THE INFLUENCE OF A SINGLE−TONE SINUSIOD OVER HURST ESTIMATORS (TueAmPO4)

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Abstract :

Hurst parameter is a common measure of the degree of self−similarity. Its estimation is an important issue where numerous methods have been proposed in the past and is still being proposed. In particular, estimation becomes intricate when the data contains periodicity, trend, noise, etc. These factors considerably affect the accuracy of Hurst parameter estimators. In this paper, we focus on periodicity and explore the behavior of three estimation methods under additive periodic component. For comparison, we choose a time domain estimator, Higuchi's Method, a frequency domain estimator, Wavelet Based Method and finally, a recently proposed, eigen domain estimator, Principal Component Analysis Based Method. We derive the analytical expressions for each of these estimators considering a 1/f signal with a single tone sinusoid buried into it. We also verify our results with simulations using a single tone sinusoid added to fractional Brownian motion (fBm) trace. We show that the magnitude and the frequency of the periodic component clearly affect the Hurst estimation.

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