

**A STUDY OF A ONE-DIMENSIONAL BILINEAR DIFFERENTIAL MODEL
FOR STOCHASTIC PROCESSES**

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Abstract: This paper is concerned with a study of a one-dimensional bilinear differential model for stochastic processes in continuous time. We provide conditions for second-order and strict-sense stationarities of the state process. We obtain a linear representation of the state process, derive the optimal linear filter, and investigate its asymptotic behaviour. We consider the problem of parameter estimation for the autonomous version of the model. By the use of the quadratic variation of the process we compute the diffusion coefficient parameters. In the reduced model, under the additional assumption that the parameters of the diffusion coefficient are known, we use the maximum likelihood method and the method of moments, in order to estimate the drift coefficient parameters. We prove consistency and asymptotic normality of the estimates.

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