

Efficient and Realistic Uncertainty Quantification

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Engineering structures and systems are increasingly characterized by a significant complexity. In addition, their environment is changing and only known to a limited extent. At the same time, our structures and systems are often quite critical for the functionality of our economic and societal life and, thus, require proper approaches and measures to verify their safety and to ensure their faultless operation. Performance and safety analysis, however, become increasingly complicated due to uncertainties associated with the structural and system formulations, their parameters and their environment. These uncertainties appear in various forms and may considerably influence the results of an analysis and the associated decisions. This poses a challenge for a suitable mathematical modeling and a numerically efficient analysis. This Mini Symposium aims at bundling developments in this regard in three areas:

- advanced stochastic modeling to capture the physics of the underlying problem with efficient approximate representations and solution methodologies
- generalized uncertainty modeling to cope with limited and vague information; this includes imprecise probabilities, fuzzy concepts, evidence theory, intervals, convex models etc.
- numerically efficient simulations including Monte Carlo techniques.

Contributions are invited with emphasis on theory, numerical methods and applications. These may address specific technical or mathematical details, conceptual developments and solution strategies, individual solutions, and may also provide overviews and comparative studies. Particular attention should be paid to practical applicability in engineering.