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Impact of scaling range on the effectiveness of detrending methods

A comparative study of scaling range properties for detrended fluctuation analysis (DFA), detrended moving average analysis (DMA) and recently proposed new technique called modified detrended moving average analysis (MDMA) is presented.

Basic properties of scaling ranges for these techniques are reviewed. In particular, the efficiency and exactness of all three methods towards proper determination of scaling exponents is discussed, with emphasis given to short series of uncorrelated and persistent data.

Our findings should be particularly useful in local fluctuation analysis searching for local memory properties in data, e.g., in econophysics, finances, or physiology,

where the huge number of short time series has to be examined at once and wherever the preliminary check of the scaling range regime for each of the series separately is neither effective nor possible.