

Advanced techniques for data assimilation, inverse analysis, and data-based enrichment of simulation models

Organizer:

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Abstract:

The use of experimental data in association with simulation models has become an active research topic. Indeed, new sensing facilities (such as those related to image-based or optic fiber-based technologies) now enable to collect a large and diversified amount of data, and these may be used to identify and validate complex models, or to enhance predictions made by simulation tools. However, many challenges dealing with data filtering, uncertainty quantification, management of computational cost, or numerical robustness, need to be addressed in order to incorporate data efficiently.

The goal of this mini-symposium is to present, in both deterministic and stochastic contexts, recent fundamental advances in data assimilation, inverse methods, and hybrid modeling. With regards to innovative and powerful numerical approaches which emerged recently, we anticipate contributions on the following topics:

- use of model reduction or adaptive/multi-fidelity strategies;
- real-time sequential model updating for DDDAS;
- applications in multiscale or multi-physics contexts;
- physics-informed algorithms for deep learning from data;
- analysis of full-field measurements and large data;
- representation and propagation of modeling and measurement errors;
- goal-oriented model updating;
- experimental design.