

Iterative methods with constant and variable coefficients for computing matrix inverses

Marko Petković

*University of Niš, Faculty of Sciences and Mathematics, Višegradska 33, 18000 Niš
e-mail: dexterofnis@gmail.com*

Mihailo Krstić

*University of Belgrade, Faculty of Mathematics, Studentski trg 16, 11158 Beograd
e-mail: mihailo.krstic@matf.bg.ac.rs*

Kostadin Rajković

*University of Niš, Faculty of Sciences and Mathematics, Višegradska 33, 18000 Niš
e-mail: kosta.rajkovic@gmail.com*

Abstract. We present several iterative methods for computing matrix inverse of the matrix A as well as several generalized matrix inverses. Two classes of methods are considered:

1. methods of the form $X_{k+1} = X_k p(AX_k)$ where $p(x)$ is the polynomial with constant coefficients;
2. methods of the form $X_{k+1} = X_k \left(a_0^{(k)} I + a_1^{(k)} AX_k \right)$ where $a_0^{(k)}$ and $a_1^{(k)}$ are coefficients computed in each iteration.

Convergence properties are studied, as well as the orders of convergence and computation efficiencies of these methods. They are verified on the several numerical examples.

Keywords: iterative method; generalized inverse; convergence

References

- [1] **M.D. Petković**, Generalized Schultz iterative methods for the computation of outer inverses, *Computers & Mathematics with Applications* 67:10 (2014), 1837-1847.
- [2] **M.D. Petković**, **M.S. Petković**, Hyper-power methods for the computation of outer inverses, *Journal of Computational and Applied Mathematics* 278 (2015), 110-118.
- [3] **M.D. Petković**, **M.A. Krstić**, **K.P. Rajković**, Rapid generalized Schultz iterative methods for the computation of outer inverses, *Journal of Computational and Applied Mathematics* 344 (2018), 572-584.