

Parallel algorithms of cyclic sweep method

D.L.Golovashkin¹, M.V. Filatov²

¹*Image Processing Systems Institute of RAS*

²*Samara State Aerospace University(SSAU)*

Abstract:

The work is devoted to the development of parallel algorithms of cyclic sweep method for solving strip-type grid equations. Two approaches to the net domain partitioning are considered: linear and cyclic decomposition. Each approach is applied to the development of algorithms using the right and counter cyclic sweeps. An analytical and experimental comparison of the proposed algorithms is performed, their advantages and disadvantages are revealed.

Keywords: cyclic sweep method, strip-type grid equations, algorithms

Acknowledgments: This work was supported by the Russian-American Program for Basic Research and Higher Education (BRHE), as well as the Foundation for the Promotion of Russian Science, a grant from the President of the Russian Federation (No HIII-1007.2003.01), and a grant from the Russian Foundation for Basic Research (No 04-07-90149).

Citation: Golovashkin DL, Filatov MV. Parallel algorithms of cyclic sweep method. *Computer Optics* 2005; 27: 123-130.

[Access full text \(in Russian\)](#)

References:

- [1] Samarski AA, Nikolaev ES. Método de Solución de las ecuaciones reticulares. Moscú: Editorial Mir; Tomo I 1982, Tomo II 1983.
- [2] Golub GH, Van Lown ChF. Matrix calculations. The Johns Hopkins University Press; 1996. ISBN: 978-0-8018-5413-2.
- [3] Ortega JM. Introduction to parallel and vector solution of linear systems. New York: Springer Science+Business Media; 1988. ISBN: 978-0-306-42862-3.
- [4] Mirenkov NN. Parallel algorithms for solving problems on homogeneous computer systems [In Russian]. *Vychislitel'nyye Sistemy* 1973; 57: 3-32.
- [5] Golovashkin DL. Application of the method of counter runs for the synthesis of a parallel algorithm for solving grid equations of tridiagonal type. *Computer Optics* 2002; 24: 33-39.
- [6] Lester BP. The art of parallel programming. Prentice Hall International (UK) Limited; 1993. ISBN: 978-0-13-045923-7.