%oef9

%initiele condities

y0=[20 1 1 20 1 1];

%tijdsduur

tspan=[0 500];

%solver oproepen

[t y]=ode45(@oef\_9f,tspan,y0);

%resultaat plotten

subplot(2,1,1)

plot(t,y(:,1),'b-',t,y(:,2),'r-',t,y(:,3),'g-')

xlabel('tijd (h)')

ylabel('concentratie (kg/m^3)')

legend('Sa','X1a','X2a');

title('populatiedynamica roofdier-prooi-systeem 1')

subplot(2,1,2)

plot(t,y(:,4),'b-',t,y(:,5),'r-',t,y(:,6),'g-')

xlabel('tijd (h)')

ylabel('concentratie (kg/m^3)')

legend('Sb','X1b','X2b');

title('populatiedynamica roofdier-prooi-systeem 2')

function [ ydot] = oef\_9f( t,y)

D=0.04;

Sf=125;

Y1=0.14;

Y2=0.5;

umax1=0.5;

umax2a=0.11;

umax2b=0.49;

K1=10;

K2=10;

Sa=y(1);

X1a=y(2);

X2a=y(3);

Sb=y(4);

X1b=y(5);

X2b=y(6);

u1a=(umax1\*Sa)/(K1+Sa);

u1b=(umax1\*Sb)/(K1+Sb);

u2a=(umax2a\*X1a)/(K2+X1a);

u2b=(umax2b\*X1b)/(K2+X1b);

ydot=[Sf\*D-Sa\*D-u1a\*X1a/Y1

u1a\*X1a-D\*X1a-u2a\*X2a/Y2

u2a\*X2a-D\*X2a

Sf\*D-Sb\*D-u1b\*X1b/Y1

u1b\*X1b-D\*X1b-u2b\*X2b/Y2

u2b\*X2b-D\*X2b];

end

