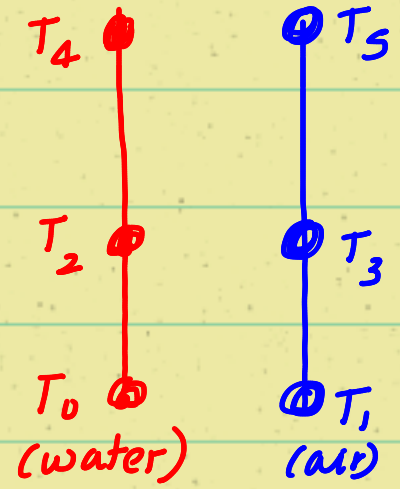

$$\dot{m}_w C_{pw}(T_2 - T_0) = \frac{1}{R}(T_3 - T_2)$$

$$\dot{m}_a C_{pa}(T_3 - T_1) = \frac{1}{R}(T_2 - T_3) + \frac{1}{R_e}(T_e - T_3) + \frac{1}{R_i}(T_i - T_3)$$

$$\dot{m}_w C_{pw}(T_4 - T_2) = \dot{Q}_w$$

$$\dot{m}_a C_{pa}(T_5 - T_3) = \dot{Q}_a$$

$$\begin{bmatrix} \dot{m}_w C_{pw} + \frac{1}{R} & -\frac{1}{R} & 0 & 0 \\ -\frac{1}{R} & \dot{m}_a C_{pa} + \frac{1}{R} + \frac{1}{R_e} + \frac{1}{R_i} & 0 & 0 \\ -\dot{m}_w C_{pw} & 0 & \dot{m}_w C_{pw} & 0 \\ 0 & -\dot{m}_a C_{pa} & 0 & \dot{m}_a C_{pa} \end{bmatrix} \begin{bmatrix} T_2 \\ T_3 \\ T_4 \\ T_5 \end{bmatrix} = \begin{bmatrix} \dot{m}_w C_{pw} T_0 \\ \dot{m}_a C_{pa} T_1 + \frac{T_e}{R_e} + \frac{T_i}{R_i} \\ \dot{Q}_w \\ \dot{Q}_a \end{bmatrix}$$