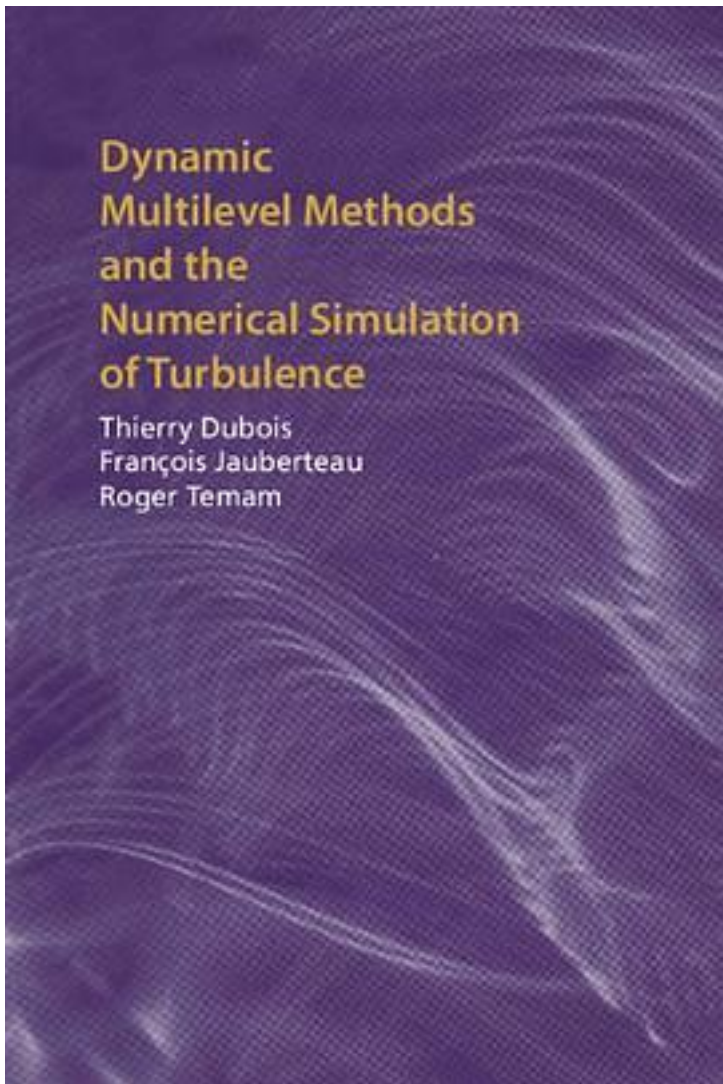


Dynamic Multilevel Methods and the Numerical Simulation of Turbulence



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This 1999 book describes the implementation of multilevel methods for the numerical simulation of turbulent flows. The general ideas for the algorithms presented stem from dynamical systems theory and are based on the decomposition of the unknown function into two or more arrays corresponding to different scales in the Fourier space. Before describing in detail the numerical algorithm, survey chapters are included on the mathematical theory of the Navier-Stokes equations and on the physics of the conventional theory of turbulence. The multilevel methods are applied here to the simulation of homogeneous isotropic turbulent flows as well as turbulent channel flows. The implementation issues are discussed in detail and numerical simulations of the flows cited above are presented and analysed. The methods have been applied in the context of the direct numerical simulation and are therefore compared to such simulations.

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