

## Goodness of fit test for ergodic diffusion processes

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**Abstract** A goodness of fit test for the drift coefficient of an ergodic diffusion process is presented. The test is based on the score marked empirical process. The weak convergence of the proposed test statistic is studied under the null hypothesis and it is proved that the limit process is a continuous Gaussian process. The structure of its covariance function allows to calculate the limit distribution and it turns out that it is a function of a standard Brownian motion and so exact rejection regions can be constructed. The proposed test is asymptotically distribution free and it is consistent under any simple fixed alternative.

**Keywords** Consistent test · Empirical process · Asymptotically distribution free tests