FAST PREDETERMINED EQUILIBRIUM DYNAMICS APPLIED TO MAGNETIC SYSTEMS

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In this paper, a fast algorithm for implementing the method [1] is proposed for consideration. Its application to the problem of modeling microscopic magnetic dynamics is also shown.

Nowadays, the search for solutions to many-body physical problems by numerical modeling attracts much attention of reseachers. Indeed, traditional energy-based approaches is very difficult to find for a large number of particles, considered as a unified system.

Therefore, it is important to develop alternative and optimal numerical schemes that bypass the formation of the solution by the Hamiltonian treatment. Original approach is presented in [1].

The goal of this paper is to improve this method and apply it to the physical systems. Our idea is to reconstruct the distribution function of the total magnetic moment using distinct algorithm. For this purpose, we suggest a fast numerical scheme for its implementation. It appeared possible to increase the performance of the method by efficiently representing operations over the entire phase space. Achieved acceleration could be several orders of magnitude without losing accuracy.

As a physical application, the spin dynamics of the magnetic system is reconstructed. This algorithm also makes it easier to statistically estimate many key parameters and properties of such systems.

1. I. V. Kashin, AIP Conference Proceedings 2313, 030048 (2020)