On the invariants of velocity and magnetic field gradient tensors in MHD theory

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In the framework of MHD turbulence, the velocity and magnetic field topological features can be characterized by three quantities invariant under rotations, which are defined by the velocity and magnetic field gradient tensors. These quantities provide information about field structures and dissipative features.

In this work we present a preliminary derivation of the evolution of the invariant quantities of the velocity and magnetic field gradient tensors in the framework of MHD theory, using a Lagrangian point of view. This work can be considered as a first step useful to characterize and describe the evolution of the fields structures in heliospheric space plasmas. Furthermore, some examples of the statistical features of magnetic field gradient tensor invariants, in the inertial and dissipation ranges, are also shown and discussed.