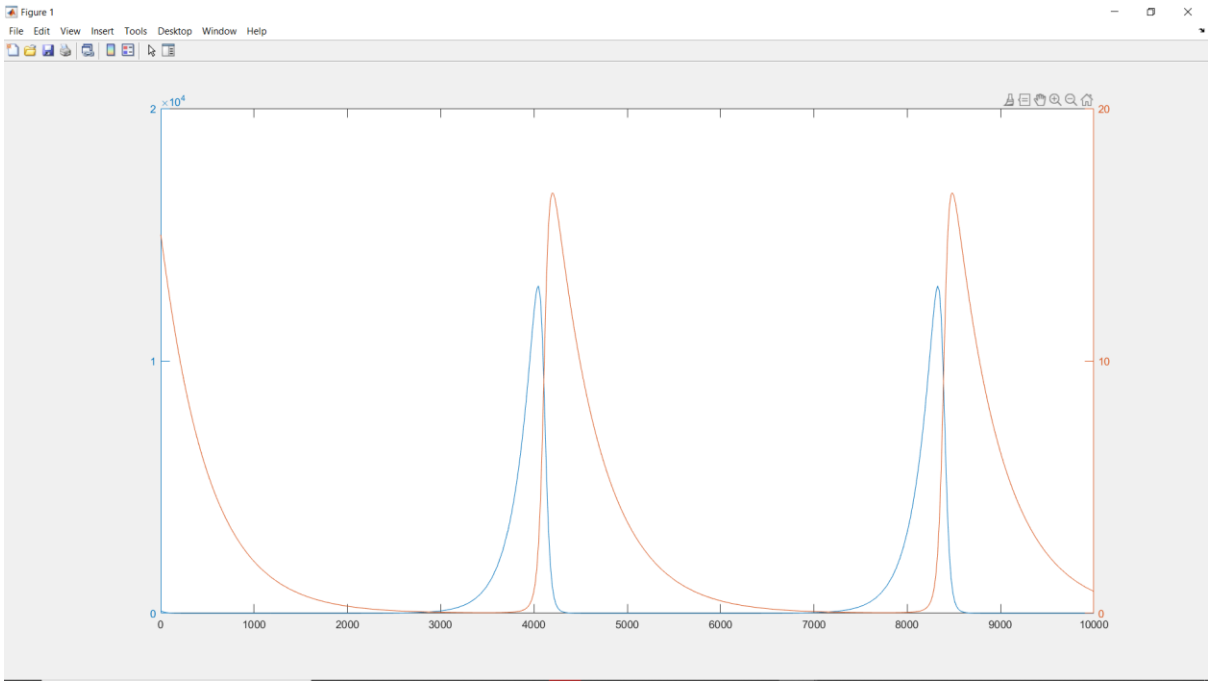
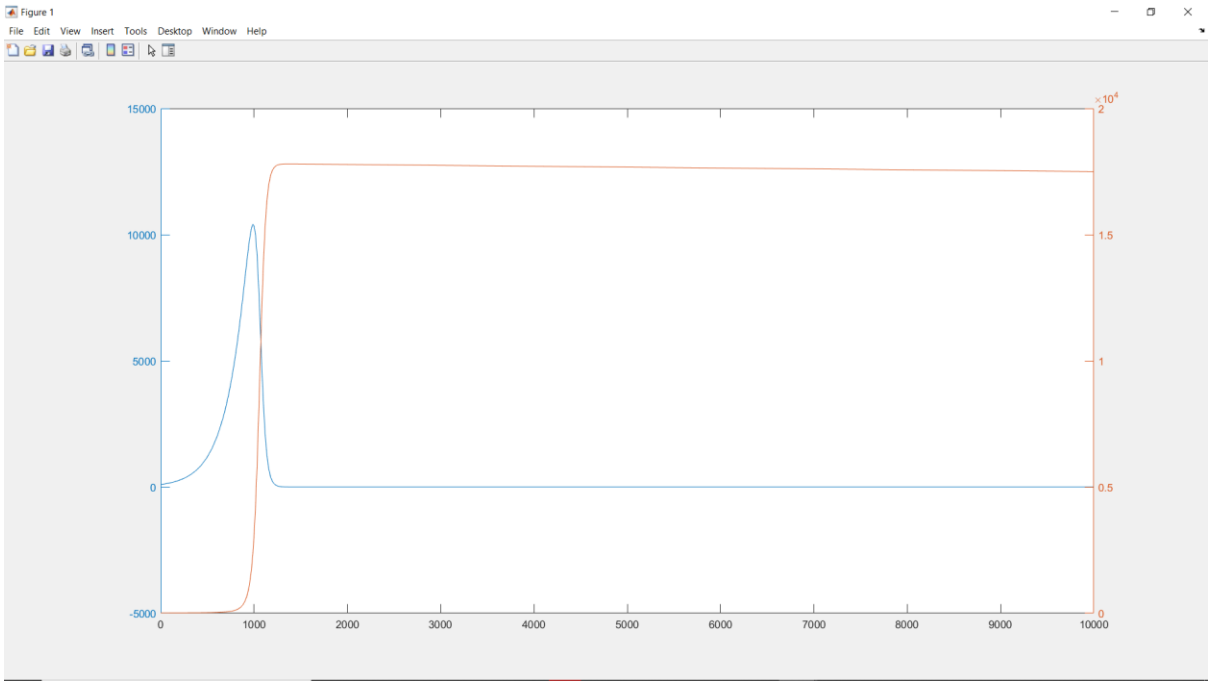
Part a

Without fishing

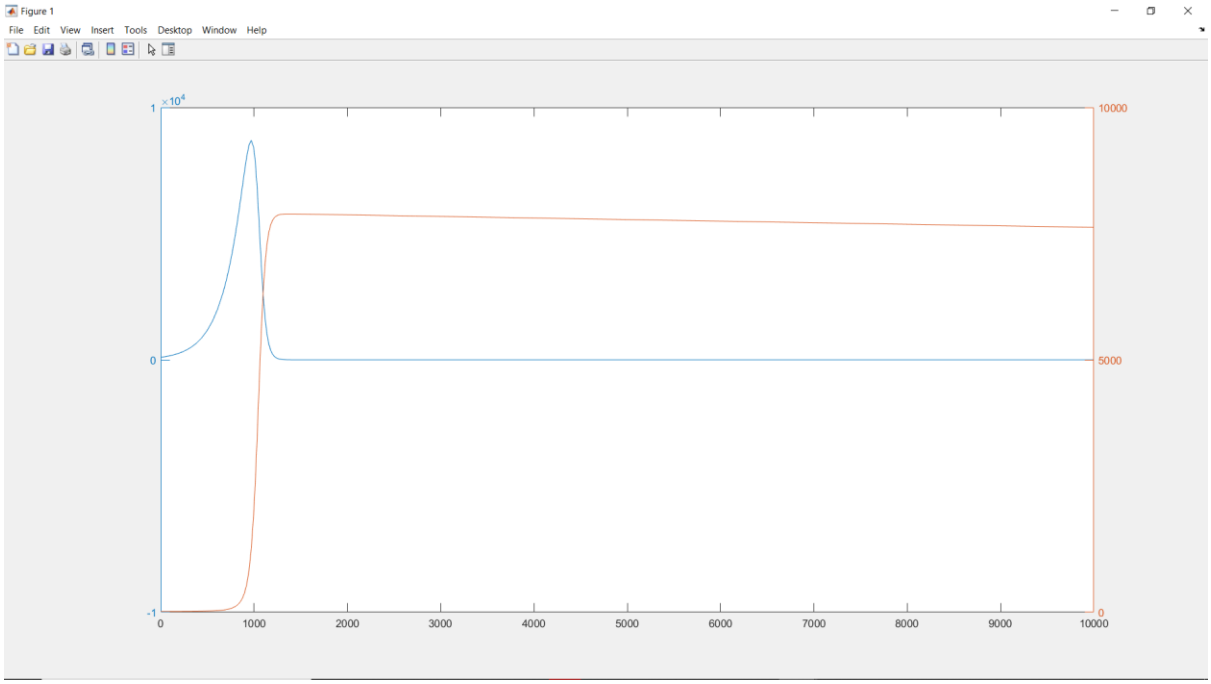


Part b

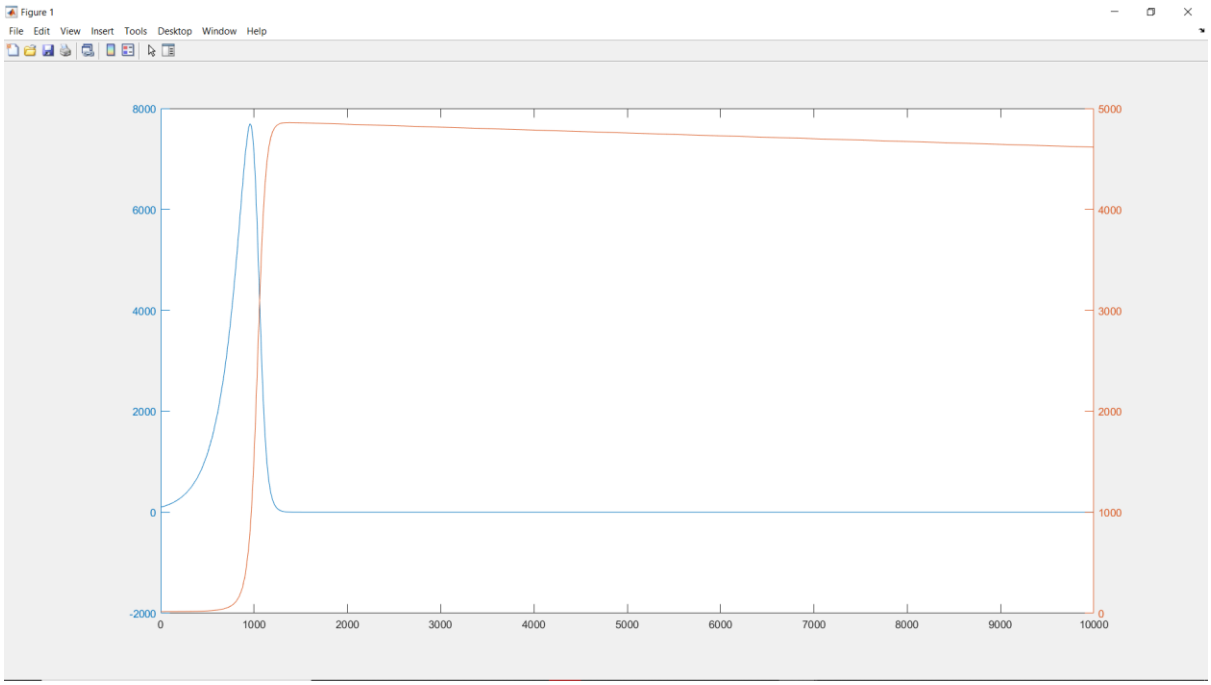
With fishing at 0.001



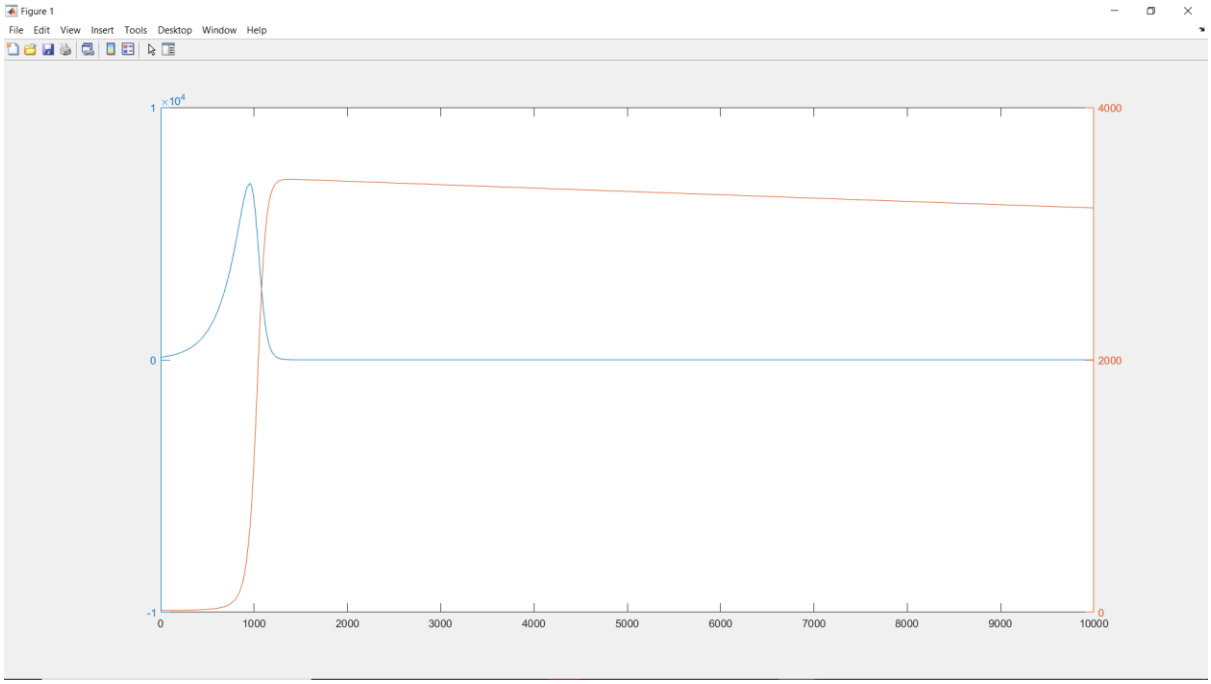
With fishing at 0.002



With fishing at 0.003



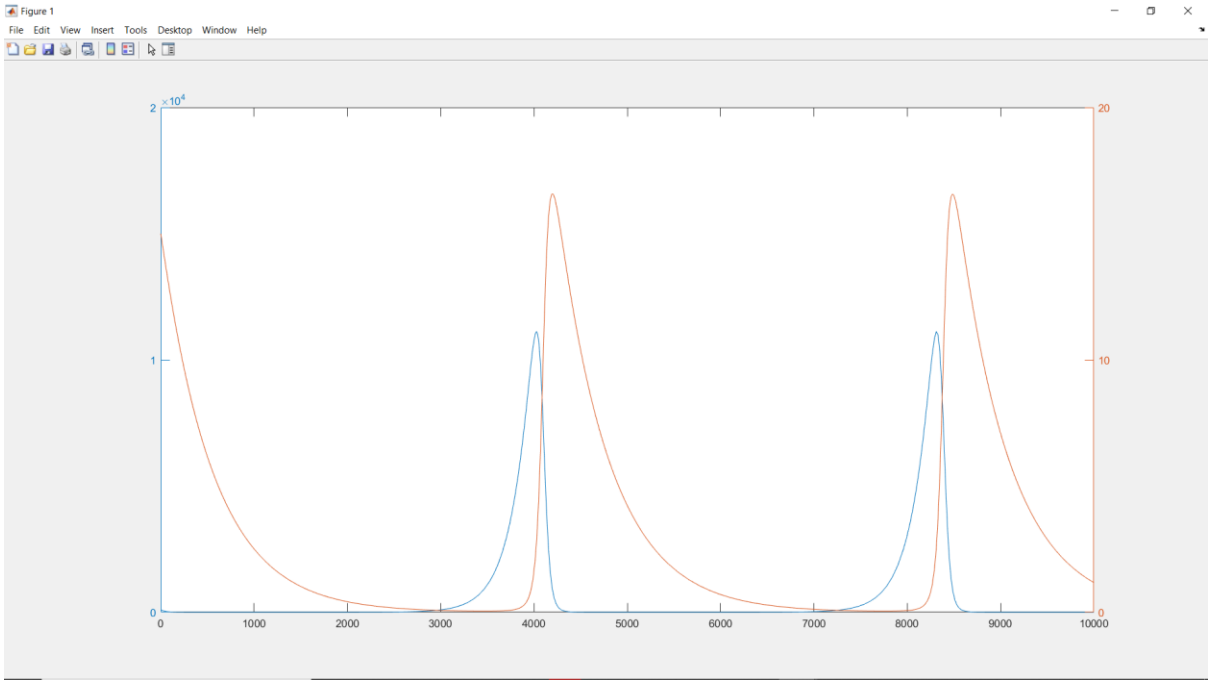
With fishing at 0.004



The predator prey number keep decreasing

Part c

At about 3000 days when the rate of hunting is 0.9



The rate of hunting which is **0.9** is much greater than the prey birth rate **0.005**

MATLAB CODE

PPmodel.m

```
clear

%initial variables

p.alpha = 0.005;
p.beta = 0.002;
p.rho = 0.001;
p.gamma = 0.002;
p.b = 0.9; % rate of hunting


% p.theta = 1;
% p.omega = 1;
p.tf = 10000;

prey_population = 100;
predator_population = 15;
y0 = [prey_population, predator_population];

options = odeset();

[t,y] = ode45(@actualmodel, [0 p.tf], y0, options, p);

plotyy(t,y(:,1),t,y(:,2))
```

actualmodel.m

```
function yp = actualmodel(t, y, p)

yp1 = y(1);
yp2 = y(2);

y1 = (p.alpha*yp1) - (p.beta*p.b*yp1*yp2); % prey
y2 = (p.rho*p.beta*yp1*yp2) - (p.gamma*p.b*yp2);
%predator

yp = [y1; y2];
```