Numerical Analysis and Scientific Computing Seminar

Iterative regularization methods for large-scale linear inverse problems

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Abstract: Inverse problems are ubiquitous in many areas of Science and Engineering and, once discretized, they lead to ill-conditioned linear systems, often of huge dimensions: regularization consists in replacing the original system by a nearby problem with better numerical properties, in order to find a meaningful approximation of its solution. After briefly surveying some standard regularization methods, both iterative (such as many Krylov methods) and direct (such as Tikhonov method), this talk will introduce a recent class of methods that merge an iterative and a direct approach to regularization. In particular, strategies for choosing the regularization parameter and the regularization matrix will be emphasized, eventually leading to the computation of approximate solutions of Tikhonov problems involving a regularization term expressed in some p-norms.

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