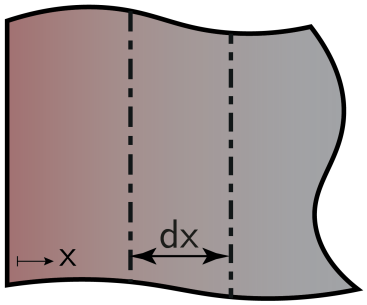
Control Volume - Cond. - IE 17

A very thick wall $\mathrm{Fo} \ll 1$, initially at a homogeneous temperature T_0, is heated up at the left-hand side. Pick the control volume used for deriving the energy balance that results in the heat conduction equation. Assume one-dimensional transient conditions without sources or sinks at constant atmospheric pressure. If needed, also define the coordinate system.



Defining the domain:

The temperature profile in a body can be determined by solving the heat equation. The heat equation yields from setting up an energy balance of an infinitesimal element inside the relevant body.

The temperature only when moving from left to right, which we will as the x-direction. Therefore a one-dimensional infinitesimal element in Cartesian coordinates is suitable for solving the problem.