

Solving Vlasov-Maxwell equations by using Hamiltonian splitting

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Abstract

In this paper, we consider the structure of the Vlasov-Maxwell equations based on the Morrison-Marsden-Weinstein Poisson bracket. To get a numerical solution to preserve the Poisson bracket, we construct the numerical methods by splitting the Hamiltonian of the Vlasov-Maxwell equations into five parts, and we can solve each subsystem exactly. The theoretical results and numerical experiments are given by choosing the appropriate spatial discretization.