Clarissa Garvey

Approximate SVD preconditioners for large-scale inverse problems

Department of Math & CS
400 Dowman Drive W401
Atlanta GA 30322
ccgarve@emory.edu
James Nagy

In this talk we consider solving large-scale ill-posed linear inverse problems by iterative methods. Convergence can be accelerated using preconditioning, but if not done carefully, it can lead to erratic convergence behavior that results in fast convergence to a poor approximate solution. It has been shown that effective preconditioners can be obtained from approximate spectral or singular value decompositions (SVD) of the matrix that models the forward operator. We present a new technique to compute an approximate SVD preconditioner based on Kronecker product decompositions, and show that the preconditioner can be computed very efficiently for inverse problems arising in imaging applications. Performance will be illustrated on a variety of numerical examples.