

Abstract Submitted
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Reduced order flow control using input-output hidden Markov model¹ PALASH SASHITTAL, DANIEL BODONY, University Of Illinois at Urbana-Champaign — In this work we extend the cluster based reduced order modeling framework to partially observed fluid systems with a control oriented perspective. We employ a data-driven model learning approach coupled with a closed-loop control strategy. Model parameters are learned using expectation maximization in the presence of scarce and noisy data. Two feedback controller design methods are proposed to control the long term behavior of the system. We demonstrate the performance of the controllers by controlling the transitions of the Lorenz system and to suppress the nonlinear vortex shedding past an inclined flat plate. The application of hidden Markov model based control to primary atomization of a liquid jet in a high-speed gas co-flow will be discussed.

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Palash Sashittal
University Of Illinois at Urbana-Champaign

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