

NUMERICAL METHODS FOR UNCERTAINTY QUANTIFICATION, MODEL CALIBRATION, INVERSE METHODS AND OPTIMISATION IN NONLINEAR DYNAMICS

2000 - VERIFICATION AND VALIDATION, UNCERTAINTY QUANTIFICATION
AND ERROR ESTIMATION

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ABSTRACT

Most natural phenomena and engineering problems are intrinsically nonlinear involving potentially many complex physical phenomena. Indeed, the nonlinearities may come from large amplitude vibrations, nonlinear material behaviour, contact interfaces, fluid-structure interactions, multi-physics coupling etc. The management of uncertainties is essential for determining reliable prediction of the nonlinear dynamic response.

This mini-symposium aims at gathering current works and fruitful discussions around the development of numerical methods for uncertainty quantification, model calibration, inverse methods and optimisation of nonlinear dynamic systems, or more generally on how to deal with numerous uncertainties and varying parameters and/or how to integrate nonlinear features in such numerical approaches. A non-exhaustive list of relevant topics includes the following:

- Nonlinear vibrations and bifurcation analysis
- Surrogate modelling
- Advanced design of experiments
- Parametric and structural optimisation
- Optimisation under uncertainty
- Model calibration under uncertainty
- Inverse problems, model updating and identification methods
- Multi-scale and multi-fidelity uncertainty propagation

Any applications that involve nonlinear dynamics are relevant to the MS.