Numerical Analysis and Scientific Computing Seminar

Image Deblurring with Krylov Subspace Methods

Per Christian Hansen
Technical University of Denmark

Abstract: Image deblurring, i.e., reconstruction of a sharper image from a blurred and noisy one, involves the solution of a large and very ill-conditioned system of linear equations, and regularization is needed in order to compute a stable solution. Krylov subspace methods are often ideally suited for this task: their iterative nature is a natural way to handle such large-scale problems, and the underlying Krylov subspace provides a convenient mechanism to regularized the problem by projecting it onto a low-dimensional "signal subspace" adapted to the particular problem. In this talk we consider the three Krylov subspace methods CGLS, MINRES, and GMRES. We describe their regularizing properties, and we discuss some computational aspects such as preconditioning and stopping criteria.

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