UNCERTAINTIES IN COMPUTATIONAL MECHANICS WITH EMPHASIS ON STRUCTURAL OPTIMIZATION APPLICATIONS

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ABSTRACT

In real world engineering practice there are uncertainties associated with both randomness (i.e., aleatory uncertainty) and imperfect knowledge (i.e., epistemic uncertainty). The aforementioned uncertainties play a crucial role in the design, especially if they are integrated in the framework of an optimization procedure, of engineering systems.

The significant developments of stochastic analysis methods have stimulated the interest for their application in optimum design of structures. At present there are two optimum design formulations accounting for systems' response considering uncertainties: Reliability-Based Design Optimization (RBDO) and Robust Design Optimization (RDO). The main goal of RBDO methods is to achieve increased safety levels of the structure with respect to variations of the random design parameters. On the other hand, RDO methods primarily seek to minimize the influence of stochastic variations on the mean design of a structural system.

The aim of this minisymposium is to attract state-of-the-art papers dealing with the use of advanced stochastic methods in computational mechanics, where the emphasis will be given on the optimal design of structures. The selected contributions will provide an overview of the present thinking as well as the latest research findings related to the application of probabilistic techniques in the field of structural optimization.

This minisymposium is addressed to top researchers and specialists in probabilistic mechanics and structural optimization. It aims to attract academic staff, researchers, post-graduate students and professional engineers seeking for advanced methodologies in computational stochastic mechanics with emphasis on structural optimization applications.