Iterative Methods for Tihkonov Regularization

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ABSTRACT

Consider the ill-posed problem of the form $Ax = y$, where A is a linear bounded (compact, in particular) operator on an in¯nite dimensional Hilbert space. Tikhonov's regularization will be applied to solve for a solution to the equation. We shall report some results on iterative approaches to Tikhonov's regularization. The ideas will then used to study the following penalized least squares problem:

$$\min_{u \in L^2(\Omega)} \frac{1}{2} \| Ax - z \|^2 + \alpha J_\beta(z);$$

where $J_\beta = \int_\Omega \sqrt{|\nabla u|^2 + \beta^2}.$