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NUMERICAL CONCEPTS FOR SUSTAINABLE ENGINEERING SOLUTIONS

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ABSTRACT

Sustainable engineering solutions are characterized by inherent robustness and flexibility as essential features for a faultless life of structures and systems under uncertain and changing conditions. An implementation of these features in a structure or system requires a comprehensive consideration of uncertainty in structural and environmental parameters as well as in the numerical models. This is indispensible for a reliable numerical analysis and prediction of the lifecycle of a structure or system under environmental processes associated with climate change. Challenges in this context involve, for example, limited information, human factors, subjectivity and experience, linguistic assessments, imprecise measurements, dubious information, unclear physics, etc. Due to the diverse nature of the available information both probabilistic and set-theoretical approaches are relevant for solutions.

This mini-symposium is meant to pool recent developments of numerical methods in the field of engineering sustainability. Developments which include a comprehensive consideration of uncertainty and associated efficient analysis techniques, such as advanced Monte Carlo simulation and meta-model approximations, are explicitly invited. These may involve probabilistic including Bayesian approaches, interval methods, fuzzy methods, imprecise probabilities and further concepts. The contributions 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.