On Single Projection Kaczmarz Extended Type Algorithms

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The Kaczmarz Extended (KE) algorithm has been proposed by the author in [2, 3] as an extension of the Kaczmarz-Tanabe algorithm from [4], to inconsistent linear least squares problems. It uses in each iteration orthogonal projections onto the hyperplanes determined by all the rows and all the columns of the system matrix. Recently, in the paper [5], the authors proposed a single projection KE type algorithm, which in each iteration uses orthogonal projections onto the hyperplanes determined by only one row and one column. If the projection row and column indices $i$ and $j$ are selected at random with probability proportional with a certain quotient of the norm of the $i$-th row, and $j$-th column, respectively, they prove that the sequence of approximations so generated converges in Expectation to a least square solution of the problem.

In this paper we propose two single projection KE type algorithms, in which the projection indices are selected in an almost cyclic, and remote control manner, respectively (see e.g. [1]). We prove that the sequence of approximations generated in each case converges in norm to a least square solution of the problem.

References


