FLUENT - Turbulent Pipe Flow (LES)

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Turbulent Pipe Flow (LES)

Created using ANSYS 13.0

Problem Specification

Consider fluid flowing through a cylindrical pipe of diameter *D = 0.0127 m* and length *L = 5D = 0.0635 m*. The bulk velocity at the pipe inlet is U_{bulk} *= 6.58 m /s*. Let us consider the case where the density of the fluid is constant. Take density *= 1.331 kg/ m*^{3} *_and coefficient of viscosity _μ = 2.34 x 10*$^{-5}$ *kg/(ms).* The Reynolds number *Re* based on the pipe diameter and the bulk velocity is

$$\mathrm{Re} = \frac{\rho U_{bulk} D}{\mu} \approx 4750$$

Solve the above fluid flow problem using the LES capability in FLUENT via ANSYS Workbench. Plot the mean and the root mean square velocities versus the radial distance at a particular x/D downstream of the inlet. Compare the mean velocity obtained from the LES simulation with the mean velocity obtained using the k- model.

Go to Step 1: Pre-Analysis & Start-Up

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