# Tutorial 4: Pressure Transients in a helium network

# Problem Description:

A flow circuit with Helium gas as the fluid inside is considered in Figure 7. Sudden closure of valves at the outlet of branches 1 and 2 is the transient condition (instantaneous flow reduction to zero can be assumed). The evolution of pressure in the circuit at the midpoint of pipe2 must be estimated. Each pipe has a length of 10 m and a diameter of 0.5 m. A friction factor of 0.02 can be assumed. Node1 pressure is fixed as 700 kPa. The mass source in node2, node3, and node 4 are -11.61 kg/s, -12.37 kg/s and -11.61 kg/s respectively.

Diagram, schematic

Description automatically generated

Figure 7: Schematic of Flow Circuit for Problem 3.2.1

# Results

The evolutions of pressure at point A predicted by the code and reported in [3] are shown in Figure 8. Both the curves match reasonably well, thus giving confidence in predicting pressure transients by PINET code in complex flow networks.

Chart

Description automatically generated

Figure 8: Evolution of Pressure at Pipe2 Midpoint (Problem 3.2.1)