

NONLINEAR AND DEEP LEARNING BASED MODEL REDUCTION FOR COUPLED PROBLEMS

SILKE GLAS^{*} AND KARSTEN URBAN[†]

^{*} University of Twente, Department of Applied Mathematics
Hallenweg 19, 7522NH Enschede, The Netherlands
Email: s.m.glas@utwente.nl

[†] Ulm University, Institute for Numerical Mathematics
Helmholtzstr. 20, 89081 Ulm, Germany
Email: karsten.urban@uni-ulm.de

ABSTRACT

Real-world coupled problems often involve parameters, and the arising parameterized coupled problems need to be solved in real-time, for many different parameters and/or on devices with restricted CPU and/or memory. In such situations, model reduction is a must. There has been significant progress in model reduction over the past decade. However, problems involving, e.g., transport or hyperbolic effects cannot efficiently be reduced with standard linear reduction techniques. There are several recent advances using nonlinear techniques and deep learning approaches for model reduction, which will be addressed in this session with particular emphasis on coupled problems.