

A new hypothesis on the anisotropic reynolds stress tensor for turbulent flows. Volume I: theoretical background and development of an anisotropic hybrid k-omega shear-stress transport/stochastic turbulence model

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Abstrak

This book gives a mathematical insight--including intermediate derivation steps--into engineering physics and turbulence modeling related to an anisotropic modification to the Boussinesq hypothesis (deformation theory) coupled with the similarity theory of velocity fluctuations.

Through mathematical derivations and their explanations, the reader will be able to understand new theoretical concepts quickly, including how to put a new hypothesis on the anisotropic Reynolds stress tensor into engineering practice. The anisotropic modification to the eddy viscosity hypothesis is in the center of research interest, however, the unification of the deformation theory and the anisotropic similarity theory of turbulent velocity fluctuations is still missing from the literature. This book brings a mathematically challenging subject closer to graduate students and researchers who are developing the next generation of anisotropic turbulence models.