Signal Processing Approach to Study Multifractality and Singularity of Solar Wind Speed Time Series

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Abstract : This paper investigates the nature of the fluctuation of the daily average Solar wind speed time series collected over a period of 2492 days, from 1st January, 1997 to 28th October, 2003. The degree of self-similarity and scalability of the Solar Wind Speed signal has been explored to characterise the signal fluctuation. Multi-fractal Detrended Fluctuation Analysis (MFDFA) method has been implemented on the signal which is under investigation to perform this task. Furthermore, the singularity spectra of the signals have been also obtained to gauge the extent of the multifractality of the time series signal.