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Meshless symplectic radial basis procedure for solving KdV equation. (Chinese. English summary) Zbl 07366769

Summary: Based on radial basis function (RBF) theory, this study suggests a meshless symplectic approximation for a class of conservative equations. Specifically, Korteweg-de Vries (KdV) equation is chosen as an illustration. We get a Hamiltonian ODE by discretizing Hamiltonian functional and Poisson bracket with RBF interpolation. Then the symplectic algorithm is derived by integrating the resulting system with Euler-centered scheme. The convergence of the algorithm is discussed. Numerical experiments verify the theoretic results.

MSC:
65P10 Numerical methods for Hamiltonian systems including symplectic integrators

Keywords:
meshless method; radial basis function; conservative law; symplectic integrator; KdV equation