Statistical Distributions of Time Series in the Frequency Domain and the Patterns of Violation of White Noise Conditions

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Abstract - This paper investigates the distinction between white noise processes and their non-white noise counterparts, an issue of considerable empirical relevance to financial strategy and economic policy, in the frequency domain; and further examines the associated features and patterns for the process where white noise conditions are violated. A frequency domain stochastic variable is derived to evaluate the property of a time series with regard to the above distinction and, based on which, three propositions are put forward to identify patterns of a time series where white noise conditions are violated. The procedure is then applied to US PPI to illustrate the application. While US PPI tends to exhibit the features of a time series with compound effects, these features cannot be strongly confirmed and statistically established.