

Implementation of Block Algebraic Iterative Reconstruction Methods

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Two standard row-projection methods are routinely used for solving the ill-posed sparse linear systems arising in tomographic image reconstruction: Algebraic Reconstruction Techniques (ART) and Simultaneous Iterative Reconstruction Techniques (SIRT). Block methods are hybrids of ART and SIRT, which apply a partitioning of the linear system in order to achieve the fast convergence of ART and the parallel properties of SIRT. The block methods can be separated into two classes: methods that, in each iteration, access the blocks in a sequential manner, and methods that compute a result for each block in parallel and then combine these results before the next iteration. In this talk, we consider the implementations of both classes of block methods and demonstrate the semiconvergence and the performance of our implementations by examples taken from tomographic imaging. We also consider the use of a relaxation parameter "training" strategy, proposed recently for the standard algorithms, for controlling the semiconvergence of the block algorithms.