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A novel lattice Boltzmann model for the Poisson equation. (English) Zbl 1145.82344

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Summary: In this paper, a novel lattice Boltzmann model is proposed to solve the Poisson equation through modifying equilibrium distribution function. Compared with previous models, which can be viewed as the solvers to diffusion equation, the present model is a genuine solver to the Poisson equation, and the transient term derived by previous models is eliminated. Numerical solutions agree well with analytical solutions, which indicates the potential of the present model for solving the Poisson equation.

MSC:

82C70 Transport processes in time-dependent statistical mechanics

Cited in **49** Documents

65N99 Numerical methods for partial differential equations, boundary value problems

Keywords:

lattice Boltzmann method; the Poisson equation; Chapman-Enskog expansion

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