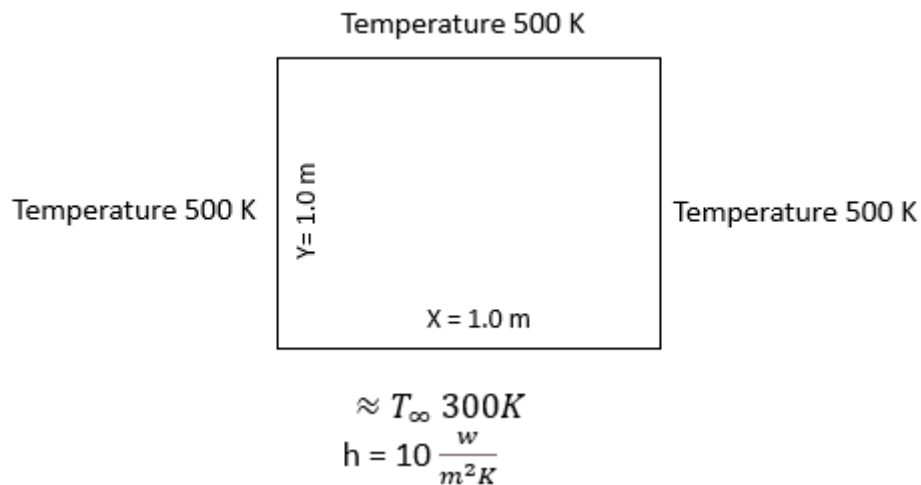


Example Problem 1:

Solve the following heat transfer problem with appropriate boundary conditions and assume thermal conductivity of the material $K = 1.0$

$$\frac{w}{mK}$$



Boundary conditions

Left wall

$T = 500 \text{ K}$

Right wall

$T = 500 \text{ K}$

Top wall

$T = 500k$

Dirichlet boundary
condition

Bottom wall

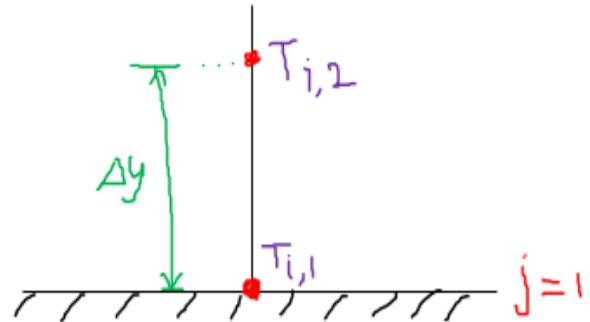
Mixed boundary condition

For heat transfer – convective boundary condition

$$\left. \frac{-K \partial T}{\partial y} \right|_{j=1} = h(T|_{j=1} - T_{\infty})$$

Apply forward difference
approximation

$$-K \frac{T_{i,2} - T_{i,1}}{\Delta y} = h(T_{i,1} - T_{\infty})$$



$$T_{i,1} = \frac{T_{i,2} + \frac{h\Delta y}{K} T_{\infty}}{1 + \frac{h\Delta y}{K}}$$