Convergence acceleration of row action methods

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During the last decades, the class of the *row projection*, also called *row-action*, *methods* for solving a (possibly large) system of linear equations received much attention since they have several interesting properties (i.e. no changes to the original matrix and no operations on the matrix as a whole). Although the convergence of these methods is quite slow, many acceleration schemes have been proposed, based on different techniques.

Here we present some results already obtained for Kaczmarz's method [2] and new results on Cimmino's method [3]. The acceleration is based on sequence transformations [1]. Two algorithms are proposed: in the first one the accelerated sequence is obtained directly by using the sequence obtained by the original method (Accelerated algorithm); in the second algorithm, the accelerated sequence, is computed by restarting the original method from a vector obtained by an extrapolation method (Restarted algorithm).

Numerical results for both Kaczmarz and Cimmino methods will be presented.

References

[1] C. Brezinski, M. Redivo-Zaglia, *Extrapolation Methods. Theory and Practice*, North Holland, Amsterdam, 1991.

[2] C. Brezinski, M. Redivo-Zaglia, *Convergence acceleration of Kaczmarz's method*, Journal of Enginering Mathematics, to appear.

[3] C. Cimmino, *Calcolo approssimato per le soluzioni dei sistemi di equazioni lineari*, La Ricerca Scientifica, II, 9 (1938), pp. 326–333.