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Abstracts of Short Communications and Posters

Section:

8. Analysis

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Convergence rates of regularized approximation processes
Let $\{T_\alpha\}$, $\{S_\alpha\}$ be two nets of bounded linear operators such that $\|T_\alpha\| = O(\alpha)$, $S_\alpha \to I$ strongly, and $S_\alpha A \subset AS_\alpha = (e(\alpha))^{-1}(T_\alpha - I)$, where A is a closed linear operator and $e(\alpha) \to 0$. It is shown that $\{T_\alpha\}$ is saturated with the order $O(e(\alpha))$, its saturation class being the completion of the domain $D(A)$ of A relative to the space X. Under suitable conditions, we further describe, in terms of K-functionals, those x for which the convergence rate of $\{T_\alpha x\}$ is of the order $O(f(\alpha))$, where f satisfies $0 < e(\alpha) \leq f(\alpha) \to 0$. In case A is unbounded and $f(\alpha)/e(\alpha) \to \infty$, the non-optimal rate is seen to be sharp. The general results provide a unified approach to dealing with convergence rates of many particular approximation processes.