

Convergence analysis of the LSQR method for compact operator equations

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In this work we study the behaviour of the LSQR algorithm in the solution of the linear equation $Ax = b$ where A is a compact operator between two separable Hilbert spaces and $b \in \mathcal{R}(A)$ the range of A . We present a rigorous analysis concerning the existence of a Krylov solution, and new results on the rate of convergence in terms of an ℓ_p sequence where p depends on the summability of the singular values of the operator. We also study the approximation of the singular values of the operator obtained by the bidiagonal matrices derived from the Lanczos bidiagonalisation algorithm.