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INTERPOLATED MODELS FOR NON-INTRUSIVE AFFINIZATION OF REDUCED BASIS METHODS

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Reduced Basis Methods (RBMs) promise fast solutions of parametrized problems arising from a wide variety of backgrounds. Such methods can be used to enable real-time response, control and efficient algorithms for inverse problems.

Although the solution step of an RBM is fast, a great deal of care must be taken to ensure fast assembly. In particular, the problem must be fully or approximately affine in the parameter space. This is generally a process that involves expert knowledge not only of the specific problem and the parameters under consideration, but also of the full-order model (FOM) being used to construct the RBM. This process is rarely generalizable and highly intrusive. See for example [2].

We present AROMA, a general framework for *nearly* non-intrusive RBMs for building re-usable joint component models [1] for jacket structures. Such components require extensive variation in geometry. Problems like these are almost never affine, but by interpolating system matrices in the parameter space we are nevertheless able to achieve appreciable accuracy without impacting speed.

To achieve rapid deployment in industry applications, a core aim has been mimimal intrusiveness. To this end, AROMA only requires knowledge from the FOM about the system matrix and load vector, as well as information about which degrees-of-freedom are fixed.

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