Adaptive Step Size Implementations for Stiffly Accurate Runge-Kutta Method applied to Stochastic Differential Equations

Ratna Herdiana
ratna@maths.uq.edu.au
Dept. of Mathematics, The University of Queensland, Australia

An adaptive step size algorithm is introduced for the strong solution of stiff stochastic differential equations. The implementation is based on a pair of embedded implicit stochastic Runge-Kutta methods: a stiffly accurate method with two corrections of strong order 1 and a one correction method of strong order 0.5. The method of strong order 1 advances the numerical computation and the difference between the two numerical approximation is used for control of the local error. Two different stepsize control strategies are implemented: Standard and Predictive. The nonlinear algebraic system that arise at each step is solved using modified Newton iteration method. Numerical results which show the performance of the implementation are presented. In particular, Predictive control is shown to be more effective than standard error control.