

A reduced basis method for parametrized variational inequalities with nonlinear constraints

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ABSTRACT

We investigate new developments of the Reduced-Basis (RB) method for parametrized optimization problems with nonlinear constraints. In this work, we propose a reduced-basis scheme in a saddle-point form combined with the Empirical Interpolation Method to deal with the nonlinear constraint. In this setting, a ‘primal’ reduced-basis is needed for the primal solution and a ‘dual’ one is needed for Lagrange multipliers. We suggest to construct the latter using a ‘cone-projected’ hierarchical algorithm that conserves the non-negativity of the dual basis vectors. The reduction strategy is applied to elastic frictionless contact problems including the possibility of using non-matching meshes. We study test cases that are inspired from existing work on finite elements for contact mechanics. The numerical examples confirm the efficiency of the reduction strategy.

REFERENCES

- [1] AMINA BENACEUR. *Model reduction for nonlinear thermics and mechanics*. Ph. D. thesis, 2018.