

Subspace methods for computing pseudospectral quantities

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The pseudospectrum of a matrix and associated quantities, such as the pseudospectral abscissa, are well-established tools for, e.g., quantifying the stability of a matrix under perturbations. Among the applications is the robust analysis and control of linear control systems that are subject to uncertainties. In this talk, we will introduce subspace methods for computing quantities associated with pseudospectra, very much inspired by the methodology of reduced basis methods for parameter-dependent PDEs. More specifically, we propose to combine a reduced basis approach with a linearly converging iterative method by Guglielmi and Overton. We prove local quadratic convergence for one of the resulting subspace methods. Extensive numerical experiments demonstrate the robustness and efficiency of the method. *This talk is based on joint work with Bart Vandereycken.*