Abstract

The main focus of the thesis is the introduction of new method for interpretation of fractality aspects of financial time series together with its application. We begin with description of various techniques of estimation of Hurst exponent – rescaled range, modified rescaled range and detrended fluctuation analysis. Further on, we present original theoretical results based on simulations of three mentioned procedures which have not been presented in literature yet. The results are then used in the new method of time-dependent Hurst exponent with confidence intervals developed in this thesis. Moreover, we show important advantage of using the mentioned techniques together to clearly distinguish between independent, trending, short-term dependent and long-term dependent properties of the time series. We eventually apply the proposed procedure on 13 different world stock indices and come to interesting results. To the author's best knowledge, the thesis presents the broadest application of timedependent Hurst exponent on stock indices yet.