A Stochastic Square of the Rayleigh Diffusion Process

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SUMMARY

This work describes a study of a new one-dimensional homogeneous stochastic process termed the square of the Rayleigh process. The model is based on the homogeneous stochastic Rayleigh diffusion process (cf. [1]) which is examined from the perspective of a nonlinear stochastic differential equation and used in various aspects of stochastic modelling such as physics, stochastic finance, demographic and economic (cf. [2]).

In this study, we first obtain the transition probability density function of the model after which we determine the trend functions (conditional and non-conditional). Then, the drift parameters are estimated by maximum likelihood on the basis of continuous sampling of the process (cf. [3]). Finally, in the diffusion coefficient, we consider the problem of parameter estimation, doing so by a numerical approximation.

Keywords: Rayleigh diffusion process, Stochastic differential equation, Trend function, Statistical inference in diffusion process.

AMS Classification: 60J60, 60J35, 62M86.

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