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Abstracts of Short Communications and Posters

Section:

15. Numerical Analysis and Scientific Computing

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On the a-posteriori patameter choice in regularization methods

Consider the equation $Au = f$ with linear bounded operator A from one Hilbert space to another. The range $\mathcal{R}(A)$ of A may be non-closed. Instead of $f \in \mathcal{R}(A)$ available is f_δ, $\|f_\delta - f\| \leq \delta$. In the iterated Tikhonov method we take $u_{\alpha,0} = u_0$, find iteratively $u_{\alpha,n} = (\alpha I + A^*A)^{-1}(\alpha u_{\alpha,n-1} A^* f_\delta)$ for $n = 1, \ldots, m$ and take $u_\alpha := u_{\alpha,m}$. Let u_* be the nearest to u_0 solution of $Au = f$. Let $b =$ const > 1. As known, the pseudo-optimal error estimate holds by choice of $\alpha = \alpha_1$ by Raus-Gferer rule from the equation $(Au_\alpha - f_\delta, Au_{\alpha,m+1} - f_\delta)^{1/2} = b\delta$. We propose to choose $\alpha = \alpha_2$ from equation $(Au_\alpha - f_\delta, Au_{\alpha,m+1} - f_\delta) = b\|Au_{\alpha,m+1} - f_\delta\|\delta$. One may prove that $\|u_{\alpha_2} - u_*\| \leq \|u_{\alpha_1} - u_*\|$.