

Krylov Subspaces and Their Application to Model Order Reduction

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Abstract

Given a matrix H and vector r , the n -th Krylov subspace $\mathcal{K}_n(H, r)$ is the space spanned by the vectors $r, Hr, H^2r, \dots, H^{n-1}r$. Krylov subspaces are used extensively in numerical linear algebra, but computing a basis for one is non trivial. I will explain why explicitly computing Hr, H^2r, H^3r is not numerically feasible, and discuss a few strategies for generating a basis for a Krylov subspace. Finally, I will talk about how Krylov subspaces are used in my field of research, Model Order Reduction.

- I'll assume the audience is familiar with some basic concepts in Linear Algebra, such as eigenvectors, and the notion of a subspace spanned by a set of vectors. Also, to understand model reduction it would help to have familiarity with differential equations and Taylor series approximation.
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