function BTL\_VL1\_14

clc;

clear all;

close all;

%Nhap du kien de cho

syms v t tA tB h

g = input('Nhap gia toc trong truong: g= ');

hA = input('Nhap do cao bao dau cua vat A: hA= ');

hB = input('Nhap do cao bao dau cua vat B: hB= ');

delta\_t = input('Nhap khoang thoi gian chenh lech giua A va B: delta\_t= ');

y\_A = input('Nhap phuong trinh yA theo t la yA = ');

y\_B = input('Nhap phuong trinh yA theo t la yB = ');

%Tinh toan

y\_A = subs(y\_A,'h',hA);

y\_B = subs(y\_B,'h',hB);

y\_A = subs(y\_A,'t',tA);

y\_B = subs(y\_B,'t',tB);

v\_A = diff(y\_A,tA);

v\_B = diff(y\_B,tB);

nghiem = solve((y\_A==0),(tA-tB-delta\_t==0),(y\_B==0),tB>0);

v = double(nghiem.v);

tA = double(nghiem.tA);

tB = double(nghiem.tB);

y\_A = subs(y\_A,'v',v);

v\_A = subs(v\_A,'v',v);

%Xuat ra man hinh

fprintf('Van toc dau cua vat A la: v0 = %0.2f m/s\n',v)

fprintf('Thoi gian cham dat cua vat A: tA = %0.2f s\n',tA);

fprintf('Thoi gian cham dat cua vat B: tB = %0.2f s\n',tB);

fprintf('\nNHAN ENTER DE HIEN QUY DAO CUA HE\n');

pause;

% Moc thoi gian ban dau

t=0;

dt=0.01;

t\_ketthuc = tA;

% Toa do vat A, B khi t=0

xA=0;

xB=0;

yA=subs(y\_A,'tA',t);

yB=subs(y\_B,'tB',t);

% Tao cua so figure

figure('color','white','numbertitle','off');

set(gcf,'Units','normalized');

set(gcf,'Position',[0 0 0.5 1]);

hold on

% Tao anh Vat A va B

fig\_VatA = plot(xA,yA,'ro','MarkerSize',10,'markerfacecolor','r');

fig\_VatB = plot(xB,yB,'ro','MarkerSize',10,'markerfacecolor','b');

% Dem thoi gian

ht = title(sprintf('t = %0.2f s',t));

% Dieu chinh truc xOy

axis equal

axis ([-20 20 0 2\*hA]);

% Chu thich

legend('A','B');

% Gia tri ban dau

vA = subs(v\_A,'tA',t);

tA = 0;

sA = yA;

tA\_array = tA;

sA\_array = sA;

vA\_array = abs(vA);

vB = subs(v\_B,'tB',t);

tB = 0;

sB = yB;

tB\_array = tB;

sB\_array = sB;

vB\_array = abs(vB);

% Do thi do thi

fig\_toado = figure('name','Toa do','color','white','numbertitle','off');

axis ([0 t\_ketthuc+1 0 2\*hA]);

hold on;

set(gcf,'Units','normalized');

set(gcf,'Position',[0.6 0.5 0.3 0.4]);

graph\_toadoA = plot(tA\_array,sA\_array,'r','linewidth',2);

graph\_toadoB = plot(tB\_array,sB\_array,'b','linewidth',2);

xlabel('Thoi gian [s]'); ylabel('Toa do [m]');

% Do thi van toc

fig\_vantocA = figure('name','Van toc','color','white','numbertitle','off');

axis ([0 t\_ketthuc+1 -100 100]);

hold on;

set(gcf,'Units','normalized');

set(gcf,'Position',[0.6 0.02 0.3 0.4]);

graph\_vantocA = plot(tA\_array,vA\_array,'r','linewidth',2);

graph\_vantocB = plot(tB\_array,vB\_array,'b','linewidth',2);

xlabel('Thoi gian [s]'); ylabel('Van toc [m/s]');

% Vong lap ve do thi toa do, van toc va mo phong chuyen dong cua vat

while (yA>=0 || yB>=0)

yA = subs(y\_A,'tA',t);

yB = subs(y\_B,'tB',t);

vA = subs(v\_A,'tA',t);

vB = subs(v\_B,'tB',t);

if yA>=0

set(fig\_VatA,'xdata',xA,'ydata',yA);

tA=t;

tA\_array = [tA\_array tA];

sA\_array = [sA\_array yA];

vA\_array = [vA\_array vA];

set(graph\_toadoA,'xdata',tA\_array,'ydata',sA\_array);

set(graph\_vantocA,'xdata',tA\_array,'ydata',vA\_array);

else

break;

end

if yB>=0

set(fig\_VatB,'xdata',xB,'ydata',yB);

tB=t;

tB\_array = [tB\_array tB];

sB\_array = [sB\_array yB];

vB\_array = [vB\_array vB];

set(graph\_toadoB,'xdata',tB\_array,'ydata',sB\_array);

set(graph\_vantocB,'xdata',tB\_array,'ydata',vB\_array);

else

end

pause(0.0000000001);

set(ht,'string',sprintf('tA = %0.2f s tB = %0.2f s',tA,tB ));

t=t+dt;

end

end



