T. Nikazad, R. Davidi and G.T. Herman, Accelerated perturbation-resilient block-iterative projection methods with application to image reconstruction, *Inverse Problems*, Vol. 28, 035005 (19pp), (**2012**). DOI:10.1088/0266-5611/28/3/035005.

Abstract

We study the convergence of a class of accelerated perturbation-resilient block-iterative projection methods for solving systems of linear equations. We prove convergence to a fixed point of an operator even in the presence of summable perturbations of the iterates, irrespective of the consistency of the linear system. For a consistent system, the limit point is a solution of the system. In the inconsistent case, the symmetric version of our method converges to a weighted least-squares solution. Perturbation resilience is utilized to approximate the minimum of a convex functional subject to the equations. A main contribution, as compared to previously published approaches to achieving similar aims, is a more than an order of magnitude speed-up, as demonstrated by applying the methods to problems of image reconstruction from projections. In addition, the accelerated algorithms are illustrated to be better, in a strict sense provided by the method of statistical hypothesis testing, than their unaccelerated versions for the task of detecting small tumors in the brain from *x*-ray CT projection data.