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Arbitrary Lagrangian Eulerian framework for efficient projection-based reduction of convection dominated nonlinear flows[1] RAMBOD MOJGANI, MACIEJ BALAJEWICZ, Univ of Illinois - Urbana — One of the main hurdles in projection-based model reduction techniques is the efficient approximation of convective features, specially moving shocks and sharp gradients. These features typically require a very large number of reduced basis to reach the desired precision. In this talk, we introduce details of a new Arbitrary Lagrangian Eulerian (ALE) reduction framework that significantly out-performs traditional approaches. At the heart of this method is an optimization problem to solve for a low-rank grid deformation. That is, we seek global basis functions for both the state of the system and the positions of the computational grid in the parameter space. This proposed method is general in that it is not limited to a single wave speed or direction. This method is successfully applied to the reduction of several hyperbolic and parametric elliptic partial differential equations.

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