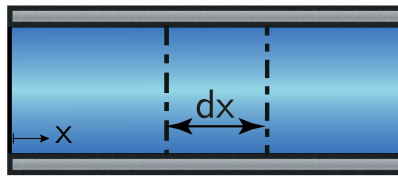


# Control Volume - Conv. - I.E. 1

Through a very long pipe with diameter  $D$  flows a heat-generating fluid (homogeneous and constant source strength  $\dot{\Phi}''' > 0$ ). In addition, the pipe has a uniform, constant wall temperature  $T_w < T(x)$ .

Pick the correct control volume for setting up the energy balance to calculate the temperature profile of the fluid in the flow direction. If needed, also define the coordinate system.



**Defining the domain:**

The temperature profile in the flow direction needs to be determined. The temperature profile can be derived from setting up the energy balance of an infinitesimal element in the flow direction and defining its boundary and/or initial conditions. Therefore an energy balance around an infinitesimal element with the flow-direction being parallel to the  $x$ -direction is suitable.