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Application of system-identification by ARMarkov and sensitivity analysis to noise-amplifier models NICOLAS DOVETTA, PETER SCHMID, Ecole Polytechnique, DENIS SIPP, ONERA-DAFE, BEVERLEY MCKEON, CalTech — Separated flow often exhibit amplification of external noise sources via an interaction with shear layer instabilities. In order to manipulate this amplification process we consider a data-based control design strategy. The first step is to build a state-space representation of the input-output transfer function. An autoregressive representation is used that explicitly includes Markov parameters (ARMarkov). This is then coupled with the eigensystem realization algorithm (ERA) which yields a reduced-order state-space representation of the problem. In real experiments the data is contaminated by measurement noise or by non-linearities which are not accounted for by the present approach. In order to enforce robustness of the identification-realization procedure a sensitivity analysis of the algorithm is performed. These sensitivities provide quantitative criteria to find the most robust way of identifying the system using the ARMarkov/ERA algorithm. The system-identification and sensitivity framework will be demonstrated on the Ginzburg-Landau equation. Support from the Partner University Fund (PUF) is gratefully acknowledged.

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