

Analytical Determination of Fractal Structure in Stochastic Time Series

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Current methods for determining whether a time series exhibits fractal structure (FS) rely on subjective assessments on estimators of the Hurst exponent (H). Here, I introduce the Bayesian Assessment of Scaling, an analytical framework for drawing objective and accurate inferences on the FS of time series. The technique exploits the scaling property of the diffusion associated to a time series. The resulting criterion is simple to compute and represents an accurate characterization of the evidence supporting different hypotheses on the scaling regime of a time series. Additionally, a closed-form Maximum Likelihood estimator of H is derived from the criterion, and this estimator outperforms the best available estimators.

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