Preface

This volume contains selected peer-reviewed contributions from the MoRePaS conference, Model Reduction of Parametrized Systems, third edition, held at SISSA, International School for Advanced Studies, Trieste, Italy on October 13–16, 2015: http://www.sissa.it/morepas2015, following its 2009, first edition, in Münster (hosted by the Westfälische Wilhelms-Universität Münster, Germany) and 2012, second edition, Schloss Reisensburg (hosted by Ulm University, Germany). The next MoRePaS 2018 will be in Nantes, France.

The MoRePaS workshop series aims to foster international exchange of new concepts and ideas in numerical analysis, applied mathematics, engineering, scientific computing, and programming with respect to the following topics:

– Reduced basis methods
– Proper orthogonal decomposition
– Proper generalized decomposition
– Approximation theory related to model reduction
– Learning theory and compressed sensing
– Stochastic and high-dimensional problems
– System-theoretic methods
– Nonlinear model reduction
– Reduction of coupled problems/multiphysics
– Optimization and optimal control
– State estimation and control
– Reduced order models and domain decomposition methods
– Krylov subspace and interpolatory methods
– Application to real, industrial and complex problems

The model reduction community is growing rapidly and during the past decade has achieved a high level of visibility in the computational science and engineering (CSE) global community, as is evident from the 30 contributions selected to appear in this special volume, which cover a broad range of modern topics as well as applications. A further collection of open access posters related to MoRePaS 2015 is available at www.scienceopen.com, doi:10.14293/S2199-1006.1.SOR-MATH.CLI8YJR.v1.

The MoRePaS organization also supports a website (www.morepas.org) collecting research software, preprints, organization of annual PhD student summer schools, open positions and several other activities.

This book represents the current state of the art in developments in applied mathematics, computational mathematics and engineering to deal with the increase in the complexity of modelled systems, to improve parametric computing, to deal with uncertainty quantification and to develop real-time computing. The need for a computational collaboration between full order classical discretization techniques and reduced order methods is highlighted.

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