

*Superconvergence of the structure-preserving trigonometric collocation methods for solving the nonlinear Hamiltonian wave equations*

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This work is devoted to the error estimate of the trigonometric collocation time integrators for solving the nonlinear Hamiltonian wave equations. We propose the trigonometric collocation time integrators, which could take full advantage of the oscillation introduced by the spatial discretisation. The superconvergence of the trigonometric collocation time integrators is rigorously analysed. Moreover, we also prove that the trigonometric collocation time integrators could be symmetric and symplectic with suitable collocation points. Numerical experiments verify our theoretical analysis results.