```matlab
function ode45_ex
close all
clear all


lr=1.5;
lf=1.5;

%C
%Initial Condition:
xo=[0;0;0];


%timespan:
t=0:0.1:10;

Vx=1;
[t,x]=ode45(@sys,t,xo);
plot(t, x(:,3))
ylabel('y(m)');
xlabel('x(m)');
title(['Vx=',num2str(Vx), 'm/s'])




function  dx = sys(t, x)

%Parameters:

%Vx=4; %(m/s)
m=50; %(kg)
Iz=100; %(kg-m^2);
Caf=8000; %(N/rad)
Car=8000;  %(N/rad)

%square input
Amp=5; %steering angle in degree
yd=Amp-2*Amp.*heaviside(t-5)+2*Amp.*heaviside(t-10); %input square
 wave
steerangle=5*yd;
steerangle=steerangle*pi()/180;


A=-(cos(steerangle)*Caf+Car)/m*Vx;
B=(-(cos(steerangle)*Caf*lf+lr*Car)/(m*Vx))-Vx;
C=(-cos(steerangle)*Caf*lf+lr*Car)/Iz*Vx;
D=-(cos(steerangle)*Caf*lf*lf+lr*lr*Car)/Iz*Vx;
E=Caf*cos(steerangle)/m;
F=lf*Caf*cos(steerangle)/Iz;

u=steerangle;
```
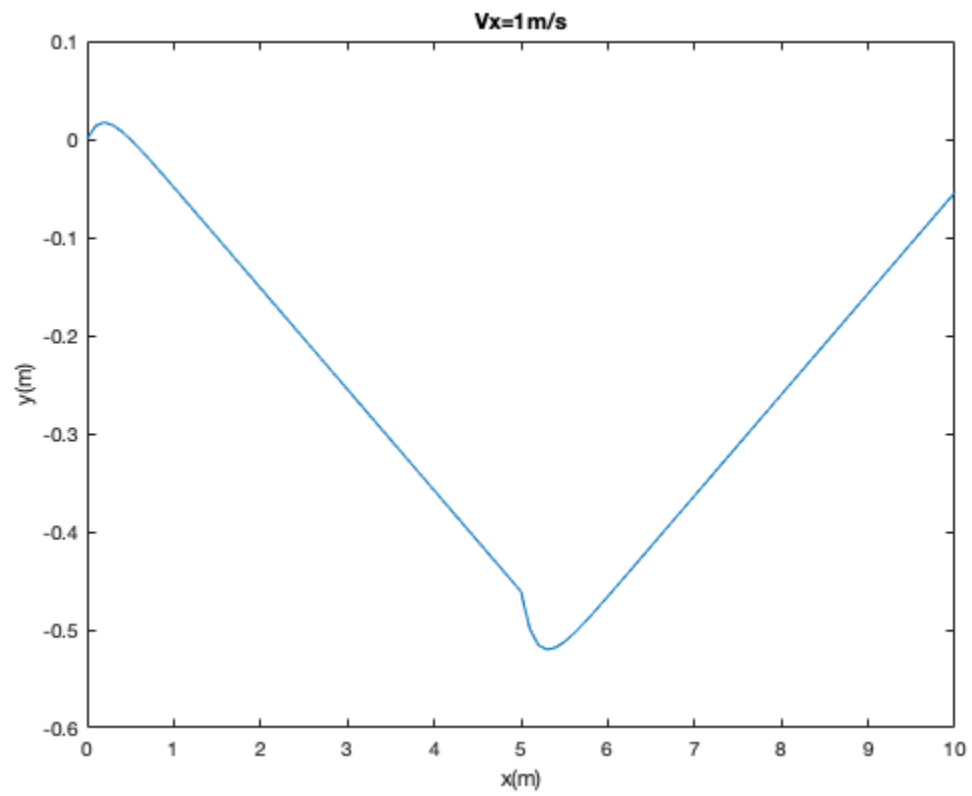
```
dx(1,:)=A*x(1)+C*x(2)+E*u;
dx(2,:)=B*x(1)+C*x(2)+F*u;
dx(3,:)=x(1);

end


end
```

Vx=1 m/s

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