论文

产生相关非高斯随机变量的扩散过程方法

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摘要
该文研究使用扩散过程产生相关非高斯随机变量。在遍历性假设的前提下，得到由随机微分方程(SDE)描述的Markov扩散过程的平稳分布，该分布由SDE模型中的漂移系数和扩散系数决定。选择扩散系数为x的一次幂，由待求随机变量所满足的平稳分布得到漂移系数，确定所需要的SDE，并使用Milstein高阶法求解此方程得到所需的随机变量。改变扩散系数中的常数可以改变所得随机样本的相关特性。以Nakagami分布和K-分布为例进行仿真分析，验证本文提出方法的准确性和有效性。
关键词 无线通信 随机微分方程 随机模型 非高斯分布 扩散过程
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The Generation of Correlated Non-Gaussian Random Variables with Diffusion Processes

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Abstract
Random variables of non-Gaussian distribution are produced by diffusion processes. Under the assumption of ergodicity, the stationary distribution of Markov diffusion processes described by a Stochastic Differential Equation (SDE) is obtained, which is determined by drift coefficient and diffusion coefficient. Let the drift coefficient be the first order power of x, and then the diffusion coefficient can be derived as a function of diffusion coefficient and aimed probability density function. As a result, the SDE is determined, and its solution by using Milstein high order method produces the aimed random variables. The correlation of the random samples can be adjusted through changing the constant of diffusion coefficient. Taking the Nakagami distribution and K-distribution as examples, simulation results are similar to the theoretical value, which validates the effectiveness of this method.
Key words Wireless communications Stochastic Differential Equations (SDE) Stochastic models Non-Gaussian distribution Diffusion processes
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扩展功能

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