

Abstract Submitted
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Lagrangian dimensionality reduction of convection dominated nonlinear flows MACIEJ BALAJEWICZ, RAMBOD MOJGANI, University of Illinois at Urbana-Champaign — We introduce a new projection-based model reduction approach for convection dominated nonlinear fluid flows. In this method the evolution of the fluid is approximated in the Lagrangian frame of reference. More specifically, global basis functions are utilized for both the state of the system and the positions of the Lagrangian computational domain. In this approach, wave-like solutions exhibit low-rank structure and thus, can be approximated efficiently using a small number of reduced bases. The proposed approach is successfully demonstrated for the reduction of several simple but representative flow problems.

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