Consider a steady one-dimensional flow with varying density through the nozzle below:

\[ \rho_1 V_1 \]

\[ A_1 \]

\[ A_2 \]

\[ \rho_2 V_2 \]

Determine \( \rho_2 \) as a function of \( \rho_1 \), the device geometry, and the velocities at the inlet and exit.

1. **Choice of the CV**

2. **General expression of the governing equation**

3. **Assumptions**

   A1:

   A2:
4- Reduced governing equation

5- Study of the fluxes across the CS

6- Solution to the governing equation