# Tutorial 5: Blowdown of a helium tank

# Problem Description:

In this problem, the blowdown of a pressure vessel through a pipe has been considered. The pipe has a length of 10 m and a diameter of 0.1 m. The steady-state upstream and downstream pressures are 700 kPa and 650 kPa, respectively. The pressure in the upstream vessel varies, as shown in equation (25). Helium

|  |  |  |
| --- | --- | --- |
|  |  | (25) |

Where t is in s. It is required to estimate the transient flow rate through the pipe.

# Results

The evolution of the mass flow rate in the pipe is shown in Figure 9, along with the values reported in [3]. The values match very well. This problem is an example of a slow transient. The problem was simulated with a relatively large time step size (10 s) without any convergence or accuracy issue. Thus, the code can handle fast as well as slow transients efficiently.

Chart, line chart

Description automatically generated

Figure 9: Evolution of Flow Rate (Problem 3.2.2)