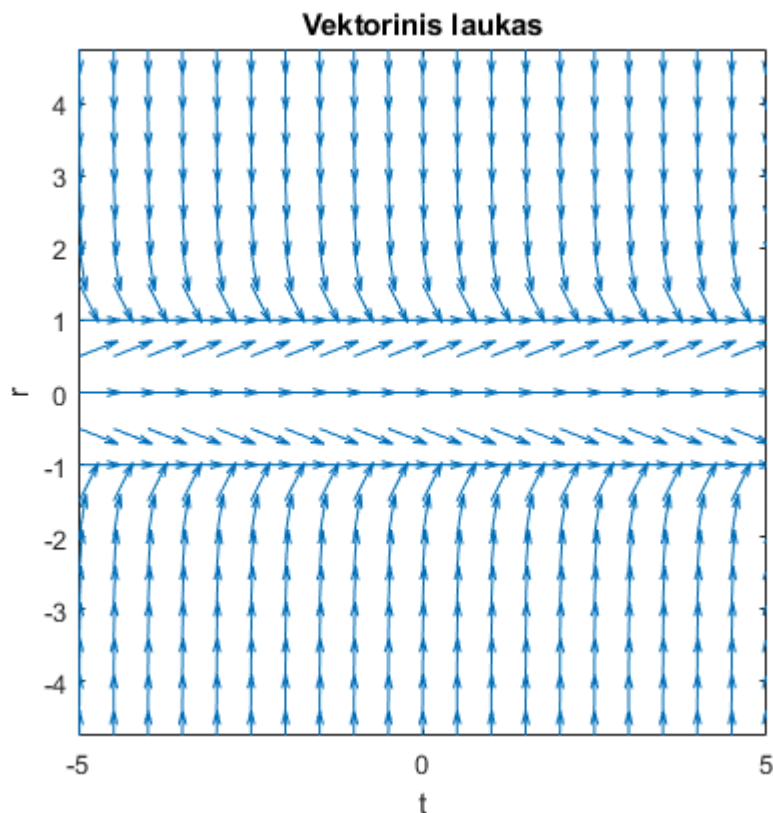


$$\begin{cases} r' = r(1 - r^2), \\ \theta' = 1, r \geq 0. \end{cases}$$

```

%Vektorinis laukas r atžvilgiu (pirmosios sistemos lygties analizė)
syms r(t) t
[t,r]=meshgrid(-5:0.5:5,-5:0.5:5);
dr=r.*(1-r.^2);
dt=ones(size(dr));
dru = dr./sqrt(dt.^2+dr.^2);
dtu = dt./sqrt(dt.^2+dr.^2);
quiver(t,r,dtu,dru)
tmin=t(1)-(t(1)-t(2))/2;
tmax=t(end)+(t(1)-t(2))/2;
rmin=r(1)-(r(1)-r(2))/2;
rmax=r(end)+(r(1)-r(2))/2;
axis([tmin tmax rmin rmax]);
hold on;
axis square; xlabel('t'), ylabel('r')
title('Vektorinis laukas')
hold off;

```



```

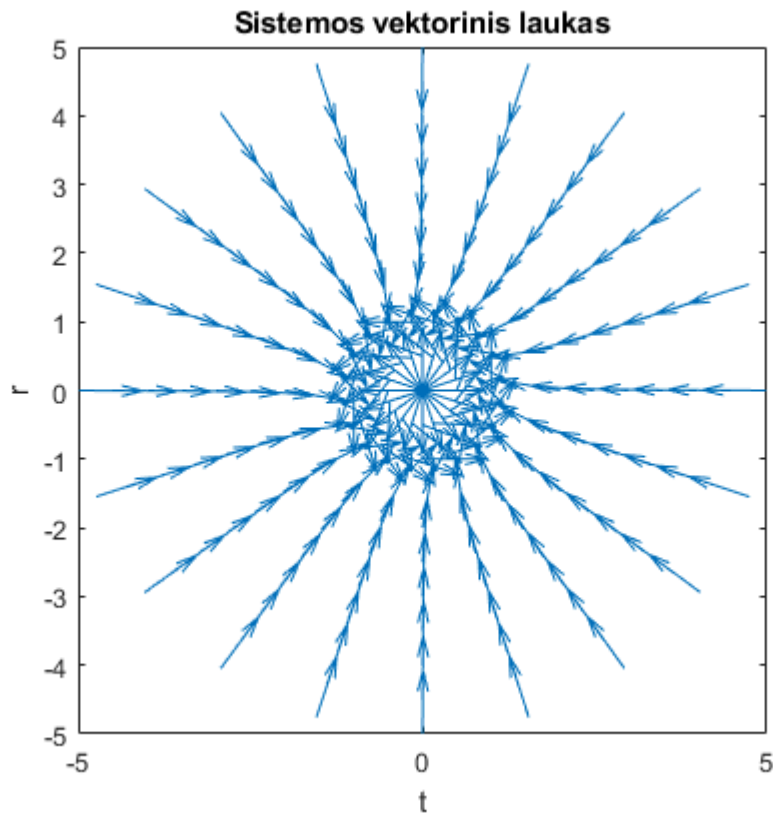
%Sistemos vektorinis laukas
syms r(t) theta(t) t
[r,theta]=meshgrid(0:0.5:5,0:pi/10:2*pi);
dr=r.*(1-r.^2);

```

```

dtheta=1;
Fieldpol2cart(r,theta,dr,dtheta);
hold off;

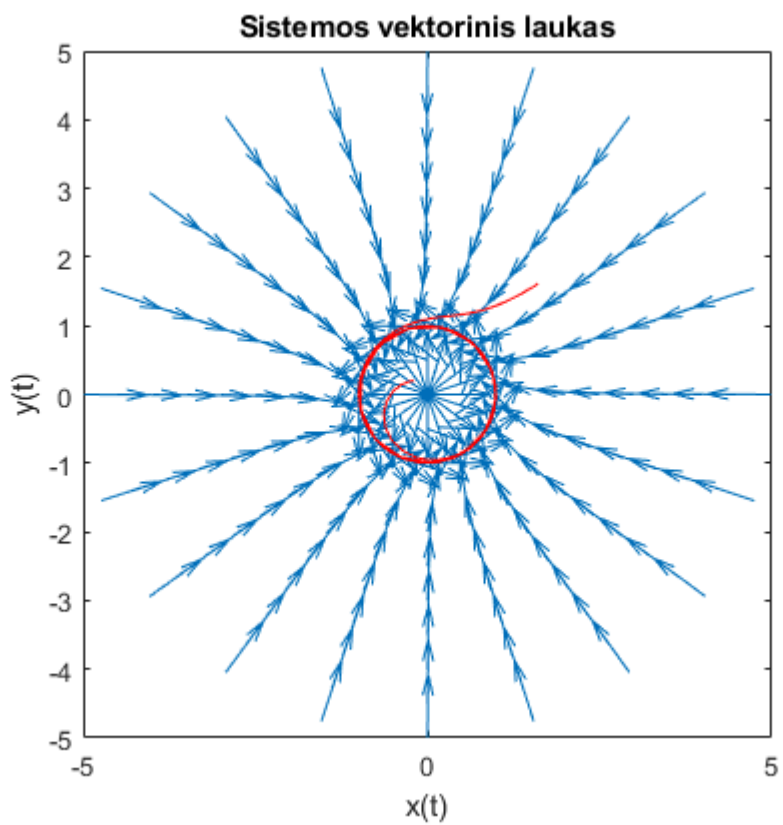
```



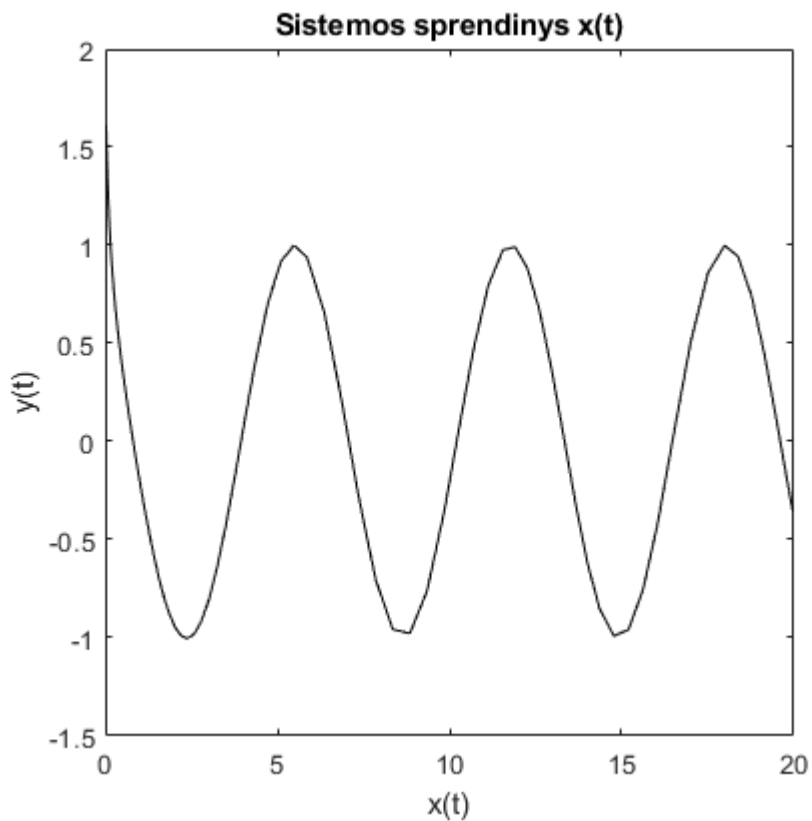
```

%Sistemos vektorinis laukas su sprendiniais
syms r(t) theta(t) t
[r,theta]=meshgrid(0:0.5:5,0:pi/10:2*pi);
dr=r.*(1-r.^2);
dtheta=1;
Fieldpol2cart(r,theta,dr,dtheta);
hold on;
clear all;
tiks(1:2)=1e-3;
tiksl=tiks.';
options=odeset('AbsTol',tiksl);
[t,Y]=ode45(@sist,[0 10],[-0.28;-pi/4],options);
[r1,r2] = pol2cart(Y(:,2),Y(:,1));
plot(r1,r2,'r')
hold on;
[t,Y]=ode45(@sist,[0 20],[2.28;pi/4],options);
[r1,r2] = pol2cart(Y(:,2),Y(:,1));
plot(r1,r2,'r')
hold off;

```



```
plot(t,r1,'k')  
axis square; xlabel('x(t)'), ylabel('y(t)')  
title('Sistemos sprendinys x(t)')  
hold off;
```



```

function [x,y,u_x,u_y]=Fieldpol2cart(r,theta,u_r,u_0)
[x,y] = pol2cart(theta,r);
u_x = u_r.*cos(theta) - u_0.*sin(theta);
u_y = u_r.*sin(theta) + u_0.*cos(theta);
dux=u_x./sqrt(u_x.^2+u_y.^2);
duy=u_y./sqrt(u_x.^2+u_y.^2);
quiver(x,y,dux,duy)
axis square; xlabel('x(t)'), ylabel('y(t)')
title('Sistemos vektorinis laukas')
end
function sistema=sist(t,Y)
s(1)=Y(1).*(1-Y(1).^2);
s(2)=1;
sistema1=[s(1:2)];
sistema=sistema1.';
end

```