Department of Mechanical Engineering

ME534 Advanced Graduate Fluid Mechanics

Homework #4, due 06-08-18

Problem 1

The Corrsin-Kistler equation relates the vorticity with the Reynolds stresses, demonstrating that there can be no real turbulence without vorticity. Show this mathematically and describe the physical connection between the two (can you have a spatial gradient of turbulent flux of momentum in a region where vorticity is zero?) and whether the reciprocal condition applies (there can be no vorticity without turbulence?).