Lagrangian turbulence and anomalous transport

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The motion of a passive particle in a given velocity field can be considered from the viewpoint of dynamic systems theory. A two-dimensional time-dependent field and a three-dimensional field generate chaotic behaviour of liquid particles. The diffusion process of liquid particles is considered as a random walk process in the fractal space and time. This leads to anomalous transport properties of the particles. The notion of stochastic jets is introduced. A complete analysis is given for a special form of Beltrami flows – so-called Q-flows with symmetry of the order of Q.

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