

NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING
SEMINAR

*Reduced-Order Models for Parametrized PDE Models with
Constraints*

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Abstract: Model order reduction techniques are effective for solving parametrized models involving PDEs, including models of incompressible flow, where the constraint is the incompressibility constraint, and in optimal control, where the constraints themselves are PDEs. However, reduced models may fail to be inf-sup stable. We present a new approach for generating reduced bases in this scenario, using a so-called stacked reduced basis, which avoids some of the difficulties associated with inf-sup stability. We show that this approach is effective although in some circumstances it also requires stabilization, which can be done using either classic methods of penalization or through Petrov-Galerkin methods. Computational tests are presented for models based on PDE-constrained optimization and incompressible flow.

This is joint work with Kayla Davie, Applied Mathematics Program, University of Maryland at College Park

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