Energy-stable Galerkin Reduced Order Models for Prediction and Control of Fluid Systems

Abstract. The focus of this talk is the construction of POD/Galerkin ROMs for real-time prediction and control of fluid systems. An energy stability analysis reveals that the inner product employed in the Galerkin projection step of the model reduction dictates the ROM's stability. For linearized compressible flow, a symmetry transform leads to a stable formulation for the inner product. Stability of the proposed ROM is demonstrated on several model problems. Extensions involving flow control are described.

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