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## Estimation for Dynamical Systems with Small Noise from Discrete Observations

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**Abstract:** We consider an efficient estimation of an unknown parameter appearing in both the drift and the diffusion coefficient for a  $d$ -dimensional dynamical system with small noise. Asymptotic properties of an  $M$ -estimator obtained from an approximate quadratic martingale estimating function are stated. The sample path is observed at equidistant times  $k/n$ ,  $k = 0, 1, \dots, n$ . The type of asymptotics considered is when a small dispersion parameter  $\varepsilon$  goes to 0 and  $n$  goes to  $\infty$  simultaneously.

**Key words:** discrete time observation, dynamical systems with small noise,  $M$ -estimator, parametric inference, quadratic martingale estimating function

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