



### Region 1

Water Balance

$$\dot{m}_w C_{pw} (\Theta_{i+1} + \Theta_i) = \dot{q}_{wa} = \frac{(T_a - \Theta_{i+1})}{R_{pipe}}$$

Air Balance

$$\underbrace{\dot{m}_a C_{pa} T_a}_{\text{This term is incorrect}} = -\dot{q}_{wa} + \dot{q}_o = -\frac{(T_a - \Theta_{i+1})}{R_{pipe}} + \frac{(T_e - T_a)}{R_{ext}}$$

### Region 2

Water Balance

$$\dot{m}_w C_{pw} (\Theta_{i+2} - \Theta_{i+1}) + Q_{Receiver}$$

Air Balance

$$\dot{m}_a C_{pa} T_a + Q_{module\_loss}$$

