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**Computing Singular Values of Large Matrices with an  
Inverse Free Preconditioned Krylov Subspace Method**

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We present an efficient algorithm for computing a few extreme (largest and smallest) singular values and corresponding singular vectors of a large sparse  $mn$  matrix  $C$ . Our algorithm is based on reformulation of the singular value problem as an eigenvalue problem for  $C^T C$  and, to address the clustering of singular values, we use an inverse-free preconditioned Krylov subspace method to accelerate convergence. We consider preconditioning that is based on robust incomplete factorizations and we discuss various implementation issues such as deflations. Numerical tests will be presented to demonstrate efficiency and robustness of the new algorithm.