

Non-intrusive reduced-order modeling of combustor flow

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Abstract: A non-intrusive reduced basis method is proposed for the quasi-1D continuous variable resonance combustor (CVRC) flow, which is a typical complex non-linear time-dependent problem. The reduced basis from a collection of high-fidelity solutions is extracted via proper orthogonal decomposition (POD). The coefficients of reduced basis are approximated by artificial neural networks (ANNs). The offline stage consists of the generation of reduced basis and the training of ANNs, while the online stage only perform evaluation of the reduced basis coefficients via the ANNs. Therefore, the proposed reduced basis method is efficient. Numerical results demonstrate that, the proposed method can recover unsteady solution of the CVRC flow with physical parametrization accurately and efficiently.