$$\theta_j(x = \mathrm{X}_1, t) = \theta_{j+1}(x = \mathrm{X}_1, t) \tag{3.1}$$

$$-k_j \left.\frac{\partial \theta_j}{\partial x}\right|_{x=\mathrm{X}_1} = -k_{j+1} \left.\frac{\partial \theta_{j+1}}{\partial x}\right|_{x=\mathrm{X}_1} \tag{3.2}$$

where:

$k_i$ : conductivity of $i^{th}$ layer
$T_A$ : ambient air temperature

Assumptions:

$$S(t) = S_0 \tag{3.3}$$

$$\dot{Q}_W(t) = A(u(\theta_S - T_R)) \tag{3.4}$$

where:

$$\frac{1}{u} = \frac{1}{h_o} + \sum_j \frac{X_j}{k_j} + \frac{1}{h_i} \tag{3.5}$$

$h_o$ : outer convection coefficient
$h_i$ : inner convection coefficient