



$$\Rightarrow 0 = A_{inner} c_p \frac{\partial T_{inner}}{\partial t} - \dot{v} c_p \frac{\partial T_{inner}}{\partial z} = -U_{inner} \alpha_{inner} (T_{inner} - T_{outer})$$

$$0 = A_{outer} c_p \frac{\partial T_{outer}}{\partial t} + \dot{v} c_p \frac{\partial T_{outer}}{\partial z} = U_{inner} \alpha_{inner} (T_{inner} - T_{outer}) + U_{outer} \alpha_{outer} (T_{ambien} - T_{outer})$$

$$T_{outer}(z=L) = T_{inner}(z=L)$$

$$T_{inner}(z=0) = \dots \text{ something } \rightarrow \text{Dirichlet BC}$$