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MHD modeling of phenomena in the solar corona using an absolutely implicit scheme.
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Zh. Vychisl. Mat. Mat. Fiz. 44, No. 10, 1873-1897 (2004); translation in *Comput. Math. Math. Phys.* 44, No. 10, 1784-1806 (2004).

Summary: We develop an absolutely implicit finite-difference scheme for solving a system of three-dimensional equations of magnetohydrodynamics with dissipative terms for a compressible plasma. The solution is obtained by the iterative method. We stipulate the possibility of specifying boundary conditions by the method of characteristics. The scheme is intended for modeling structures, such as a current sheet, with sharp variations of the magnetic field in space plasma. The main application of the method is in modeling energy accumulation for solar flares. We give examples of the simulation results. The method can also be used to model other processes in space plasma: X-ray bright points, corona loops, coronal plasma ejections into interplanetary space, plasma jets in the Russian-American active experiment in the magnetosphere, and solar wind formation due to corona expansion.

Reviewer: [Evgenij Nechaev \(Moskva\)](#)

MSC:

[85A30](#) Hydrodynamic and hydromagnetic problems in astronomy and astrophysics

[76W05](#) Magnetohydrodynamics and electrohydrodynamics

[85-08](#) Computational methods for problems pertaining to astronomy and astrophysics

Keywords:

[implicit finite-difference scheme](#); [MHD simulation](#); [current sheet](#); [solar flares](#)

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