

Estimating the n-width of solution manifolds of parametric PDE's

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Numerous model reduction methods, such as reduced basis and its generalization, proper orthogonal decomposition, generalized empirical interpolation, rely on the implicit assumption that the solution manifold that gathers the solution to a PDE as parameters vary can be well approximated by low dimensional spaces. This is made more precise by assuming that the Kolmogorov n-width of the manifold has certain decay. In this talk, I shall discuss strategies that allow to rigorously establish rates of decay for the Kolmogorov n-width of solution manifolds associated with relevant parametric PDE's. One key result is that the rate of decay of n-width of sets in Banach space is almost preserved under the action of holomorphic maps.

Joint work with Ronald DeVore.