Time-Dependent Hurst Exponent Calculated by Detrending Analysis

A. Carbone[1], *G. Castelli*[1], *and H. E. Stanley* [2]

[1] *Physics Department and INFM, Politecnico di Torino, Corso Duca degli Abruzzi, 24, I-10129 Torino, Italy*

[2] *Center for Polymer Studies and Department of Physics Boston University, Boston, Massachusetts 02215, USA*

The model of *mean reversion* in financial prices assumes the existence of some mechanism which works over long time horizons. The mean-reverting behavior of stock prices corresponds to the idea that a given change in prices will be followed, in long time horizons, by changes with the opposite sign. The time-dependent correlation parameter $H(t)$ is particularly interesting for financial application where the investment strategies should be adjusted on real-time. We investigate long-range power-law correlations in financial series by implementing two different detrending analysis methods, Dynamic Detrending Moving Average (DDMA) and Dynamic Detrended Fluctuation Analysis (DDFA). We calculate the Hurst exponent $H(t)$ as a function of time of artificial and financial time series using both the DDMA and the DDFA technique. Implementation of DDFA and DDMA algorithms is challenging in view of the analysis of multifractal properties of the series along with other techniques (higher-order power spectra, wavelet analysis) operating in the frequency domain.