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**Nonlinear model-order reduction for oscillator flows using POD-DEIM** MIGUEL FOSAS DE PANDO, PETER J. SCHMID, LadHyX, CNRS-Ecole Polytechnique, DENIS SIPP, ONERA/DAFE — The design of control laws for fluid systems often relies on the prediction given by a reduced-order model of the response of the flow to actuations. Model-order reduction techniques have successfully been applied to flows exhibiting linear behavior. However, in many cases of practical interest the effect of nonlinearities must be incorporated to assess the dynamics of the flow. In this work, we present an extension to the POD-DEIM technique introduced by Chaturantabut and Sorensen (2010) to derive reduced-order models from flow solvers with minimal development effort. This technique will be demonstrated on the compressible flow around a NACA0012 airfoil featuring limit-cycle oscillations. Attention will then be focused on the accuracy and the robustness of the POD-DEIM reduced-order model at off-design conditions, and its application to flow control.

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