

A Trapezoidal-Like Integrator for the Numerical Solution of One-Dimensional Time Dependent Schrödinger Equation

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Abstract : In this paper, the one-dimensional time dependent Schrödinger equation is discretized by the method of lines using a second order finite difference approximation to replace the second order spatial derivative. The evolving system of stiff ordinary differential equation (ODE) in time is solved numerically by an L-stable trapezoidal-like integrator. Results show accuracy of relative maximum error of order 10^{-4} in the interval of consideration. The performance of the method as compared to an existing scheme is considered favorable.

Keywords : Schrodinger's equation, partial differential equations, method of lines (MOL), stiff ODE, trapezoidal-like integrator

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