

Abstract Submitted
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Prediction capabilities in a turbulent flow field JULIE AUSSEUR,
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— Part of our continuous efforts to implement an optimal closed-loop feedback control of the flow over a NACA 4412 airfoil is the development of an accurate model of the flow state. Combining several low-dimensional techniques, such as the Proper Orthogonal Decomposition (POD) and the modified Linear Stochastic Measurement (mLSM), we are able to access real-time information on the flow state just by sensing the pressure on the surface of the airfoil. In previous studies (Glauser et al. 2004), we have demonstrated using a simple proportional feedback control that the first POD coefficient estimated through the mLSM procedure alone contains this valuable information. In 2001 Ukeiley et al. derived a dynamical system able to predict the temporal dynamics of the POD modes and therefore of the flow. This presentation will mainly focus on the different methods that we are applying to solve this low-dimensional set of ODEs. We will present and discuss our prediction results as well as their incorporation in a more elaborate control system.

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