

## NONLINEAR APPROXIMATION METHODS FOR COUPLED PROBLEMS

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### ABSTRACT

Real-time or embedded simulations as well as Uncertainty Quantification require reduced order models in particular for coupled systems. It is by now well understood that linear approximation schemes cannot simultaneously respect the internal structure of coupled systems and yield sufficiently small system sizes for the above requirements.

On the other hand, nonlinear methods have shown to offer significant potential – since they allow for a large variety of schemes such as reduction on manifolds, deep learning, data-based models, nonintrusive methods, adaptivity, space-time coupling, and many more.

There are several recent advances using nonlinear techniques which will be addressed in this session with particular emphasis on coupled problems.