UNCERTAINTY QUANTIFICATION IN STRUCTURAL DYNAMICS

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MINISYMPOSIUM

Uncertainty quantification is important for the design of vibration sensitive structures. Especially for lightweight structures, which are more and more demanded to save construction material, dynamical structural analyses are required to asses the structural reliability with respect to the structural safety and the structural serviceability. Another field of application in structural dynamics is structural health monitoring, where defined dynamical loads are applied to assess the structural condition, e.g., to detect and localize structural damages. Beside high-quality numerical simulation models, which are needed to capture the physical behavior, advanced uncertainty models are required to quantify the structural loads, material and geometrical parameters as well as the boundary conditions according to available information. This often needs to consider not only aleatory uncertainties, but also epistemic uncertainties within the dynamical structural analysis, which can be solved, e.g., by finite element simulations in combination with stochastic simulations and interval or fuzzy analyses. In case of time-consuming numerical simulation models, reduced order models, surrogate models or multi-fidelity models can help to reduce the computation time.

Possible topics for contributions of the Minisymposium are:
- quantification of uncertain structural loads and parameters in structural dynamics
- reliability and risk assessment of vibration sensitive structures
- simulation techniques in structural dynamics considering uncertainties
- surrogate modeling, reduced order modeling and multi-fidelity models for dynamical analyses
- structural health monitoring and inverse analysis based on dynamical models
- design and optimization of structures under uncertain dynamical loading