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Nonparametric entropy-based tests of independence between stochastic processes. (English)

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Summary: This article develops nonparametric tests of independence between two stochastic processes satisfying β-mixing conditions. The testing strategy boils down to gauging the closeness between the joint and the product of the marginal stationary densities. For that purpose, we take advantage of a generalized entropic measure so as to build a whole family of nonparametric tests of independence. We derive asymptotic normality and local power using the functional delta method for kernels. As a corollary, we also develop a class of entropy-based tests for serial independence. The latter are nuisance parameter free, and hence also qualify for dynamic misspecification analyses. We then investigate the finite-sample properties of our serial independence tests through Monte Carlo simulations. They perform quite well, entailing more power against some nonlinear AR alternatives than two popular nonparametric serial-independence tests.

MSC:

62G10 Nonparametric hypothesis testing
62M07 Non-Markovian processes: hypothesis testing
62B10 Statistical aspects of information-theoretic topics
62G20 Asymptotic properties of nonparametric inference
65C05 Monte Carlo methods
62M10 Time series, auto-correlation, regression, etc. in statistics (GARCH)
62P05 Applications of statistics to actuarial sciences and financial mathematics

Cited in **7** Documents

Keywords:

independence; misspecification testing; nonparametric theory; Tsallis entropy

Full Text: DOI

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