(3) Evaporative cooling:

$$(bd\rho_w C_w \frac{\partial T_w}{\partial t} + \dot{m}_w C_w \frac{\partial T_w}{\partial y})dy = [\tau_1 S(t) - Q_r - Q_c - Q_e + h_1(\theta_1|_{x=0} - T_w)]bdy \quad (4.1)$$

$$Q_r = h_r(T_w - T_A) \quad (4.2)$$

$$Q_c = h_c(T_w - T_A) \quad (4.3)$$

$$Q_e = 0.013h_e[p(\bar{T}_w - \gamma p(\bar{T}_A)] \quad (4.4)$$

where:

τ_1 : fraction of solar radiation absorbed by water
Q_r : radiative heat
Q_c : convective heat flux
ρ : saturated partial pressure
$\left.\begin{matrix} h_r \\ h_e \\ h_c \end{matrix}\right\}$: respective heat transfer coefficient

$$P(T) = R_1 T + R \quad (4.5)$$

on simplification,

$$M_w \frac{\partial T_w}{\partial t} + \dot{m}_w C_w \frac{\partial T_w}{\partial y} = bH(T_S - T_w) + bh_1(\theta_1|_{x=0} - T_w) \quad (4.6)$$

$$T_s = \frac{1}{H}(\tau_1 S(t) + H_1 T_A(t) - R_0 R_2(1 - r)) \quad (4.7)$$

$$H = h_r + h_c + R_0 R_1 \quad (4.8)$$

$$H_1 = h_r + h_c + rR_0 R_1 \quad (4.9)$$

$$R_0 = 0.013h_c \quad (4.10)$$

$$M_w = bdC_w S_w \quad (4.11)$$

$$\dot{Q}(y,t) = h_i[\theta|_{x=x_4} - T_R] \quad (4.12)$$