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ABSTRACTS

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FRACTAL SCALING EXPONENT ESTIMATION IN FINANCIAL TIME SERIES ANALYSIS USING CONTINUOUS WAVELET TRANSFORM VIA DAUBECHIES WAVELETS

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In this article fractal scale exponent estimation approach using Continuous Wavelet Transform is considered. The goal of this article is to provide adequate fractal scale exponent estimation approach for financial time series data in capital markets using wavelet transforms. This approach should be beneficial for the most European and placeAsia stock index forecasting simulations.

In order to identify European and Asia stock index multiracial scaling exponent spectrum, Wavelet Transform Modulus Maxima (WTMM) method¹ is being used for skeleton function² estimation; multifractal formalism³ is checked using Fractal Partition Function⁴, which is analysed using Moment Generating Function⁵, consequently Local Scaling Exponents Spectrum⁶ is calculated. Multifractal Local Scaling Exponents Spectrum is parameterized with other methods.

In this article most European and placeAsia stock indexes are considered. Objects of experiment are 9 worldwide stock indexes: Dow Jones Industrial Average⁷, AEX, CAC40, DAX30, IBEX, FTSE100, Nikkei225, SMI, STI⁸. The Dow Jones Industrial Average index is considered for the whole available period: from 01/10/1928 to 11/11/2011, other mentioned indexes were analyzed during the following period: 05/07/1993 to 11/11/2011. Next The Dow Jones Industrial Average index analysis example is considered. In this research stock index multifractal nature is analysed.

¹<http://en.wikipedia.org>. Wavelet transform modulus maxima method. (Accessed 01 March. 2012.)

²<http://www.scholarpedia.org>. Wavelet-based multifractal analysis. (Accessed 01 March. 2012.)

³<http://www.maths.usyd.edu.au>. On the Multifractal Formalism.

<http://www.maths.usyd.edu.au/u/donaldc/gbrown/peyriere.pdf> (Accessed 01 March. 2012.)

⁴W. Wornell Signal Processing with Fractals: A Wavelet-Based Approach-G. Prentice-Hall, Inc.: Upper Saddle River, NJ, 1998- 626 page.

⁵A. Arneodo, N. Decoster, P. Kestener & S. G. Roux (2003). A wavelet-based method for multi- fractal image analysis: From theoretical concepts to experimental applications. Adv. Imaging Electr. Phys. 126, 1-92.

⁶H. Wendt & P. Abry (2007). Multifractality tests using bootstrapped wavelet leaders. IEEE Trans. Signal Process. 55, 4811–4820.

⁷<http://www.yahoo.com>. Dow Jones Industrial Average. Historical Prices.

<http://finance.yahoo.com/q/hp?s=%5EDJI+Historical+Prices> (Accessed 01 March. 2012.)

⁸<http://www.yahoo.com>. STRAITS TIMES INDEX. Historical Prices.

<http://finance.yahoo.com/q/hp?s=%5ESTI+Historical+Prices> (Accessed 01 March. 2012.)