GALERKIN PROPER ORTHOGONAL DECOMPOSITION METHODS FOR PARAMETER DEPENDENT ELLIPTIC SYSTEMS

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Abstract

Proper orthogonal decomposition (POD) is a powerful technique for model reduction of linear and non-linear systems. It is based on a Galerkin type discretization with basis elements created from the system itself. In this work, error estimates for Galerkin POD methods for linear elliptic, parameter-dependent systems are proved. The resulting error bounds depend on the number of POD basis functions and on the parameter grid that is used to generate the snapshots and to compute the POD basis. The error estimates also hold for semi-linear elliptic problems with monotone nonlinearity. Numerical examples are included.

Keywords: proper orthogonal decomposition, elliptic equations, error estimates.


References


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