Numerical simulations of turbulent shear layer using MUSCL schemes

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Abstract

Computational simulations have been performed to study the structure of two-dimensional turbulent shear
layer. The governing equations are the two-dimensional, compressible Euler equations with ideal gas law.
Spatial derivatives are evaluated using third-order-accurate MUSCL type MOC schemes and time advancement
is via the second-order-accurate LU-SSOR scheme. Numerical results indicate that the predicted axial mean
velocity, vorticity thickness, streamwise turbulence intensity, lateral turbulence intensity, and Reynolds stress for
Mc = 0.51 free shear layer are in good agreement with existing experimental data and other predictions using
different numerical schemes. This suggests that the present computational fluid dynamics (CFD) code is valid
for further analysis of turbulent free shear layers.

Keyword：Shear layer, MUSCL, MOC, LU-SSOR