On the usage of spectral information about matrices arising from parallel-in-time integration

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Abstract

In the development of iterative solvers for linear systems information about the spectrum of the system matrix is of large importance. For normal matrices this information alone suffices to accurately describe the behavior of the method.

As the all-at-once systems arising from time integration are non-normal, this information is much less useful. Nevertheless spectral information is used to analyze numerical methods, e.g., using local Fourier analysis. To overcome the low accuracy of the obtained bounds block techniques like semi-algebraic mode analysis have been proposed and for preconditioning results from the literature on Krylov subspace methods can be applied. Finally, we recently extended the concept of the generating symbol to provide more accurate predictions.

In the talk an overview about the different approaches of using spectral information to analyze parallel-in-time methods will be provided.