Adaptive Reduced-Order Modeling using a Goal-Oriented PGD approach

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ABSTRACT

The talk will deal with a formulation aiming at adaptively constructing goal-oriented reduced-order models, that is, reduced-order models built and adapted towards the approximation of quantities of interest. The main idea behind the goal-oriented approach is to formulate a constrained minimization problem that includes refined information in the goal functionals so that the resulting model be capable of delivering enhanced predictions of the quantities of interest [1]. Such a paradigm represents a departure from standard goal-oriented approaches where the model is first derived by minimization of the energy, or of the residual functional, and subsequently adapted via a greedy approach by controlling a posteriori error estimates measured in terms of quantities of interest using dual-based error estimates [2]. In the present approach these dual-based error estimates – or rather the corrections they suggest – are directly incorporated into the constrained primal problem. Subsequently, the formulation will be applied to the so-called Proper Generalized Decomposition method [3], an instance of reduced-order modeling methods, with the aim of providing cheap and accurate solution maps for quantities of interest of solutions of parametric boundary value problems. Numerical examples will illustrate the performance of the proposed methodology.

REFERENCES

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