

Flexibly detrended multifractal fluctuation analysis

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Abstract

Multifractal time series analysis is a process that shows the possible complexity of the system. Nowadays, one of the most popular and the best methods for determining of multifractal characteristics is Multifractal Detrended Fluctuation Analysis (MF DFA). However, it has some drawbacks. One of its core elements is detrending of the series. In the classical MF DFA a trend is estimated by fitting a polynomial of degree m where $m = \text{const.}$. We propose that the degree m of a polynomial was not constant ($m \neq \text{const.}$) and its selection was ruled by established criterion. Taking into account the above amendment, we examine the multifractal spectra both for artificial and real-world mono- and the multifractal time series. Unlike classical MF DFA method, obtained singularity spectra almost perfectly reflects the theoretical results and for real time series we observe a significant right side shift of the spectrum.
