

Talk: Model reduction of conservation laws: nonlinear approximations and optimal projection.

Speaker: Tommaso Taddei (Inria)

Abstract:

Abstract: We present projection-based model reduction of parametrized steady nonlinear conservation laws, with emphasis on shock-dominated flows in aerodynamics. The main features of the formulation are (i) an optimally-weighted least-square Petrov-Galerkin (minimum residual) reduced-order model; and (ii) a nonlinear compression method based on coordinate transformations (registration) that provide rapid convergent approximations of the solution set. We demonstrate the framework for parametrized aerodynamics problems modeled by the compressible Euler equations. We illustrate the influence of the choice of the norm on the performance of minimum residual reduced-order models; we further discuss the importance of registration to enhance performance of linear compression techniques and also to facilitate mesh adaptation.