

Stochastic model reduction using low-rank separated representations

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This talk is concerned with the approximation of PDEs/ODEs with high-dimensional random inputs where the issue of curse-of-dimensionality is a bottleneck. We will present a model reduction approach based on the sums of separated functions and discuss conditions under which the proposed technique requires a computational complexity that is *linear* in the number of random inputs. We describe both intrusive and non-intrusive (with standard random sampling) constructions of such representations.

We then demonstrate how separated representations can be applied for a partitioned treatment of the uncertainty space in domain coupling problems. The novelty of the proposed approach is that the propagation of uncertainty is achieved through a sequence of approximations with respect to the dimensionality of the uncertainty of each individual domain and not the combined dimensionality.