On parameter estimation for periodic diffusion processes II

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Abstract

We present a revue of several problems concerning parameter estimation for periodic diffusion process

$$\mathrm{d}X_t = S\left(\vartheta, t\right)\,\mathrm{d}t + b\left(X_t\right)\,\mathrm{d}t + \sigma\left(X_t\right)\,\mathrm{d}W_t, \quad X_0, \quad 0 \leq t \leq T.$$

observed in continuous time. We suppose that this process has ergodic properties. Here $S\left(\vartheta, t\right)$ is deterministic τ-periodic signal.

At particularly, we are interested by the shift $\left(S\left(\vartheta, t\right) = S\left(t - \vartheta\right)\right)$ and the scale $\left(S\left(\vartheta, t\right) = S\left(\vartheta t\right)\right)$ parameter estimation in the cases of smooth and discontinuous periodic functions $S\left(t\right)$. The asymptotic $\left(T \to \infty\right)$ properties of the maximum likelihood and bayesian estimators are described.