Abstract

Reduced Basis Methods (RBMs) have become a powerful tool for efficiently reducing parametrized partial differential equations (PPDEs). We are particularly concerned with time-dependent problems. There are two main approaches for RBM for time-dependent problems, (1) using a standard time-stepping scheme and a POD-Galerkin method (Haasdonk, Ohlberger) to construct a reduced evolution; (2) to consider a space-time variational formulation in Bochner spaces (Patera, U.).

We will first introduce both approaches and discuss differences and similarities. Then, we focus on (2) and show how a space-time inf-sup theory yields sharp error bounds and highly reduced systems for online computations. We discuss different space-time problems.