Nondimensionalized Model

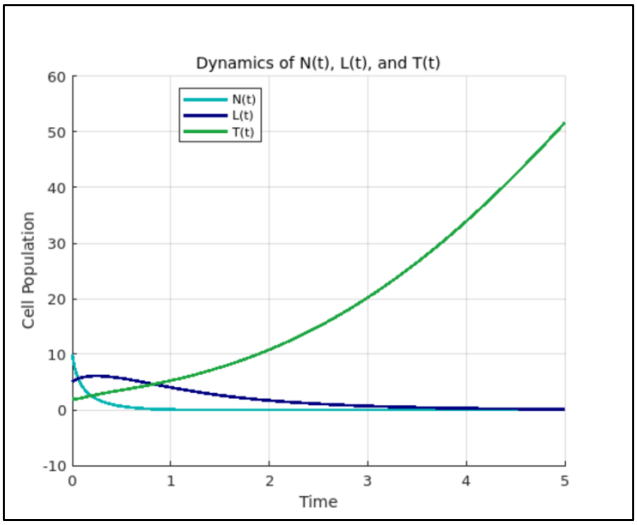
MATLAB Output

Nondimensionalized System

$$\frac{dN}{dt} = p_1 N(1 - qN) - p_2 N - NT$$

$$\frac{dL}{dt} = NT + I_0 2^{-\frac{t}{h}} - L - 0.00342LT$$

$$\frac{dT}{dt} = 25.7(1 - 0.000204T) - NT - \delta LT$$




```
%% Core Parameters %%
P1 = 1;
q = 1;
P2 = 1;
h = 1;
delta = 1;
I0 = 1;

%% Tuning Parameters %%
T_param1 = 0.00342;
T_param2 = 25.7;
T_param3 = 0.000204;

%% Initial conditions %%
N0 = 10;
L0 = 5;
T0 = 2;
y0 = [N0; L0; T0];

%% Time span %%
tspan = [0 5];
```

```
%%
function dydt = systemODEs(t, y, P1, q, P2, T_param1, T_param2, T_param3, delta, h, I0)
    N = y(1);
    L = y(2);
    T = y(3);

    dNdt = P1 * N * (1 - q * N) - P2 * N - N * T;
    dLdt = N * T + I0 * 2^(-t / h) - L - T_param1 * L * T;
    dTdt = T_param2 * (1 - T_param3 * T) - N * T - delta * L * T;

    dydt = [dNdt; dLdt; dTdt];
end
```