

## **Applications of error estimation and model adaptation in Computational Mechanics**

A persistent trend in computational science and engineering is that problems become larger in scale and mathematical models more complex. Consequently, performing accurate simulations more than ever requires robust error estimation tools as well as suitable adaptive strategies.

Nowadays, the field of error estimation and adaptivity, known as *model verification*, goes beyond classical discretization error assessment and mesh refinement. It currently includes adaptive modeling, where the aim is to adaptively control surrogate models which have been obtained by model reduction techniques. Furthermore, it focuses on new specific aspects which are relevant for engineering purposes, such as goal-oriented procedures, the computation of guaranteed (upper and lower) error bounds for a large class of physical problems, or the control of errors due to uncertainty.

The objective of the mini-symposium is to present the recent fundamental advances, both in error estimation and adaptive methods, that aim at providing methods to control simulation models effectively.

We anticipate contributions on the following topics :

- estimation of discretization and modeling errors;
- stability, convergence and optimality analysis;
- goal-oriented and adjoint/duality-based techniques;
- methods leading to guaranteed error bounds, such as construction of equilibrated fields;
- hierarchical, reduced-order and multiscale modeling;
- error estimation and adaptive schemes for stochastic problems;
- applications to linear, nonlinear, coupled, or time-dependent problems.

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