Homework: 2

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Problem: flow in a pipe

Case 1 output :

**Velocity = 100 m/s**

Characteristics Reynolds number = 68055.55555555555

Integral eddy length scale (m) = 0.007000000000000001

Turbulence intensity = 0.03981182026283784

Turbulent kinetic energy per unit mass (m^2/S^2) = 37.14799295251185

Energy dissipation rate per unit mass (m^2/S^3) = 2911.035496453359

Specific dissipation rate per unit mass (1/S) = 870.7021908513282

Kolmogorov length scale (m) = 0.0001816939376561729

Kolmogorov time scale (s) = 0.00022466967528739682

Kolmogorov velocity scale(m/s) = 0.8087158955642346

Kolmogorov Reynolds number = 0.9999999999999998

Fricion coefficient cf = 0.004891152405414061

shear stress tau = 29.95830848316113

friction velocity u\_tau (m/s)= 4.9452767391795485

y1 = 2.971295303780757e-05

y100 = 0.002971295303780757

Reynolds turbulent l\_avg = 290.35499447694997

Taylor length scale (m) = 0.004330241669421395

Turbulent viscosity (kg/ms) = 0.052263899005851

Case 2 Output

**Velocity = 10 m/s**

Characteristics Reynolds number = 6805.555555555555

Integral eddy length scale (m) = 0.007000000000000001

Turbulence intensity = 0.053089915573928365

Turbulent kinetic energy per unit mass (m^2/S^2) = 0.6605951099172285

Energy dissipation rate per unit mass (m^2/S^3) = 6.90315303253722

Specific dissipation rate per unit mass (1/S) = 116.11000325318072

Kolmogorov length scale (m) = 0.0008233612749339762

Kolmogorov time scale (s) = 0.004613648008886699

Kolmogorov velocity scale(m/s) = 0.1784620918951852

Kolmogorov Reynolds number = 1.0

Fricion coefficient cf = 0.008697835613910174

shear stress tau = 0.5327424313519982

friction velocity u\_tau (m/s)= 0.6594632519674684

y1 = 0.00022281571425219104

y100 = 0.022281571425219103

Reynolds turbulent l\_avg = 38.71946080706764

Taylor length scale (m) = 0.011858018808653234

Turbulent viscosity (kg/ms) = 0.0069695029452721755