

Abstract

Mohamed A Omar

The composite Milstein methods for the numerical solution of Ito stochastic differential equations

In this paper, we present the composite Milstein methods for the strong solution of Ito stochastic differential equations. These methods are a combination of semi-implicit and implicit Milstein methods. We give a criterion for choosing either the implicit or the semi-implicit scheme at each step of our numerical solution. The stability and convergence properties are investigated and discussed for the linear test equation. The convergence properties for the nonlinear case are shown numerically to be the same as the linear case. The stability properties of the composite Milstein methods are found to be more superior compared to those of the Milstein, the Euler, and even better than the composite Euler method. This superiority in stability makes the methods a better candidate for the solution of stiff SDEs.