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Sommario/riassunto

This book presents topics in a single source format using unified spectral theory of computing. With developments of DNS and LES, practitioners are rediscovering waves as important in fluid flows, and capturing these numerically is central to high accuracy computing. Analysis of waves and its use in numerical methods in propagating energy at the right velocity (dispersion effects) and with right amplitude (dissipation) are essential. Most industrial codes using Reynolds-averaged Navier-Stokes equations with turbulence models cannot conceive of capturing waves. The new themes covered in this book are:

- Correct error propagation analysis
- Practical compact schemes and global analysis tool
- Aliasing error and its alleviation
- Spurious upstream propagating q-waves
- Explanation of the Gibbs phenomenon
- New 1D and 2D filters for LES/DNS without SGS modelling
- Anisotropic skewed wave propagation
- Development and analysis of dispersion relation preservation (DRP) schemes
- Flow instabilities and wave propagation phenomena
