Numerical solution of stochastic differential equation corresponding to continuous distributions

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Abstract: *We obtain special type of differential equations which their solution are random variable with known continuous density function. Stochastic differential equations (SDE) of continuous distributions are determined by the Fokker-Planck theorem. We approximate solution of differential equation with numerical methods such as: the Euler-Maruyama and ten stages explicit Runge-Kutta method, and analysis error prediction statistically. Numerical results, show the performance of the Rung-Kutta method with respect to the Euler-Maruyama. The exponential two parameters, exponential, Normal, Uniform, Beta Gamma and Parreto distributions are considered in this paper.*

Keywords *Stochastic differential equation, continuous distribution function, confidence interval, Euler-Maruyama method.*

MSC 2000: *Primary 65C20; Secondary 65C10, 65C99.*

1 Introduction and Preliminaries

Many Physical system are modeled by ordering differential equations. In many models for describing Physical phenomena, stochastic terms were omitted because there are not powerful numerical methods and high performance computers. Some applications of stochastic differential equations are Investment funds, Population dynamic, Polymer dynamic, Sntyk protein and Genetic Science. Also stochastic concepts apply in Chemical Movement models and Physic. History of appearance of stochastic differential equation has been a time to solve different physical and mathematical problems

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