



Analysis and comparison of different methods to characterize turbulent environment

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The methods and approaches that can be used to analyze the hydrodynamic and magnetohydrodynamic turbulent flows are selected. It is shown that the best methods to characterize the types of turbulent processes are the methods of statistical physics.

Within the statistical approach we considered the fractal analysis (determination of fractal length and height of the maximum of the probability density fluctuations of the studied parameters), and multifractal analysis (study of a power dependence of high order statistical moments and construction of multifractal spectrum). It is indicated that the statistical analysis of properties of turbulent processes can be supplemented by the spectral studies: Fourier and wavelet analysis.

In order to test the methods and approaches we have used the magnetic field measurements from the space mission Cluster-II with a sampling frequency of 22.5 Hz in different regions of Earth's magnetosphere and solar wind plasma.

We got a good agreement between different approaches and their mutual complementing to provide a general view of the turbulence.

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