

Conserved quantities of some Hamiltonian wave equations after full discretization

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Hamiltonian PDEs have some invariant quantities, which would be good to conserve with the numerical integration. In this talk, we concentrate on the nonlinear wave and Schrödinger equations. Under hypotheses of regularity and periodicity, we study how a symmetric space discretization makes that the space discretized system also has some invariants or ‘nearly’ invariants which well approximate the continuous ones. The good approximation of them after time integration is studied under some assumptions when using symplectic Runge-Kutta methods or symmetric linear multistep methods for second-order systems.