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Preconditioned Iterative Methods for Weighted Toeplitz Least Squares Problems

Saturday, 11 June 2022 12:15 (30 minutes)

In this talk we consider the problem of finding effective preconditioners for linear systems of the form $Hx = y$ where
H = A$^T DA + \lambda^2 L^T LwhereAandLarestructuredmatrices(e.g., Toeplitz)$,D$isadiagonalmatrix, and\lambda$ is a scalar. These linear systems can arise when iteratively computing approximations to nonlinear inverse problems. Typically in these applications the matrix D changes at each nonlinear iteration, but A and L remain constant. Benzi and Ng [1] considered linear systems of this form, and proposed an effective variant of constraint preconditioning and a Hermitian/skew-Hermitian splitting (HSS) preconditioner. In this talk we consider an alternative approach based on low-rank matrix approximations.

References

[1] M. Benzi, M. K. Ng Preconditioned Iterative Methods for Weighted Toeplitz Least Squares Problems SIAM J. Matrix Anal. Appl., 27 (2006), pp. 1106–1124.

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