
```
%=====
% Lotka_Volterra.m
%=====
close all; clear all; clc;
%=====

% We look to model the Lotka-Volterra System.

%-----
%parameters
%-----

beta = 1.1;
ar = 0.4;
delta = 1.5;
aw = 0.1;

params = [beta; ar; delta; aw];

%-----
% Initial Values
%-----

y0 = [12; 2];

%-----
% time span
%-----

tend=50;
N=1000;
tspan=linspace(0,tend,N+1)';

%-----
%Solving the system using ode45
%-----

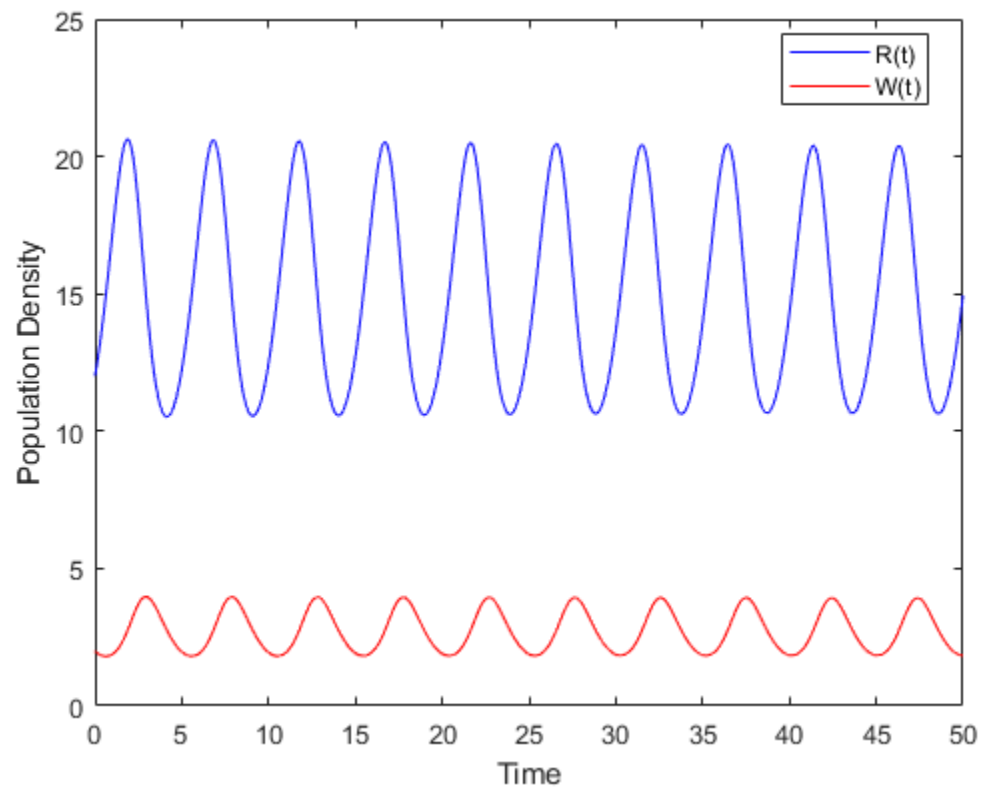
[t, y] = ode45(@(t,y)LotkaVolterra(t,y,params), tspan, y0);

%-----
% Plotting graph
%-----

r0=10; w0=2;
title_params={'r0','w0','beta','ar','delta','aw'};
plot(t,y(:,1), 'b',t,y(:,2),'r');
xlabel('Time'), ylabel('Population Density');
legend('R(t)','W(t)','location','best')
hold off

%-----
% Function
```

```
%-----  
  
function dy = LotkaVolterra(t,y,params)  
  
    beta = params(1);  
    ar = params(2);  
    delta = params(3);  
    aw = params(4);  
  
    R = y(1);  
    W = y(2);  
  
    dy = zeros(2,1);  
  
    dy(1) = beta * R - ar * R * W;  
    dy(2) = aw * R * W - delta * W;  
  
end
```



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