

## Statistical approach for uncertainty quantification of experimental modal model parameters - DTU Orbit (08/11/2017)

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Composite materials are widely used in manufacture of aerospace and wind energy structural components. These load carrying structures are subjected to dynamic time-varying loading conditions. Robust structural dynamics identification procedure impose tight constraints on the quality of modal models estimates obtained from vibration experiments. Modal testing results are influenced by numerous factors introducing uncertainty to the measurement results. Different experimental techniques applied to the same test item or testing numerous nominally identical specimens yields different test results. This paper aims at a systematic approach for uncertainty quantification of the parameters of the modal models estimated from experimentally obtained data. Statistical analysis of modal parameters is implemented to derive an assessment of the entire modal model uncertainty measure. Investigated structures represent different complexity levels ranging from coupon, through sub-component up to fully assembled aerospace and wind energy structural components made of composite materials. The proposed method is demonstrated on two application cases of a small and large wind turbine blade.

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