Sagaut, Pierre; **Cambon, Claude**
Homogeneous turbulence dynamics. (English) Zbl 1154.76003
Cambridge: Cambridge University Press (ISBN 978-0-521-85548-8/hbk). xvi, 463 p. (2008).

This book presents a state-of-art sum of the results and theories dealing with homogeneous turbulence dynamics. A large class of flows is covered: flows governed by anisotropic production mechanisms (e.g., shear flows) and flows without production but dominated by waves (e.g., homogeneous rotating or stratified turbulence). Compressible turbulent flows are also considered. In each case, the main trends are illustrated using computational and experimental results, and both linear and nonlinear theories and closures are discussed. Details about linear theories (e.g. rapid distortion theory and its variants) and nonlinear closures (e.g., EDQNM) are provided in the corresponding chapters, following by fully unified approach. The emphasis is on homogeneous flows, including several interactions (rotation, stratification, shear, shock waves, acoustic waves, and more) which are pertinent to many applications fields – from aerospace engineering to astrophysics and Earth sciences.

The volume will be of interest to all people involved in turbulence studies, as it highlights basic physical mechanisms that are present in all turbulent flows.

Reviewer: Felix Kaplanski (Tallinn)

MSC:

76-02 Research exposition (monographs, survey articles) pertaining to fluid mechanics
76F02 Fundamentals of turbulence
76F05 Isotropic turbulence; homogeneous turbulence

Keywords:

isotropic turbulence; anisotropic turbulence; incompressible turbulence; compressible turbulence

Full Text: DOI