



```

clear
close all
clc

tf = 100;
h = 0.01;
t = 0:h:tf-h;
x(:,1) = [0 0 0 100 200 150 30 10 20 -100 5 0]';

i=1;
while t(i) < tf-h
    k1 = h * x_dot(t(i), x(:,i));
    k2 = h * x_dot(t(i)+h/2, x(:,i)+k1/2);
    k3 = h * x_dot(t(i)+h/2, x(:,i)+k2/2);
    k4 = h * x_dot(t(i)+h, x(:,i)+k3);
    x(:,i+1) = x(:,i) + 1/6*(k1+2*k2+2*k3+k4);
    i=i+1;
end

figure (1)
plot3 (x(1,:),x(2,:),x(3,:),x(7,:),x(8,:),x(9,:))
xlabel ('x')
ylabel ('y')
zlabel ('z')
legend('r_M', 'r_T')
grid on

figure (2)
plot(t,x(1:3,:))

```

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grid on
figure (3)
plot(t,x(7:9,:))
xlabel(' t ')
ylabel(' vt ')
legend('vt_x','vt_y','vt_z')
grid on

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```

function f = x_dot(t,x)
if t<=7
u=[0;5;0];
else
u=[0;0;0]
end
if(t<=5)
p=(50/sqrt(x(4)^2+x(5)^2+x(6)^2)) * x(4:6) ;
f=[x(4);x(5);x(6);p(1);p(2);p(3);x(10);x(11);x(12);u(1);u(2);u(3)];
end
if(5<t)
f=[x(4);x(5);x(6);0;0;0;x(10);x(11);x(12);u(1);u(3);u(3)];
end
end
end

```

