123	7844	2.00	146	7990
2.10	97	8087	2.20	98	8185	2.30	94	8279	2.40	73	8352	2.50	87	8439
2.60	86	8525	2.70	81	8606	2.80	60	8666	2.90	64	8730	3.00	67	8797
3.10	61	8858	3.20	65	8923	3.30	63	8986	3.40	42	9028	3.50	45	9073
3.60	48	9121	3.70	37	9158	3.80	46	9204	3.90	42	9246	4.00	29	9275
4.10	42	9317	4.20	28	9345	4.30	35	9380	4.40	29	9409	4.50	40	9449
4.60	20	9409	4.70	21	9490	4.80	24	9514	4.90	12	9526	5.00	18	9544
5.10	25	9569	5.20	20	9589	5.30	18	9607	5.40	17	9624	5.50	17	9641
5.60	18	9659	5.70	15	9674	5.80	8	9682	5.90	17	9699	6.00	14	9713
6.10	8	9721	6.20	15	9736	6.30	10	9746	6.40	13	9759	6.50	6	9765
6.60	14	9779	6.70	12	9791	6.80	12	9803	6.90	7	9810	7.00	10	9820
7.10	7	9827	7.20	7	9834	7.30	10	9844	7.40	6	9850	7.50	2	9852
7.60	7	9859	7.70	5	9864	7.80	8	9872	7.90	8	9880	8.00	6	9886
8.10	6	9892	8.20	5	9897	8.30	5	9902	8.40	3	9905	8.50	6	9911
8.60	4	9915	8.70	5	9920	8.80	6	9926	8.90	4	9930	9.00	4	9934
9.10	3	9937	9.20	3	9940	9.30	2	9942	9.40	3	9945	9.50	2	9947
9.60	3	9950	9.70	2	9952	9.80	2	9954	9.90	1	9955	10.00	3	9958
10.10	4	9962	10.20	1	9963	10.30	1	9964	10.40	2	9966	10.50	1	9967
10.60	1	9968	10.70	1	9969	10.80	0	9969	10.90	1	9970	11.00	1	9971
11.10	2	9973	11.20	3	9976	11.30	1	9977	11.40	1	9978	11.50	0	9978
11.60	3	9981	11.70	1	9982	11.80	1	9983	11.90	2	9985	12.00	1	9986
12.10	0	9986	12.20	1	9987	12.30	0	9987	12.40	1	9988	12.50	0	9988

12.60	1	9989	12.70	1	9990	12.80	0	9990	12.90	1	9991	13.00	0	9991
13.10	0	9991	13.20	1	9992	13.30	0	9992	13.40	0	9992	13.50	0	9992
13.60	2	9994	13.70	0	9994	13.80	0	9994	13.90	0	9994	14.00	0	9994
14.10	0	9994	14.20	0	9994	14.30	0	9994	14.40	1	9995	14.50	0	9995
14.60	0	9995	14.70	0	9995	14.80	0	9995	14.90	0	9995	15.00	0	9995
15.10	5	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 2.05

A = -1.29

R2 = 1.00

90 CENTILE = 3.42

95 CENTILE = 4.85

97.5 CENTILE = 6.26

99 CENTILE = 8.14

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 20

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2302	2302	0.20	889	3191	0.30	649	3840	0.40	516	4356	0.50	447	4803
0.60	380	5183	0.70	369	5552	0.80	321	5873	0.90	267	6140	1.00	241	6381
1.10	217	6598	1.20	196	6794	1.30	209	7003	1.40	173	7176	1.50	168	7344
1.60	152	7496	1.70	145	7641	1.80	134	7775	1.90	111	7886	2.00	98	7984
2.10	90	8074	2.20	124	8198	2.30	97	8295	2.40	92	8387	2.50	89	8476
2.60	76	8552	2.70	84	8636	2.80	74	8710	2.90	50	8760	3.00	59	8819
3.10	53	8872	3.20	45	8917	3.30	43	8960	3.40	52	9012	3.50	50	9062
3.60	51	9113	3.70	42	9155	3.80	44	9199	3.90	40	9239	4.00	46	9285
4.10	34	9319	4.20	36	9355	4.30	34	9389	4.40	28	9417	4.50	25	9442
4.60	24	9406	4.70	23	9489	4.80	25	9514	4.90	25	9539	5.00	22	9561
5.10	24	9585	5.20	22	9607	5.30	15	9622	5.40	17	9639	5.50	20	9659
5.60	23	9682	5.70	16	9698	5.80	17	9715	5.90	12	9727	6.00	7	9734
6.10	21	9755	6.20	13	9768	6.30	12	9780	6.40	14	9794	6.50	12	9806
6.60	5	9811	6.70	4	9815	6.80	7	9822	6.90	6	9828	7.00	5	9833
7.10	12	9845	7.20	9	9854	7.30	11	9865	7.40	7	9872	7.50	6	9878
7.60	7	9885	7.70	11	9896	7.80	7	9903	7.90	5	9908	8.00	6	9914
8.10	2	9916	8.20	4	9920	8.30	0	9920	8.40	3	9923	8.50	3	9926
8.60	4	9930	8.70	1	9931	8.80	0	9931	8.90	2	9933	9.00	1	9934
9.10	1	9935	9.20	4	9939	9.30	2	9941	9.40	3	9944	9.50	4	9948
9.60	0	9948	9.70	3	9951	9.80	2	9953	9.90	5	9958	10.00	2	9960
10.10	3	9963	10.20	1	9964	10.30	5	9969	10.40	1	9970	10.50	1	9971
10.60	4	9975	10.70	1	9976	10.80	3	9979	10.90	0	9979	11.00	1	9980
11.10	2	9982	11.20	0	9982	11.30	0	9982	11.40	1	9983	11.50	2	9985
11.60	0	9985	11.70	1	9986	11.80	0	9986	11.90	2	9988	12.00	0	9988
12.10	1	9989	12.20	1	9990	12.30	0	9990	12.40	1	9991	12.50	2	9993

12.60	0	9993	12.70	1	9994	12.80	1	9995	12.90	2	9997	13.00	0	9997
13.10	0	9997	13.20	0	9997	13.30	0	9997	13.40	0	9997	13.50	0	9997
13.60	0	9997	13.70	0	9997	13.80	0	9997	13.90	0	9997	14.00	1	9998
14.10	0	9998	14.20	0	9998	14.30	0	9998	14.40	0	9998	14.50	0	9998
14.60	0	9998	14.70	0	9998	14.80	0	9998	14.90	0	9998	15.00	0	9998
15.10	2	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = 1.96$

$A = -1.11$

$R^2 = 1.00$

90 CENTILE = 3.40

95 CENTILE = 4.77

97.5 CENTILE = 6.12

99 CENTILE = 7.92

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 2

N2 = 30

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2315	2315	0.20	866	3181	0.30	635	3816	0.40	571	4387	0.50	452	4839
0.60	408	5247	0.70	327	5574	0.80	286	5860	0.90	296	6156	1.00	233	6389
1.10	227	6616	1.20	209	6825	1.30	190	7015	1.40	177	7192	1.50	155	7347
1.60	146	7493	1.70	146	7639	1.80	144	7783	1.90	132	7915	2.00	112	8027
2.10	118	8145	2.20	101	8246	2.30	104	8350	2.40	86	8436	2.50	81	8517
2.60	81	8598	2.70	64	8662	2.80	67	8729	2.90	67	8796	3.00	76	8872
3.10	56	8928	3.20	57	8985	3.30	60	9045	3.40	62	9107	3.50	47	9154
3.60	46	9200	3.70	45	9245	3.80	39	9284	3.90	33	9317	4.00	27	9344
4.10	38	9382	4.20	41	9423	4.30	31	9454	4.40	23	9477	4.50	32	9509
4.60	17	9526	4.70	25	9551	4.80	15	9566	4.90	16	9582	5.00	25	9607
5.10	16	9623	5.20	21	9644	5.30	22	9666	5.40	13	9679	5.50	16	9695
5.60	11	9706	5.70	12	9718	5.80	17	9735	5.90	17	9752	6.00	11	9763
6.10	9	9772	6.20	15	9787	6.30	11	9798	6.40	13	9811	6.50	16	9827
6.60	7	9834	6.70	5	9839	6.80	5	9844	6.90	7	9851	7.00	9	9860
7.10	10	9870	7.20	3	9873	7.30	2	9875	7.40	10	9885	7.50	4	9889
7.60	3	9892	7.70	3	9895	7.80	3	9898	7.90	6	9904	8.00	5	9909
8.10	7	9916	8.20	1	9917	8.30	4	9921	8.40	2	9923	8.50	3	9926
8.60	5	9931	8.70	4	9935	8.80	2	9937	8.90	9	9946	9.00	4	9950
9.10	1	9951	9.20	2	9953	9.30	3	9956	9.40	2	9958	9.50	2	9960
9.60	3	9963	9.70	2	9965	9.80	1	9966	9.90	4	9970	10.00	1	9971
10.10	2	9973	10.20	1	9974	10.30	1	9975	10.40	2	9977	10.50	0	9977
10.60	3	9980	10.70	1	9981	10.80	1	9982	10.90	2	9984	11.00	0	9984
11.10	0	9984	11.20	0	9984	11.30	1	9985	11.40	2	9987	11.50	1	9988
11.60	1	9989	11.70	0	9989	11.80	1	9990	11.90	0	9990	12.00	0	9990
12.10	1	9991	12.20	0	9991	12.30	0	9991	12.40	0	9991	12.50	0	9991

12.60	1	9992	12.70	0	9992	12.80	2	9994	12.90	0	9994	13.00	0	9994
13.10	0	9994	13.20	1	9995	13.30	0	9995	13.40	0	9995	13.50	1	9996
13.60	0	9996	13.70	0	9996	13.80	1	9997	13.90	0	9997	14.00	0	9997
14.10	0	9997	14.20	0	9997	14.30	0	9997	14.40	0	9997	14.50	0	9997
14.60	2	9999	14.70	0	9999	14.80	0	9999	14.90	0	9999	15.00	0	9999
15.10	1	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 1.89

A = -1.07

R2 = 1.00

90 CENTILE = 3.27

95 CENTILE = 4.60

97.5 CENTILE = 5.90

99 CENTILE = 7.64

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 4

N2 = 4

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2149	2149	0.20	851	3000	0.30	678	3678	0.40	486	4164	0.50	469	4633
0.60	363	4996	0.70	343	5339	0.80	299	5638	0.90	284	5922	1.00	241	6163
1.10	230	6393	1.20	228	6621	1.30	192	6813	1.40	173	6986	1.50	181	7167
1.60	141	7308	1.70	148	7456	1.80	119	7575	1.90	122	7697	2.00	124	7821
2.10	123	7944	2.20	103	8047	2.30	93	8140	2.40	88	8228	2.50	84	8312
2.60	73	8385	2.70	65	8450	2.80	93	8543	2.90	63	8606	3.00	64	8670
3.10	67	8737	3.20	54	8791	3.30	48	8839	3.40	56	8895	3.50	48	8943
3.60	52	8995	3.70	54	9049	3.80	38	9087	3.90	42	9129	4.00	44	9173
4.10	49	9222	4.20	27	9249	4.30	31	9280	4.40	40	9320	4.50	34	9354
4.60	26	9380	4.70	26	9406	4.80	19	9425	4.90	20	9445	5.00	29	9474
5.10	29	9503	5.20	27	9530	5.30	15	9545	5.40	18	9563	5.50	20	9583
5.60	22	9605	5.70	22	9627	5.80	13	9640	5.90	23	9663	6.00	8	9671
6.10	7	9678	6.20	12	9690	6.30	16	9706	6.40	13	9719	6.50	5	9724
6.60	18	9742	6.70	9	9751	6.80	11	9762	6.90	11	9773	7.00	9	9782
7.10	12	9794	7.20	12	9806	7.30	6	9812	7.40	4	9816	7.50	13	9829
7.60	8	9837	7.70	7	9844	7.80	6	9850	7.90	3	9853	8.00	8	9861
8.10	1	9862	8.20	9	9871	8.30	5	9876	8.40	9	9885	8.50	7	9892
8.60	5	9897	8.70	7	9904	8.80	2	9906	8.90	6	9912	9.00	4	9916
9.10	2	9918	9.20	7	9925	9.30	3	9928	9.40	1	9929	9.50	7	9936
9.60	3	9939	9.70	0	9939	9.80	3	9942	9.90	2	9944	10.00	5	9949
10.10	4	9953	10.20	0	9953	10.30	4	9957	10.40	1	9958	10.50	2	9960
10.60	2	9962	10.70	1	9963	10.80	2	9965	10.90	1	9966	11.00	0	9966
11.10	0	9966	11.20	3	9969	11.30	1	9970	11.40	3	9973	11.50	2	9975
11.60	1	9976	11.70	1	9977	11.80	1	9978	11.90	2	9980	12.00	1	9981
12.10	0	9981	12.20	1	9982	12.30	0	9982	12.40	0	9982	12.50	0	9982

12.60	0	9982	12.70	1	9983	12.80	0	9983	12.90	0	9983	13.00	0	9983
13.10	3	9986	13.20	0	9986	13.30	0	9986	13.40	0	9986	13.50	1	9987
13.60	1	9988	13.70	1	9989	13.80	0	9989	13.90	0	9989	14.00	0	9989
14.10	1	9990	14.20	1	9991	14.30	1	9992	14.40	1	9993	14.50	1	9994
14.60	0	9994	14.70	0	9994	14.80	0	9994	14.90	0	9994	15.00	0	9994
15.10	6	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE RÉPARTITION ENTRE 0.87 ET 0.999

B = 2.23

A = -1.50

R2 = 1.00

90 CENTILE = 3.62

95 CENTILE = 5.18

97.5 CENTILE = 6.72

99 CENTILE = 8.77

FIN DES DONNÉES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 4

N2 = 6

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2249	2249	0.20	916	3165	0.30	624	3789	0.40	508	4297	0.50	435	4732
0.60	410	5142	0.70	365	5507	0.80	272	5779	0.90	302	6081	1.00	284	6365
1.10	236	6601	1.20	208	6809	1.30	192	7001	1.40	195	7196	1.50	154	7350
1.60	156	7506	1.70	151	7657	1.80	140	7797	1.90	116	7913	2.00	95	8008
2.10	104	8112	2.20	95	8207	2.30	99	8306	2.40	74	8380	2.50	82	8462
2.60	67	8529	2.70	84	8613	2.80	78	8691	2.90	61	8752	3.00	70	8822
3.10	66	8888	3.20	70	8958	3.30	70	9028	3.40	45	9073	3.50	50	9123
3.60	37	9160	3.70	38	9198	3.80	40	9238	3.90	33	9271	4.00	37	9308
4.10	36	9344	4.20	34	9378	4.30	37	9415	4.40	29	9444	4.50	21	9465
4.60	30	9495	4.70	20	9515	4.80	28	9543	4.90	17	9560	5.00	27	9587
5.10	25	9612	5.20	19	9631	5.30	14	9645	5.40	9	9654	5.50	19	9673
5.60	15	9688	5.70	18	9706	5.80	10	9716	5.90	8	9724	6.00	11	9735
6.10	13	9748	6.20	10	9758	6.30	9	9767	6.40	12	9779	6.50	12	9791
6.60	8	9799	6.70	15	9814	6.80	10	9824	6.90	7	9831	7.00	6	9837
7.10	9	9846	7.20	3	9849	7.30	16	9865	7.40	10	9875	7.50	9	9884
7.60	5	9889	7.70	4	9893	7.80	5	9898	7.90	9	9907	8.00	5	9912
8.10	2	9914	8.20	1	9915	8.30	3	9918	8.40	3	9921	8.50	4	9925
8.60	3	9928	8.70	3	9931	8.80	5	9936	8.90	5	9941	9.00	2	9943
9.10	3	9946	9.20	2	9948	9.30	4	9952	9.40	0	9952	9.50	3	9955
9.60	4	9959	9.70	4	9963	9.80	1	9964	9.90	3	9967	10.00	0	9967
10.10	1	9968	10.20	0	9968	10.30	3	9971	10.40	5	9976	10.50	1	9977
10.60	1	9978	10.70	0	9978	10.80	0	9978	10.90	0	9978	11.00	1	9979
11.10	1	9980	11.20	2	9982	11.30	2	9984	11.40	1	9985	11.50	0	9985
11.60	0	9985	11.70	0	9985	11.80	2	9987	11.90	1	9988	12.00	2	9990
12.10	1	9991	12.20	0	9991	12.30	0	9991	12.40	1	9992	12.50	2	9994

12.60	0	9994	12.70	0	9994	12.80	2	9996	12.90	0	9996	13.00	1	9997
13.10	0	9997	13.20	0	9997	13.30	1	9998	13.40	0	9998	13.50	0	9998
13.60	0	9998	13.70	0	9998	13.80	0	9998	13.90	0	9998	14.00	0	9998
14.10	0	9998	14.20	0	9998	14.30	0	9998	14.40	0	9998	14.50	0	9998
14.60	0	9998	14.70	0	9998	14.80	0	9998	14.90	0	9998	15.00	0	9998
15.10	2	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = v \ 1.92$

$A = -1.05$

$R2 = 1.00$

90 CENTILE = 3.37

95 CENTILE = 4.71

97.5 CENTILE = 6.04

99 CENTILE = 7.81

FIN DES DONNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 4

N2 = 10

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2355	2355	0.20	906	3261	0.30	626	3887	0.40	543	4430	0.50	459	4889
0.60	387	5276	0.70	342	5618	0.80	319	5937	0.90	295	6232	1.00	258	6490
1.10	229	6719	1.20	222	6941	1.30	195	7136	1.40	160	7296	1.50	176	7472
1.60	127	7599	1.70	151	7750	1.80	137	7887	1.90	107	7994	2.00	116	8110
2.10	109	8219	2.20	103	8322	2.30	114	8436	2.40	69	8505	2.50	91	8596
2.60	79	8675	2.70	67	8742	2.80	69	8811	2.90	49	8860	3.00	51	8911
3.10	58	8969	3.20	52	9021	3.30	47	9068	3.40	47	9115	3.50	42	9157
3.60	40	9197	3.70	35	9232	3.80	39	9271	3.90	41	9312	4.00	38	9350
4.10	34	9384	4.20	38	9422	4.30	27	9449	4.40	24	9473	4.50	31	9504
4.60	21	9525	4.70	22	9547	4.80	20	9567	4.90	27	9594	5.00	21	9615
5.10	21	9636	5.20	22	9658	5.30	16	9674	5.40	24	9698	5.50	19	9717
5.60	7	9724	5.70	15	9739	5.80	17	9756	5.90	15	9771	6.00	5	9776
6.10	12	9788	6.20	10	9798	6.30	5	9803	6.40	9	9812	6.50	4	9816
6.60	8	9824	6.70	12	9836	6.80	9	9845	6.90	10	9855	7.00	9	9864
7.10	10	9874	7.20	7	9881	7.30	7	9888	7.40	4	9892	7.50	4	9896
7.60	7	9903	7.70	7	9910	7.80	2	9912	7.90	4	9916	8.00	4	9920
8.10	2	9922	8.20	5	9927	8.30	1	9928	8.40	3	9931	8.50	2	9933
8.60	3	9936	8.70	1	9937	8.80	1	9938	8.90	3	9941	9.00	2	9943
9.10	2	9945	9.20	2	9947	9.30	1	9948	9.40	5	9953	9.50	3	9956
9.60	4	9960	9.70	2	9962	9.80	0	9962	9.90	1	9963	10.00	0	9963
10.10	1	9964	10.20	1	9965	10.30	5	9970	10.40	1	9971	10.50	2	9973
10.60	1	9974	10.70	1	9975	10.80	1	9976	10.90	2	9978	11.00	0	9978
11.10	2	9980	11.20	2	9982	11.30	1	9983	11.40	2	9985	11.50	1	9986
11.60	0	9986	11.70	0	9986	11.80	1	9987	11.90	0	9987	12.00	1	9988
12.10	0	9988	12.20	0	9988	12.30	0	9988	12.40	0	9988	12.50	1	9989

12.60	1	9990	12.70	0	9990	12.80	0	9990	12.90	0	9990	13.00	0	9990
13.10	1	9991	13.20	1	9992	13.30	0	9992	13.40	0	9992	13.50	0	9992
13.60	0	9992	13.70	0	9992	13.80	2	9994	13.90	0	9994	14.00	1	9995
14.10	0	9995	14.20	0	9995	14.30	0	9995	14.40	0	9995	14.50	0	9995
14.60	0	9995	14.70	0	9995	14.80	0	9995	14.90	0	9995	15.00	0	9995
15.10	5	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = 2.03$

$A = -1.51$

$R^2 = 1.00$

90 CENTILE = 3.15

95 CENTILE = 4.58

97.5 CENTILE = 5.98

99 CENTILE = 7.84

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 4

N2 = 15

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2352	2352	0.20	932	3284	0.30	698	3982	0.40	543	4525	0.50	454	4979
0.60	373	5352	0.70	351	5703	0.80	272	5975	0.90	265	6240	1.00	273	6513
1.10	235	6748	1.20	198	6946	1.30	196	7142	1.40	164	7306	1.50	184	7490
1.60	149	7639	1.70	151	7790	1.80	131	7921	1.90	127	8048	2.00	119	8167
2.10	118	8285	2.20	85	8370	2.30	77	8447	2.40	90	8537	2.50	70	8607
2.60	86	8693	2.70	77	8770	2.80	59	8829	2.90	60	8889	3.00	66	8955
3.10	67	9022	3.20	54	9076	3.30	52	9128	3.40	37	9165	3.50	49	9214
3.60	36	9250	3.70	37	9287	3.80	31	9318	3.90	34	9352	4.00	33	9385
4.10	26	9411	4.20	26	9437	4.30	31	9468	4.40	32	9500	4.50	19	9519
4.60	21	9540	4.70	26	9566	4.80	24	9590	4.90	17	9607	5.00	22	9629
5.10	21	9650	5.20	17	9667	5.30	19	9686	5.40	6	9692	5.50	18	9710
5.60	13	9723	5.70	12	9735	5.80	12	9747	5.90	13	9760	6.00	14	9774
6.10	12	9786	6.20	13	9799	6.30	12	9811	6.40	11	9822	6.50	10	9832
6.60	6	9838	6.70	4	9842	6.80	5	9847	6.90	8	9855	7.00	7	9862
7.10	3	9865	7.20	9	9874	7.30	4	9878	7.40	7	9885	7.50	3	9888
7.60	4	9892	7.70	3	9895	7.80	2	9897	7.90	6	9903	8.00	7	9910
8.10	3	9913	8.20	1	9914	8.30	5	9919	8.40	4	9923	8.50	5	9928
8.60	3	9931	8.70	3	9934	8.80	4	9938	8.90	2	9940	9.00	4	9944
9.10	3	9947	9.20	4	9951	9.30	0	9951	9.40	1	9952	9.50	3	9955
9.60	2	9957	9.70	5	9962	9.80	4	9966	9.90	1	9967	10.00	2	9969
10.10	2	9971	10.20	1	9972	10.30	1	9973	10.40	1	9974	10.50	3	9977
10.60	1	9978	10.70	0	9978	10.80	2	9980	10.90	3	9983	11.00	0	9983
11.10	1	9984	11.20	0	9984	11.30	0	9984	11.40	0	9984	11.50	0	9984
11.60	0	9984	11.70	1	9985	11.80	1	9986	11.90	1	9987	12.00	1	9988
12.10	1	9989	12.20	0	9989	12.30	0	9989	12.40	0	9989	12.50	2	9991

12.60	1	9992	12.70	0	9992	12.80	0	9992	12.90	0	9992	13.00	0	9992
13.10	0	9992	13.20	0	9992	13.30	0	9992	13.40	0	9992	13.50	0	9992
13.60	0	9992	13.70	0	9992	13.80	0	9992	13.90	0	9992	14.00	0	9992
14.10	1	9993	14.20	0	9993	14.30	0	9993	14.40	0	9993	14.50	0	9993
14.60	0	9993	14.70	0	9993	14.80	0	9993	14.90	1	9994	15.00	0	9994
15.10	6	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 2.03

A = -1.58

R2 = 1.00

90 CENTILE = 3.10

95 CENTILE = 4.52

97.5 CENTILE = 5.92

99 CENTILE = 7.80

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 4

N2 = 20

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2316	2316	0.20	935	3251	0.30	682	3933	0.40	533	4466	0.50	444	4910
0.60	422	5332	0.70	353	5685	0.80	332	6017	0.90	264	6281	1.00	268	6549
1.10	253	6802	1.20	215	7017	1.30	161	7178	1.40	166	7344	1.50	165	7509
1.60	159	7668	1.70	124	7792	1.80	140	7932	1.90	116	8048	2.00	104	8152
2.10	111	8263	2.20	91	8354	2.30	107	8461	2.40	103	8564	2.50	82	8646
2.60	72	8718	2.70	81	8799	2.80	57	8856	2.90	68	8924	3.00	50	8974
3.10	48	9022	3.20	61	9083	3.30	57	9140	3.40	43	9183	3.50	39	9222
3.60	41	9263	3.70	44	9307	3.80	33	9340	3.90	41	9381	4.00	30	9411
4.10	30	9441	4.20	35	9476	4.30	30	9506	4.40	22	9528	4.50	26	9554
4.60	20	9574	4.70	36	9610	4.80	20	9630	4.90	22	9652	5.00	15	9667
5.10	23	9690	5.20	18	9708	5.30	17	9725	5.40	11	9736	5.50	9	9745
5.60	18	9763	5.70	13	9776	5.80	12	9788	5.90	10	9798	6.00	15	9813
6.10	11	9824	6.20	11	9835	6.30	8	9843	6.40	9	9852	6.50	11	9863
6.60	7	9870	6.70	5	9875	6.80	4	9879	6.90	8	9887	7.00	2	9889
7.10	3	9892	7.20	1	9893	7.30	6	9899	7.40	8	9907	7.50	5	9912
7.60	4	9916	7.70	6	9922	7.80	3	9925	7.90	3	9928	8.00	3	9931
8.10	7	9938	8.20	2	9940	8.30	1	9941	8.40	2	9943	8.50	4	9947
8.60	1	9948	8.70	0	9948	8.80	3	9951	8.90	5	9956	9.00	3	9959
9.10	4	9963	9.20	5	9968	9.30	0	9968	9.40	0	9968	9.50	1	9969
9.60	4	9973	9.70	2	9975	9.80	1	9976	9.90	0	9976	10.00	0	9976
10.10	0	9976	10.20	2	9978	10.30	0	9978	10.40	2	9980	10.50	0	9980
10.60	1	9981	10.70	1	9982	10.80	1	9983	10.90	2	9985	11.00	2	9987
11.10	1	9988	11.20	0	9988	11.30	0	9988	11.40	2	9990	11.50	1	9991
11.60	0	9991	11.70	0	9991	11.80	2	9993	11.90	0	9993	12.00	1	9994
12.10	0	9994	12.20	0	9994	12.30	0	9994	12.40	1	9995	12.50	0	9995

12.60	0	9995	12.70	0	9995	12.80	0	9995	12.90	0	9995	13.00	0	9995
13.10	1	9996	13.20	1	9997	13.30	1	9998	13.40	0	9998	13.50	0	9998
13.60	0	9998	13.70	1	9999	13.80	0	9999	13.90	0	9999	14.00	0	9999
14.10	0	9999	14.20	0	9999	14.30	0	9999	14.40	1	10000	14.50	0	10000
14.60	0	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = 1.83$

$A = -1.14$

$R^2 = 1.00$

90 CENTILE = 3.08

95 CENTILE = 4.36

97.5 CENTILE = 5.63

99 CENTILE = 7.31

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 4

N2 = 30

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2373	2373	0.20	939	3312	0.30	741	4053	0.40	546	4599	0.50	446	5045
0.60	394	5439	0.70	337	5776	0.80	334	6110	0.90	276	6386	1.00	285	6671
1.10	224	6895	1.20	224	7119	1.30	178	7297	1.40	156	7453	1.50	172	7625
1.60	144	7769	1.70	136	7905	1.80	124	8029	1.90	141	8170	2.00	108	8278
2.10	119	8397	2.20	104	8501	2.30	89	8590	2.40	75	8665	2.50	80	8745
2.60	66	8811	2.70	75	8886	2.80	51	8937	2.90	51	8988	3.00	58	9046
3.10	40	9086	3.20	50	9136	3.30	43	9179	3.40	53	9232	3.50	51	9283
3.60	36	9319	3.70	39	9358	3.80	29	9387	3.90	29	9416	4.00	29	9445
4.10	33	9478	4.20	22	9500	4.30	26	9526	4.40	21	9547	4.50	21	9568
4.60	20	9588	4.70	20	9608	4.80	27	9635	4.90	28	9663	5.00	20	9683
5.10	16	9699	5.20	20	9719	5.30	17	9736	5.40	25	9761	5.50	9	9770
5.60	9	9779	5.70	4	9783	5.80	10	9793	5.90	6	9799	6.00	13	9812
6.10	8	9820	6.20	9	9829	6.30	5	9834	6.40	6	9840	6.50	5	9845
6.60	10	9855	6.70	7	9862	6.80	8	9870	6.90	6	9876	7.00	12	9888
7.10	5	9893	7.20	9	9902	7.30	2	9904	7.40	3	9907	7.50	2	9909
7.60	1	9910	7.70	2	9912	7.80	6	9918	7.90	3	9921	8.00	4	9925
8.10	4	9929	8.20	4	9933	8.30	3	9936	8.40	8	9944	8.50	4	9948
8.60	2	9950	8.70	1	9951	8.80	3	9954	8.90	1	9955	9.00	3	9958
9.10	3	9961	9.20	0	9961	9.30	3	9964	9.40	1	9965	9.50	2	9967
9.60	3	9970	9.70	2	9972	9.80	1	9973	9.90	1	9974	10.00	1	9975
10.10	1	9976	10.20	3	9979	10.30	1	9980	10.40	1	9981	10.50	1	9982
10.60	0	9982	10.70	1	9983	10.80	1	9984	10.90	2	9986	11.00	0	9986
11.10	0	9986	11.20	0	9986	11.30	0	9986	11.40	0	9986	11.50	2	9988
11.60	2	9990	11.70	2	9992	11.80	0	9992	11.90	0	9992	12.00	0	9992
12.10	0	9992	12.20	0	9992	12.30	1	9993	12.40	0	9993	12.50	0	9993

12.60	0	9993	12.70	0	9993	12.80	0	9993	12.90	0	9993	13.00	0	9993
13.10	0	9993	13.20	0	9993	13.30	1	9994	13.40	0	9994	13.50	0	9994
13.60	0	9994	13.70	0	9994	13.80	0	9994	13.90	0	9994	14.00	0	9994
14.10	0	9994	14.20	0	9994	14.30	1	9995	14.40	0	9995	14.50	0	9995
14.60	1	9996	14.70	1	9997	14.80	0	9997	14.90	2	9999	15.00	1	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 1.87

A = -1.34

R2 = 1.00

90 CENTILE = 2.96

95 CENTILE = 4.27

97.5 CENTILE = 5.56

99 CENTILE = 7.28

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 6

N2 = 10

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2404	2404	0.20	913	3317	0.30	718	4035	0.40	499	4534	0.50	447	4981
0.60	393	5374	0.70	347	5721	0.80	305	6026	0.90	241	6267	1.00	266	6533
1.10	215	6748	1.20	206	6954	1.30	172	7126	1.40	150	7276	1.50	173	7449
1.60	160	7609	1.70	134	7743	1.80	112	7855	1.90	131	7986	2.00	115	8101
2.10	114	8215	2.20	95	8310	2.30	101	8411	2.40	93	8504	2.50	74	8578
2.60	82	8660	2.70	64	8724	2.80	63	8792	2.90	51	8843	3.00	64	8907
3.10	55	8962	3.20	57	9019	3.30	50	9069	3.40	51	9120	3.50	51	9171
3.60	49	9220	3.70	41	9261	3.80	42	9303	3.90	30	9333	4.00	31	9364
4.10	21	9385	4.20	36	9421	4.30	41	9462	4.40	28	9490	4.50	26	9516
4.60	29	9545	4.70	25	9570	4.80	17	9587	4.90	17	9604	5.00	24	9628
5.10	24	9652	5.20	20	9672	5.30	10	9682	5.40	8	9690	5.50	16	9706
5.60	24	9730	5.70	6	9736	5.80	10	9746	5.90	17	9763	6.00	8	9771
6.10	14	9785	6.20	7	9792	6.30	10	9802	6.40	10	9812	6.50	4	9816
6.60	12	9828	6.70	8	9836	6.80	10	9846	6.90	6	9852	7.00	11	9863
7.10	9	9872	7.20	5	9877	7.30	7	9884	7.40	8	9892	7.50	8	9900
7.60	5	9905	7.70	9	9914	7.80	7	9921	7.90	2	9923	8.00	2	9925
8.10	6	9931	8.20	3	9934	8.30	3	9937	8.40	3	9940	8.50	5	9945
8.60	4	9949	8.70	0	9949	8.80	4	9953	8.90	0	9953	9.00	3	9956
9.10	1	9957	9.20	3	9960	9.30	4	9964	9.40	1	9965	9.50	2	9967
9.60	1	9968	9.70	4	9972	9.80	2	9974	9.90	3	9977	10.00	2	9979
10.10	1	9980	10.20	2	9982	10.30	0	9982	10.40	1	9983	10.50	1	9984
10.60	0	9984	10.70	0	9984	10.80	1	9985	10.90	0	9985	11.00	0	9985
11.10	0	9985	11.20	1	9986	11.30	0	9986	11.40	0	9986	11.50	3	9989
11.60	0	9989	11.70	2	9991	11.80	1	9992	11.90	0	9992	12.00	1	9993
12.10	0	9993	12.20	0	9993	12.30	0	9993	12.40	1	9994	12.50	1	9995

12.00	0	9995	12.70	1	9996	12.80	0	9996	12.90	0	9996	13.00	0	9996
13.10	0	9996	13.20	0	9996	13.30	0	9996	13.40	0	9996	13.50	0	9996
13.60	1	9997	13.70	0	9997	13.80	0	9997	13.90	0	9997	14.00	0	9997
14.10	0	9997	14.20	0	9997	14.30	0	9997	14.40	0	9997	14.50	1	9998
14.60	0	9998	14.70	0	9998	14.80	1	9999	14.90	0	9999	15.00	0	9999
15.10	1	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE RÉPARTITION ENTRE 0.87 ET 0.999

B = 1.86

A = -1.07

R2 = 1.00

90 CENTILE = 3.21

95 CENTILE = 4.51

97.5 CENTILE = 5.79

99 CENTILE = 7.50

FIN DES DONNÉES

FNCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 6

N2 = 15

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2343	2343	0.20	932	3275	0.30	660	3935	0.40	565	4500	0.50	463	4963
0.60	402	5365	0.70	350	5715	0.80	304	6019	0.90	329	6348	1.00	246	6594
1.10	202	6796	1.20	230	7026	1.30	194	7220	1.40	162	7382	1.50	175	7557
1.60	162	7719	1.70	151	7870	1.80	147	8017	1.90	142	8159	2.00	132	8291
2.10	90	8381	2.20	86	8467	2.30	96	8563	2.40	86	8649	2.50	83	8732
2.60	69	8801	2.70	65	8866	2.80	61	8927	2.90	51	8978	3.00	50	9028
3.10	61	9089	3.20	55	9144	3.30	62	9206	3.40	45	9251	3.50	39	9290
3.60	52	9342	3.70	37	9379	3.80	37	9416	3.90	29	9445	4.00	30	9475
4.10	23	9458	4.20	30	9528	4.30	23	9551	4.40	28	9579	4.50	25	9604
4.60	15	9619	4.70	22	9641	4.80	17	9658	4.90	14	9672	5.00	19	9691
5.10	18	9709	5.20	17	9726	5.30	8	9734	5.40	10	9744	5.50	12	9756
5.60	18	9774	5.70	10	9784	5.80	10	9794	5.90	11	9805	6.00	9	9814
6.10	7	9821	6.20	8	9829	6.30	9	9838	6.40	6	9844	6.50	8	9852
6.60	7	9859	6.70	9	9868	6.80	6	9874	6.90	3	9877	7.00	4	9881
7.10	3	9884	7.20	3	9887	7.30	6	9893	7.40	5	9898	7.50	4	9902
7.60	4	9906	7.70	6	9912	7.80	5	9917	7.90	5	9922	8.00	4	9926
8.10	3	9929	8.20	2	9931	8.30	4	9935	8.40	7	9942	8.50	3	9945
8.60	1	9946	8.70	5	9951	8.80	2	9953	8.90	2	9955	9.00	3	9958
9.10	2	9960	9.20	1	9961	9.30	2	9963	9.40	3	9966	9.50	4	9970
9.60	4	9974	9.70	1	9975	9.80	1	9976	9.90	0	9976	10.00	1	9977
10.10	0	9977	10.20	3	9980	10.30	2	9982	10.40	1	9983	10.50	2	9985
10.60	1	9986	10.70	0	9986	10.80	0	9986	10.90	0	9986	11.00	0	9986
11.10	0	9986	11.20	1	9987	11.30	1	9988	11.40	0	9988	11.50	0	9988
11.60	0	9988	11.70	0	9988	11.80	1	9989	11.90	0	9989	12.00	1	9990
12.10	1	9991	12.20	0	9991	12.30	0	9991	12.40	1	9992	12.50	1	9993

12.60	0	9993	12.70	1	9994	12.80	0	9994	12.90	0	9994	13.00	1	9995
13.10	0	9995	13.20	1	9996	13.30	0	9996	13.40	0	9996	13.50	0	9996
13.60	0	9996	13.70	0	9996	13.80	0	9996	13.90	1	9997	14.00	0	9997
14.10	0	9997	14.20	0	9997	14.30	1	9998	14.40	0	9998	14.50	0	9998
14.60	0	9998	14.70	0	9998	14.80	0	9998	14.90	0	9998	15.00	0	9998
15.10	2	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 1.95

A = -1.59

R2 = 1.00

90 CENTILE = 2.89

95 CENTILE = 4.26

97.5 CENTILE = 5.60

99 CENTILE = 7.40

FIN DES DONNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 6

N2 = 20

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2368	2368	0.20	925	3293	0.30	720	4013	0.40	551	4564	0.50	501	5065
0.60	376	5441	0.70	335	5776	0.80	299	6075	0.90	323	6398	1.00	271	6669
1.10	236	6905	1.20	194	7099	1.30	198	7297	1.40	175	7472	1.50	174	7646
1.60	156	7802	1.70	149	7951	1.80	121	8072	1.90	127	8199	2.00	134	8333
2.10	92	8425	2.20	103	8528	2.30	87	8615	2.40	79	8694	2.50	79	8773
2.60	79	8852	2.70	61	8913	2.80	58	8971	2.90	51	9022	3.00	47	9069
3.10	54	9123	3.20	45	9168	3.30	48	9216	3.40	41	9257	3.50	45	9302
3.60	41	9343	3.70	39	9382	3.80	32	9414	3.90	38	9452	4.00	29	9481
4.10	33	9514	4.20	34	9548	4.30	26	9574	4.40	23	9597	4.50	19	9616
4.60	18	9634	4.70	22	9656	4.80	14	9670	4.90	24	9694	5.00	13	9707
5.10	16	9723	5.20	20	9743	5.30	13	9756	5.40	13	9769	5.50	15	9784
5.60	14	9798	5.70	14	9812	5.80	3	9815	5.90	7	9822	6.00	5	9827
6.10	13	9840	6.20	5	9845	6.30	8	9853	6.40	6	9859	6.50	4	9863
6.60	15	9878	6.70	6	9884	6.80	11	9895	6.90	9	9904	7.00	9	9913
7.10	6	9919	7.20	2	9921	7.30	5	9926	7.40	5	9931	7.50	3	9934
7.60	5	9939	7.70	1	9940	7.80	7	9947	7.90	3	9950	8.00	6	9956
8.10	1	9957	8.20	5	9962	8.30	2	9964	8.40	2	9966	8.50	1	9967
8.60	3	9970	8.70	0	9970	8.80	5	9975	8.90	0	9975	9.00	1	9976
9.10	2	9978	9.20	1	9979	9.30	2	9981	9.40	1	9982	9.50	1	9983
9.60	1	9984	9.70	0	9984	9.80	4	9988	9.90	0	9988	10.00	0	9988
10.10	1	9989	10.20	0	9989	10.30	0	9989	10.40	0	9989	10.50	1	9990
10.60	0	9990	10.70	0	9990	10.80	1	9991	10.90	0	9991	11.00	1	9992
11.10	0	9992	11.20	0	9992	11.30	1	9993	11.40	1	9994	11.50	0	9994
11.60	0	9994	11.70	0	9994	11.80	1	9995	11.90	1	9996	12.00	1	9997
12.10	0	9997	12.20	0	9997	12.30	0	9997	12.40	0	9997	12.50	0	9997

12.60	0	9997	12.70	0	9997	12.80	1	9998	12.90	0	9998	13.00	0	9998
13.10	0	9998	13.20	0	9998	13.30	1	9999	13.40	0	9999	13.50	0	9999
13.60	0	9999	13.70	0	9999	13.80	0	9999	13.90	0	9999	14.00	0	9999
14.10	0	9999	14.20	0	9999	14.30	0	9999	14.40	0	9999	14.50	0	9999
14.60	0	9999	14.70	0	9999	14.80	0	9999	14.90	1	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 1.66

A = -0.90

R2 = 1.00

90 CENTILE = 2.93

95 CENTILE = 4.10

97.5 CENTILE = 5.25

99 CENTILE = 6.78

FIN DES DUNNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 6

N2 = 30

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2379	2379	0.20	960	3339	0.30	682	4021	0.40	578	4599	0.50	454	5053
0.60	379	5432	0.70	316	5748	0.80	321	6069	0.90	273	6342	1.00	267	6609
1.10	244	6853	1.20	242	7095	1.30	204	7299	1.40	175	7474	1.50	155	7629
1.60	149	7778	1.70	132	7910	1.80	119	8029	1.90	122	8151	2.00	111	8262
2.10	112	8374	2.20	106	8480	2.30	92	8572	2.40	87	8659	2.50	78	8737
2.60	75	8812	2.70	73	8885	2.80	54	8939	2.90	67	9006	3.00	72	9078
3.10	57	9135	3.20	42	9177	3.30	58	9235	3.40	44	9279	3.50	44	9323
3.60	31	9354	3.70	35	9389	3.80	38	9427	3.90	35	9462	4.00	27	9489
4.10	27	9516	4.20	29	9545	4.30	24	9569	4.40	23	9592	4.50	29	9621
4.60	20	9641	4.70	13	9654	4.80	22	9676	4.90	13	9689	5.00	18	9707
5.10	11	9718	5.20	18	9736	5.30	11	9747	5.40	13	9760	5.50	15	9775
5.60	17	9792	5.70	15	9807	5.80	11	9818	5.90	8	9826	6.00	11	9837
6.10	8	9845	6.20	8	9853	6.30	11	9864	6.40	10	9874	6.50	6	9880
6.60	4	9884	6.70	8	9892	6.80	6	9898	6.90	7	9905	7.00	7	9912
7.10	9	9921	7.20	5	9926	7.30	2	9928	7.40	2	9930	7.50	2	9932
7.60	3	9935	7.70	6	9941	7.80	2	9943	7.90	5	9948	8.00	6	9954
8.10	1	9955	8.20	2	9957	8.30	2	9959	8.40	2	9961	8.50	1	9962
8.60	1	9963	8.70	0	9963	8.80	3	9966	8.90	3	9969	9.00	3	9972
9.10	1	9973	9.20	3	9976	9.30	3	9979	9.40	4	9983	9.50	0	9983
9.60	2	9985	9.70	1	9986	9.80	3	9989	9.90	1	9990	10.00	1	9991
10.10	1	9992	10.20	0	9992	10.30	0	9992	10.40	1	9993	10.50	2	9995
10.60	0	9995	10.70	2	9997	10.80	0	9997	10.90	0	9997	11.00	0	9997
11.10	0	9997	11.20	0	9997	11.30	0	9997	11.40	0	9997	11.50	0	9997
11.60	0	9997	11.70	1	9998	11.80	0	9998	11.90	0	9998	12.00	0	9998
12.10	0	9998	12.20	0	9998	12.30	0	9998	12.40	0	9998	12.50	1	9999

12.60	0	9999	12.70	0	9999	12.80	0	9999	12.90	0	9999	13.00	0	9999
13.10	0	9999	13.20	0	9999	13.30	0	9999	13.40	0	9999	13.50	0	9999
13.60	0	9999	13.70	0	9999	13.80	0	9999	13.90	0	9999	14.00	0	9999
14.10	0	9999	14.20	0	9999	14.30	1	10000	14.40	0	10000	14.50	0	10000
14.60	0	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = 1.59$

$A = -0.66$

$R^2 = 0.99$

90 CENTILE = 2.98

95 CENTILE = 4.10

97.5 CENTILE = 5.19

99 CENTILE = 6.05

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 10

N2 = 10

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2491	2491	0.20	915	3406	0.30	692	4098	0.40	546	4644	0.50	474	5118
0.60	401	5519	0.70	356	5875	0.80	330	6205	0.90	286	6491	1.00	274	6765
1.10	265	7030	1.20	196	7226	1.30	188	7414	1.40	195	7609	1.50	152	7761
1.60	130	7891	1.70	130	8021	1.80	129	8150	1.90	122	8272	2.00	115	8387
2.10	95	8482	2.20	95	8577	2.30	78	8655	2.40	75	8730	2.50	83	8813
2.60	62	8875	2.70	69	8944	2.80	62	9006	2.90	53	9059	3.00	65	9124
3.10	34	9158	3.20	47	9205	3.30	51	9256	3.40	36	9292	3.50	39	9331
3.60	38	9369	3.70	31	9400	3.80	22	9422	3.90	32	9454	4.00	26	9480
4.10	22	9502	4.20	27	9529	4.30	26	9555	4.40	39	9594	4.50	23	9617
4.60	23	9640	4.70	20	9660	4.80	16	9676	4.90	21	9697	5.00	19	9716
5.10	13	9729	5.20	9	9738	5.30	19	9757	5.40	9	9766	5.50	11	9777
5.60	6	9783	5.70	19	9802	5.80	10	9812	5.90	11	9823	6.00	4	9827
6.10	3	9830	6.20	11	9841	6.30	7	9848	6.40	9	9857	6.50	11	9868
6.60	4	9872	6.70	10	9882	6.80	7	9889	6.90	9	9898	7.00	2	9900
7.10	2	9902	7.20	4	9906	7.30	2	9908	7.40	5	9913	7.50	4	9917
7.60	3	9920	7.70	3	9923	7.80	2	9925	7.90	6	9931	8.00	1	9932
8.10	3	9935	8.20	2	9937	8.30	4	9941	8.40	2	9943	8.50	1	9944
8.60	4	9948	8.70	3	9951	8.80	1	9952	8.90	2	9954	9.00	0	9954
9.10	1	9955	9.20	3	9958	9.30	1	9959	9.40	1	9960	9.50	1	9961
9.60	1	9962	9.70	3	9965	9.80	3	9968	9.90	2	9970	10.00	0	9970
10.10	2	9972	10.20	3	9975	10.30	2	9977	10.40	0	9977	10.50	1	9978
10.60	0	9978	10.70	1	9979	10.80	0	9979	10.90	4	9983	11.00	1	9984
11.10	1	9985	11.20	0	9985	11.30	0	9985	11.40	1	9986	11.50	1	9987
11.60	0	9987	11.70	0	9987	11.80	1	9988	11.90	0	9988	12.00	1	9989
12.10	1	9990	12.20	0	9990	12.30	0	9990	12.40	2	9992	12.50	0	9992

.50

12.60	2	9994	12.70	0	9994	12.80	0	9994	12.90	0	9994	13.00	0	9994
13.10	0	9994	13.20	0	9994	13.30	1	9995	13.40	0	9995	13.50	0	9995
13.60	0	9995	13.70	0	9995	13.80	0	9995	13.90	0	9995	14.00	2	9997
14.10	0	9997	14.20	0	9997	14.30	0	9997	14.40	0	9997	14.50	0	9997
14.60	1	9998	14.70	0	9998	14.80	0	9998	14.90	0	9998	15.00	0	9998
15.10	2	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$$B = 1.97$$

$$A = -1.77$$

$$R^2 = 1.00$$

$$90 \text{ CENTILE} = 2.75$$

$$95 \text{ CENTILE} = 4.13$$

$$97.5 \text{ CENTILE} = 5.49$$

$$99 \text{ CENTILE} = 7.30$$

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 10

N2 = 15

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2400	2406	0.20	915	3322	0.30	680	4008	0.40	554	4562	0.50	481	5043
0.60	421	5464	0.70	330	5794	0.80	298	6092	0.90	287	6379	1.00	249	6628
1.10	200	6623	1.20	215	7043	1.30	189	7232	1.40	178	7410	1.50	136	7546
1.60	155	7701	1.70	112	7813	1.80	140	7953	1.90	150	8103	2.00	118	8221
2.10	117	8338	2.20	94	8432	2.30	77	8509	2.40	92	8601	2.50	83	8684
2.60	77	8761	2.70	72	8833	2.80	64	8897	2.90	62	8959	3.00	60	9019
3.10	52	9071	3.20	51	9122	3.30	49	9171	3.40	46	9217	3.50	40	9257
3.60	44	9301	3.70	31	9332	3.80	30	9368	3.90	27	9395	4.00	32	9427
4.10	31	9458	4.20	34	9492	4.30	22	9514	4.40	26	9540	4.50	27	9567
4.60	22	9589	4.70	19	9608	4.80	28	9636	4.90	17	9653	5.00	20	9673
5.10	17	9690	5.20	19	9709	5.30	14	9723	5.40	15	9738	5.50	15	9753
5.60	11	9764	5.70	13	9777	5.80	9	9786	5.90	7	9793	6.00	7	9800
6.10	19	9819	6.20	3	9822	6.30	13	9835	6.40	5	9840	6.50	6	9846
6.60	4	9850	6.70	9	9859	6.80	12	9871	6.90	6	9877	7.00	4	9881
7.10	4	9885	7.20	4	9889	7.30	10	9899	7.40	5	9904	7.50	5	9909
7.60	4	9913	7.70	9	9922	7.80	4	9926	7.90	4	9930	8.00	2	9932
8.10	5	9937	8.20	3	9940	8.30	5	9945	8.40	3	9948	8.50	3	9951
8.60	2	9955	8.70	7	9960	8.80	1	9961	8.90	3	9964	9.00	2	9966
9.10	2	9968	9.20	1	9969	9.30	1	9970	9.40	2	9972	9.50	5	9977
9.60	0	9977	9.70	1	9978	9.80	0	9978	9.90	0	9978	10.00	2	9980
10.10	1	9981	10.20	3	9984	10.30	0	9984	10.40	3	9987	10.50	2	9989
10.60	2	9991	10.70	0	9991	10.80	0	9991	10.90	2	9993	11.00	1	9994
11.10	1	9995	11.20	0	9995	11.30	0	9995	11.40	0	9995	11.50	1	9996
11.60	0	9996	11.70	0	9996	11.80	1	9997	11.90	0	9997	12.00	0	9997
12.10	0	9997	12.20	0	9997	12.30	1	9998	12.40	0	9998	12.50	1	9999

12.00	0	9999	12.70	0	9999	12.80	0	9999	12.90	0	9999	13.00	0	9999
13.10	0	9999	13.20	0	9999	13.30	1	10000	13.40	0	10000	13.50	0	10000
13.60	0	10000	13.70	0	10000	13.80	0	10000	13.90	0	10000	14.00	0	10000
14.10	0	10000	14.20	0	10000	14.30	0	10000	14.40	0	10000	14.50	0	10000
14.60	0	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE RÉPARTITION ENTRE 0.87 ET 0.999

$$B = 1.72$$

$$A = -0.87$$

$$R^2 = 0.99$$

$$90 \text{ CENTILE} = 3.08$$

$$95 \text{ CENTILE} = 4.29$$

$$97.5 \text{ CENTILE} = 5.48$$

$$99 \text{ CENTILE} = 7.06$$

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 10

N2 = 20

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2348	2348	0.20	957	3305	0.30	743	4048	0.40	567	4615	0.50	513	5128
0.60	411	5539	0.70	345	5884	0.80	307	6191	0.90	262	6453	1.00	288	6741
1.10	253	6994	1.20	191	7185	1.30	188	7373	1.40	186	7559	1.50	170	7729
1.60	145	7874	1.70	128	8002	1.80	117	8119	1.90	112	8231	2.00	110	8341
2.10	123	8464	2.20	79	8543	2.30	80	8623	2.40	75	8698	2.50	85	8783
2.60	75	8858	2.70	68	8926	2.80	58	8984	2.90	50	9034	3.00	48	9082
3.10	64	9146	3.20	60	9206	3.30	42	9248	3.40	53	9301	3.50	38	9339
3.60	34	9373	3.70	31	9404	3.80	35	9439	3.90	24	9463	4.00	29	9492
4.10	26	9518	4.20	22	9540	4.30	25	9565	4.40	27	9592	4.50	17	9609
4.60	14	9623	4.70	17	9640	4.80	15	9655	4.90	21	9676	5.00	11	9687
5.10	10	9697	5.20	24	9721	5.30	16	9737	5.40	15	9752	5.50	12	9764
5.60	6	9770	5.70	14	9784	5.80	17	9801	5.90	11	9812	6.00	11	9823
6.10	10	9833	6.20	10	9843	6.30	7	9850	6.40	5	9855	6.50	5	9860
6.60	9	9869	6.70	5	9874	6.80	7	9881	6.90	8	9889	7.00	7	9896
7.10	6	9902	7.20	8	9910	7.30	4	9914	7.40	1	9915	7.50	4	9919
7.60	2	9921	7.70	4	9925	7.80	6	9931	7.90	3	9934	8.00	3	9937
8.10	1	9938	8.20	3	9941	8.30	3	9944	8.40	4	9948	8.50	5	9953
8.60	1	9954	8.70	3	9957	8.80	5	9962	8.90	2	9964	9.00	3	9967
9.10	4	9971	9.20	0	9971	9.30	1	9972	9.40	3	9975	9.50	3	9978
9.60	1	9979	9.70	2	9981	9.80	1	9982	9.90	2	9984	10.00	0	9984
10.10	4	9988	10.20	2	9990	10.30	0	9990	10.40	0	9990	10.50	2	9992
10.60	0	9992	10.70	0	9992	10.80	0	9992	10.90	0	9992	11.00	0	9992
11.10	1	9993	11.20	0	9993	11.30	0	9993	11.40	0	9993	11.50	0	9993
11.60	0	9993	11.70	0	9993	11.80	0	9993	11.90	0	9993	12.00	0	9993
12.10	0	9993	12.20	0	9993	12.30	0	9993	12.40	0	9993	12.50	0	9993

12.60	0	9993	12.70	0	9993	12.80	1	9994	12.90	0	9994	13.00	0	9994
13.10	0	9994	13.20	0	9994	13.30	0	9994	13.40	1	9995	13.50	1	9996
13.60	1	9997	13.70	0	9997	13.80	2	9999	13.90	0	9999	14.00	0	9999
14.10	0	9999	14.20	0	9999	14.30	0	9999	14.40	0	9999	14.50	0	9999
14.60	0	9999	14.70	0	9999	14.80	0	9999	14.90	0	9999	15.00	0	9999
15.10	1	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = 1.69$

$A = -0.95$

$R^2 = 0.99$

90 CENTILE = 2.94

95 CENTILE = 4.12

97.5 CENTILE = 5.29

99 CENTILE = 6.84

FIN DES DONNEES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 10

N2 = 30

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2396	2396	0.20	1002	3398	0.30	701	4099	0.40	561	4660	0.50	485	5145
0.60	492	5637	0.70	330	5967	0.80	321	6288	0.90	265	6553	1.00	263	6816
1.10	232	7048	1.20	157	7205	1.30	201	7406	1.40	195	7601	1.50	152	7753
1.60	160	7913	1.70	164	8077	1.80	130	8213	1.90	113	8326	2.00	113	8439
2.10	105	8544	2.20	90	8634	2.30	83	8717	2.40	71	8788	2.50	83	8871
2.60	73	8944	2.70	64	9008	2.80	57	9065	2.90	56	9121	3.00	56	9177
3.10	54	9231	3.20	48	9279	3.30	42	9321	3.40	49	9370	3.50	27	9397
3.60	43	9440	3.70	35	9475	3.80	26	9501	3.90	27	9528	4.00	33	9561
4.10	24	9585	4.20	20	9605	4.30	29	9634	4.40	18	9652	4.50	14	9666
4.60	18	9684	4.70	20	9704	4.80	13	9717	4.90	15	9732	5.00	20	9752
5.10	15	9767	5.20	12	9779	5.30	13	9792	5.40	11	9803	5.50	8	9811
5.60	12	9823	5.70	8	9831	5.80	7	9838	5.90	13	9851	6.00	9	9860
6.10	9	9869	6.20	11	9880	6.30	7	9887	6.40	4	9891	6.50	7	9898
6.60	4	9902	6.70	6	9908	6.80	5	9913	6.90	1	9914	7.00	5	9919
7.10	2	9921	7.20	1	9922	7.30	4	9926	7.40	4	9930	7.50	7	9937
7.60	1	9938	7.70	1	9939	7.80	2	9941	7.90	4	9945	8.00	1	9946
8.10	1	9947	8.20	5	9952	8.30	3	9955	8.40	1	9956	8.50	7	9963
8.60	0	9963	8.70	1	9964	8.80	4	9968	8.90	0	9968	9.00	1	9969
9.10	2	9971	9.20	1	9972	9.30	1	9973	9.40	1	9974	9.50	0	9974
9.60	5	9979	9.70	0	9979	9.80	0	9979	9.90	1	9980	10.00	1	9981
10.10	1	9982	10.20	1	9983	10.30	1	9984	10.40	1	9985	10.50	0	9985
10.60	2	9987	10.70	1	9988	10.80	0	9988	10.90	1	9989	11.00	0	9989
11.10	1	9990	11.20	1	9991	11.30	0	9991	11.40	0	9991	11.50	0	9991
11.60	1	9992	11.70	2	9994	11.80	0	9994	11.90	0	9994	12.00	3	9997
12.10	0	9997	12.20	1	9998	12.30	0	9998	12.40	1	9999	12.50	0	9999

.50

12.60	0	9999	12.70	0	9999	12.80	0	9999	12.90	0	9999	13.00	0	9999
13.10	0	9999	13.20	0	9999	13.30	0	9999	13.40	0	9999	13.50	0	9999
13.60	0	9999	13.70	0	9999	13.80	0	9999	13.90	0	9999	14.00	0	9999
14.10	0	9999	14.20	0	9999	14.30	0	9999	14.40	0	9999	14.50	0	9999
14.60	1	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

B = 1.80

A = -1.46

R2 = 1.00

90 CENTILE = 2.67

95 CENTILE = 3.93

97.5 CENTILE = 5.16

99 CENTILE = 6.82

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 15

N2 = 15

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2399	2399	0.20	913	3312	0.30	665	3977	0.40	526	4503	0.50	467	4970
0.60	403	5373	0.70	398	5771	0.80	351	6122	0.90	293	6415	1.00	239	6654
1.10	247	6901	1.20	223	7124	1.30	212	7336	1.40	179	7515	1.50	164	7679
1.60	148	7827	1.70	135	7962	1.80	117	8079	1.90	114	8193	2.00	96	8289
2.10	122	8411	2.20	100	8511	2.30	79	8590	2.40	86	8676	2.50	78	8754
2.60	65	8520	2.70	70	8390	2.80	66	8456	2.90	57	9013	3.00	62	9075
3.10	45	9121	3.20	45	9166	3.30	48	9214	3.40	44	9258	3.50	41	9299
3.60	42	9341	3.70	34	9375	3.80	30	9405	3.90	28	9433	4.00	27	9460
4.10	35	9495	4.20	27	9522	4.30	18	9540	4.40	22	9562	4.50	23	9585
4.60	27	9612	4.70	25	9637	4.80	13	9650	4.90	24	9674	5.00	20	9694
5.10	21	9715	5.20	12	9727	5.30	16	9743	5.40	15	9758	5.50	6	9764
5.60	7	9771	5.70	15	9786	5.80	10	9796	5.90	7	9803	6.00	9	9812
6.10	14	9820	6.20	11	9837	6.30	8	9845	6.40	6	9851	6.50	12	9863
6.60	5	9868	6.70	5	9873	6.80	7	9880	6.90	4	9884	7.00	3	9887
7.10	7	9894	7.20	6	9900	7.30	2	9902	7.40	4	9906	7.50	4	9910
7.60	6	9916	7.70	7	9923	7.80	5	9928	7.90	0	9928	8.00	4	9932
8.10	3	9935	8.20	3	9938	8.30	2	9940	8.40	5	9945	8.50	3	9948
8.60	2	9950	8.70	1	9951	8.80	5	9956	8.90	2	9958	9.00	3	9961
9.10	0	9951	9.20	2	9963	9.30	1	9964	9.40	3	9967	9.50	2	9969
9.60	0	9969	9.70	3	9972	9.80	2	9974	9.90	1	9975	10.00	2	9977
10.10	1	9978	10.20	0	9978	10.30	2	9980	10.40	1	9981	10.50	0	9981
10.60	3	9984	10.70	0	9984	10.80	0	9984	10.90	1	9985	11.00	1	9986
11.10	1	9987	11.20	0	9987	11.30	0	9987	11.40	1	9988	11.50	0	9988
11.60	4	9992	11.70	0	9992	11.80	1	9993	11.90	1	9994	12.00	1	9995
12.10	0	9995	12.20	1	9996	12.30	0	9996	12.40	0	9996	12.50	0	9996

12.00	0	9998	12.70	1	9997	12.80	1	9998	12.90	0	9998	13.00	0	9998
13.10	0	9998	13.20	1	9999	13.30	0	9999	13.40	0	9999	13.50	1	10000
13.60	0	10000	13.70	0	10000	13.80	0	10000	13.90	0	10000	14.00	0	10000
14.10	0	10000	14.20	0	10000	14.30	0	10000	14.40	0	10000	14.50	0	10000
14.60	0	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$\lambda = 1.88$

$A = -1.42$

$R^2 = 1.00$

90 CENTILE = 2.90

95 CENTILE = 4.22

97.5 CENTILE = 5.52

99 CENTILE = 7.25

FIN DES DONNEES

FNCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 15

N2 = 20

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2310	2310	0.20	985	3295	0.30	720	4015	0.40	613	4628	0.50	447	5075
0.60	386	5461	0.70	375	5836	0.80	313	6149	0.90	288	6437	1.00	242	6679
1.10	214	6893	1.20	205	7098	1.30	182	7280	1.40	186	7468	1.50	181	7649
1.60	158	7807	1.70	159	7966	1.80	147	8113	1.90	118	8231	2.00	104	8335
2.10	108	8443	2.20	86	8529	2.30	92	8621	2.40	61	8682	2.50	70	8752
2.60	74	8826	2.70	72	8898	2.80	57	8955	2.90	51	9006	3.00	69	9075
3.10	52	9127	3.20	56	9183	3.30	51	9234	3.40	44	9278	3.50	52	9330
3.60	39	9369	3.70	37	9406	3.80	28	9434	3.90	38	9472	4.00	34	9506
4.10	30	9536	4.20	30	9566	4.30	27	9593	4.40	17	9610	4.50	19	9629
4.60	18	9647	4.70	13	9660	4.80	20	9680	4.90	18	9698	5.00	22	9720
5.10	11	9731	5.20	16	9747	5.30	13	9760	5.40	11	9771	5.50	8	9779
5.60	13	9792	5.70	11	9803	5.80	12	9815	5.90	12	9827	6.00	4	9831
6.10	11	9842	6.20	7	9849	6.30	6	9855	6.40	8	9863	6.50	6	9869
6.60	6	9875	6.70	9	9884	6.80	5	9889	6.90	1	9890	7.00	7	9897
7.10	4	9901	7.20	5	9906	7.30	4	9910	7.40	4	9914	7.50	2	9916
7.60	5	9921	7.70	2	9923	7.80	6	9929	7.90	3	9932	8.00	3	9935
8.10	3	9938	8.20	3	9941	8.30	2	9943	8.40	3	9946	8.50	1	9947
8.60	1	9948	8.70	2	9950	8.80	3	9953	8.90	3	9956	9.00	6	9962
9.10	1	9963	9.20	2	9965	9.30	2	9967	9.40	1	9968	9.50	3	9971
9.60	0	9971	9.70	3	9974	9.80	1	9975	9.90	2	9977	10.00	2	9979
10.10	1	9980	10.20	2	9982	10.30	0	9982	10.40	2	9984	10.50	0	9984
10.60	0	9984	10.70	1	9985	10.80	0	9985	10.90	2	9987	11.00	1	9988
11.10	1	9989	11.20	0	9989	11.30	1	9990	11.40	0	9990	11.50	0	9990
11.60	1	9991	11.70	0	9991	11.80	0	9991	11.90	0	9991	12.00	1	9992
12.10	0	9992	12.20	1	9993	12.30	1	9994	12.40	0	9994	12.50	0	9994

.60

12.	9	70	1	995	12	9	990	13.90	0	995	13.00	0	995	
13.10	1	9990	13.20	0	9996	13.30	0	9996	13.40	0	9996	13.50	0	9996
13.60	0	9990	13.70	0	9996	13.80	0	9996	13.90	0	9996	14.00	1	9997
14.10	1	9998	14.20	1	9999	14.30	1	10000	14.40	0	10000	14.50	0	10000
14.60	0	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$b = 1.84$

$A = -1.38$

$R^2 = 1.00$

90 CENTILE = 2.80

95 CENTILE = 4.15

97.5 CENTILE = 5.42

99 CENTILE = 7.12

FIN DES DONNÉES

FONCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 15

N2 = 30

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2432	2432	0.20	959	3391	0.30	711	4102	0.40	508	4670	0.50	463	5133
0.60	428	5561	0.70	352	5923	0.80	327	6250	0.90	286	6536	1.00	289	6825
1.10	229	7054	1.20	200	7254	1.30	182	7436	1.40	158	7594	1.50	161	7755
1.60	138	7893	1.70	123	8016	1.80	121	8137	1.90	121	8258	2.00	115	8373
2.10	103	8476	2.20	85	8561	2.30	79	8640	2.40	74	8714	2.50	75	8789
2.60	81	8670	2.70	60	8930	2.80	59	8989	2.90	61	9050	3.00	57	9107
3.10	59	9166	3.20	50	9222	3.30	45	9267	3.40	43	9310	3.50	42	9352
3.60	42	9394	3.70	35	9429	3.80	27	9456	3.90	26	9482	4.00	28	9510
4.10	30	9540	4.20	33	9573	4.30	21	9594	4.40	27	9621	4.50	20	9641
4.60	23	9664	4.70	22	9686	4.80	15	9701	4.90	12	9713	5.00	20	9733
5.10	15	9748	5.20	14	9762	5.30	14	9776	5.40	9	9785	5.50	16	9801
5.60	8	9809	5.70	8	9817	5.80	11	9828	5.90	6	9834	6.00	8	9842
6.10	10	9852	6.20	6	9858	6.30	8	9866	6.40	6	9872	6.50	8	9880
6.60	12	9892	6.70	6	9898	6.80	2	9900	6.90	5	9905	7.00	6	9911
7.10	9	9920	7.20	7	9927	7.30	7	9934	7.40	3	9937	7.50	2	9939
7.60	2	9941	7.70	3	9944	7.80	3	9947	7.90	4	9951	8.00	0	9951
8.10	4	9955	8.20	6	9961	8.30	1	9962	8.40	1	9963	8.50	5	9968
8.60	1	9969	8.70	2	9971	8.80	3	9974	8.90	2	9976	9.00	0	9976
9.10	1	9977	9.20	0	9977	9.30	3	9980	9.40	1	9981	9.50	1	9982
9.60	2	9984	9.70	0	9984	9.80	0	9984	9.90	2	9986	10.00	1	9987
10.10	1	9988	10.20	0	9988	10.30	1	9989	10.40	0	9989	10.50	0	9989
10.60	2	9991	10.70	0	9991	10.80	0	9991	10.90	5	9996	11.00	0	9996
11.10	1	9997	11.20	0	9997	11.30	1	9998	11.40	1	9999	11.50	0	9999
11.60	0	9999	11.70	0	9999	11.80	0	9999	11.90	0	9999	12.00	0	9999
12.10	0	9999	12.20	1	10000	12.30	0	10000	12.40	0	10000	12.50	0	10000

12.00	0	10000	12.70	0	10000	12.80	0	10000	12.90	0	10000	13.00	0	10000
13.10	0	10000	13.20	0	10000	13.30	0	10000	13.40	0	10000	13.50	0	10000
13.60	0	10000	13.70	0	10000	13.80	0	10000	13.90	0	10000	14.00	0	10000
14.10	0	10000	14.20	0	10000	14.30	0	10000	14.40	0	10000	14.50	0	10000
14.60	0	10000	14.70	0	10000	14.80	0	10000	14.90	0	10000	15.00	0	10000
15.10	0	10000												

LISSAGE DE MOINDRES CARRES EN ASSUMANT UN MODELE EXPONENTIEL

POUR LA FONCTION DE REPARTITION ENTRE 0.87 ET 0.999

$B = 1.08$

$A = -1.03$

$R^2 = 1.00$

90 CENTILE = 2.84

95 CENTILE = 4.02

97.5 CENTILE = 5.18

99 CENTILE = 6.73

FIN DES DONNEES

FUNCTION DE REPARTITION DE LAMBDA SIMULEE A PARTIR DE 10,000 OBSERVATIONS

N1 = 20

N2 = 30

NC = 0

BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL	BORNE	NBR	CUMUL
0.10	2399	2399	0.20	993	3392	0.30	674	4066	0.40	573	4639	0.50	487	5126
0.60	409	5535	0.70	359	5894	0.80	285	6179	0.90	289	6468	1.00	255	6723
1.10	246	6969	1.20	223	7192	1.30	177	7369	1.40	174	7543	1.50	171	7714
1.60	148	7662	1.70	142	8004	1.80	124	8128	1.90	105	8233	2.00	100	8333
2.10	95	8428	2.20	107	8535	2.30	91	8626	2.40	88	8714	2.50	89	8803
2.60	67	8870	2.70	96	8966	2.80	47	9013	2.90	42	9055	3.00	64	9119
3.10	47	9166	3.20	49	9215	3.30	39	9254	3.40	47	9301	3.50	39	9340
3.60	53	9393	3.70	31	9424	3.80	28	9452	3.90	26	9478	4.00	23	9501
4.10	33	9534	4.20	24	9558	4.30	24	9582	4.40	21	9603	4.50	23	9626
4.60	18	9644	4.70	18	9662	4.80	17	9679	4.90	20	9699	5.00	15	9714
5.10	19	9733	5.20	8	9741	5.30	13	9754	5.40	13	9767	5.50	6	9773
5.60	8	9781	5.70	11	9792	5.80	13	9805	5.90	13	9818	6.00	10	9828
6.10	13	9841	6.20	5	9846	6.30	8	9854	6.40	6	9860	6.50	8	9868
6.60	11	9879	6.70	5	9884	6.80	4	9888	6.90	7	9895	7.00	5	9900
7.10	2	9902	7.20	3	9905	7.30	6	9911	7.40	3	9914	7.50	8	9922
7.60	7	9929	7.70	5	9934	7.80	3	9937	7.90	5	9942	8.00	5	9947
8.10	0	9947	8.20	7	9954	8.30	2	9956	8.40	0	9956	8.50	3	9959
8.60	4	9963	8.70	2	9965	8.80	1	9966	8.90	2	9968	9.00	3	9971
9.10	4	9975	9.20	2	9977	9.30	1	9978	9.40	1	9979	9.50	0	9979
9.60	1	9980	9.70	0	9980	9.80	1	9981	9.90	0	9981	10.00	1	9982
10.10	1	9983	10.20	0	9983	10.30	0	9983	10.40	0	9983	10.50	0	9983
10.60	1	9984	10.70	0	9984	10.80	0	9984	10.90	1	9985	11.00	1	9986
11.10	0	9986	11.20	1	9987	11.30	0	9987	11.40	0	9987	11.50	2	9989
11.60	0	9989	11.70	2	9991	11.80	1	9992	11.90	1	9993	12.00	1	9994
12.10	0	9994	12.20	0	9994	12.30	0	9994	12.40	1	9995	12.50	0	9995

12.60	0	9995	12.70	0	9995	12.80	0	9995	12.90	0	9995	13.00	1	9996
13.10	0	9996	13.20	0	9996	13.30	0	9996	13.40	0	9996	13.50	0	9996
13.60	0	9996	13.70	0	9996	13.80	0	9996	13.90	0	9996	14.00	1	9997
14.10	0	9997	14.20	0	9997	14.30	0	9997	14.40	1	9998	14.50	0	9998
14.60	0	9998	14.70	0	9998	14.80	1	9999	14.90	0	9999	15.00	0	9999
15.10	1	10000												

LISSAGE DE MOINDRES CARRÉS EN ASSUMANT UN MODÈLE EXPONENTIEL

POUR LA FONCTION DE RÉPARTITION ENTRE 0.87 ET 0.999

$B = 1.88$

$A = -1.56$

$R^2 = 1.00$

90 CENTILE = 2.77

95 CENTILE = 4.09

97.5 CENTILE = 5.39

99 CENTILE = 7.12

FIN DES DONNÉES

77762

A CONSULTER
SUR PLACE

ÉCOLE POLYTECHNIQUE DE MONTRÉAL
3 9334 00288785 7