

```

1 %% Parameters, unit = 1/sec
2 a    = 1.4e-6;
3 b    = 3.1e-8;
4 b_d  = 5.6e-16;
5 d    = 2.8e-8;
6 i    = 2.6e-6;
7 n    = 1.4e-6;
8 r    = 2.8e-7;
9 q_i  = 2.7e-6;
10 q_z  = 2.7e-6;
11 d_q  = 2.8e-5;
12
13
14 %% Initial values
15 H0 = (b - d) / b_d;
16 I0 = 0;
17 Z0 = 0;
18 D0 = 0;
19 Q0 = 0;
20 y0 = [H0; I0; Z0; D0; Q0];
21
22 %% Simulation
23 tf = 100 * 24 * 60 * 60; % 100 days in seconds
24 tspan = [0 tf];
25 sol = ode45(@(t, y) apocalypse(t, y, a, b, b_d, d, i, n, r, q_i, q_z, d_q),
26 tspan, y0);
27
28 x = linspace(0, tf, 1000);
29 y = deval(sol, x);
30
31 %% Plot
32 figure(1);
33 grid on;
34 hold on;
35 plot(x, y, 'LineWidth', 1.5);
36
37 title('Zombie apocalypse simulation with quarantine');
38 xlabel('Time [s]');
39 ylabel('Population size');
40 legend('Healthy', 'Infected', 'Zombies', 'Dead', 'Quarantined', 'Location',
41 'east');

```