$$\tau_q \frac{\partial^2 T}{\partial t^2} + \frac{\partial T}{\partial t} + \frac{\omega_b \rho_b c_b}{\rho c}(T - Tb) = \alpha \left(1 + \tau_T \frac{\partial}{\partial t}\right)\frac{\partial^2 T}{\partial x^2} + \frac{Q_m}{\rho c}$$

$\tau_q, \omega_b, \rho_b, c_b, \rho, c, \alpha, \tau_T, T0, q, Tb, L, k$ and Q_m are constant and positive.

Initial conditions:

$$T(x, 0) = T0$$

$$\frac{\partial T}{\partial t}(x, 0) = 0$$

Boundary conditions:

$$-k\frac{\partial T}{\partial x}(0, t) = q$$

$$-k\frac{\partial T}{\partial x}(L, t) = 0$$