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MODEL ORDER REDUCTION FOR NONLINEAR (TIME, SPACE, PARAMETER) MULTISCALE PROBLEMS AND APPLICATIONS

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ABSTRACT

Numerical simulation is nowadays an essential part of many branches of engineering. However, the incredible changes in computing resources over the past decade have struggled to compensate for the increasing complexity of the models that engineers would like to be able to handle in their design and optimization process. The resolution of problems with a very large number of degrees of freedom, nonlinearities, with the presence of several scales or interactions between several physics, or the desire to take into account uncertainties or variations in parameters, are nowadays very rich research topics.

In this context, model reduction techniques offer enormous potential for developing innovative tools for high-performance computing. The purpose of this Mini-Sympoisium is to focus on recent developments in Reduced Basis (RB) approaches, Proper Orthogonal Decomposition (POD) and Proper Generalized Decomposition (PGD) methods for the numerical solution of models involving partial differential equations. Other model reduction strategies and data-based methods are also welcome, in order to foster cross-fertilization of ideas and their synergy.

This Mini-Symposium will discuss the latest advances in model reduction techniques dedicated to nonlinear, time and/or space multiscale, or parametrized problems, especially (but non only) in the context of solid mechanics. Particular attention will be paid to works that present applications of methods in relation to industrial challenges.