Estimating equations and inference from diffusion driven models

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Abstract

Diffusion-type models provide a natural and flexible framework for modeling phenomena that evolve continuously and randomly with time. However their statistical analysis is complicated. Only rarely the functional form of the likelihood function of a diffusion is explicitly known. The same problem of course occurs with diffusion driven models such as summed diffusions, integrated diffusions, and stochastic volatility models. General estimating equations often present a simple alternative means for fitting these models. I will illustrate the use of estimating equations for diffusion-type models driven by diffusions having linear drift and quadratic squared diffusion coefficient. I shall use the term Pearson diffusions as the invariant distributions of this class of diffusions belong to the Pearson system. Futher I will present a new goodness of fit test based on estimating equations for varying sampling frequencies. The basic idea is to compare the parameter estimates based on the full data to those obtained from downsamples. The test can be used to distinguish different kinds of diffusion driven models.

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