

Problem: 2D Viscous flow between the plates

Water is injected between two infinite parallel plates. Solve analytically (in the case of fully developed laminar flow) and numerically (general case) and compare the results. Plot velocity profile across the channel and pressure drop along the channel.

Parameters

flow velocity $V=0.001\text{m/s}$;

height of the channel $h=0.4\text{m}$; length of the channel $L=2\text{m}$

dynamic viscosity (water) $\mu=10^{-3}\text{ Pa}\cdot\text{s}$; density (water) $\rho=10^3\text{ kg/m}^3$

Questions:

- What is the Reynolds number?
- What is the calculated pressure drop in the channel? What is the entrance pressure drop?
- Is laminar flow fully developed in the channel?

