

MECHANICS OF TURBULENCE

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Program:

Introduction. Mathematical description of turbulence. Mean values. Turbulent intensity. Spatio-temporal correlation functions. Stationarity and homogeneity. Stationary and homogeneous turbulence. Relevant turbulence scales. Generalities on the numerical solution of Navier Stokes equations. Reynolds equations. Kinetic energy of the mean flow. Turbulent kinetic energy equation. Vorticity dynamics. Vorticity in the Navier Stokes equations. Vorticity equation. Kelvin circulation theorem. Vortex stretching. Energy spectrum. Taylor hypothesis. Energy Cascade.

References:

Lanzoni, S. 2010. Advanced Fluid Mechanics