
Exempel 7.11 - Fallskärmshoppare

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```
clear, close all
global m k g

% parametrar
m = 75;
v_fri = 50;
v_stop = 5;
g = 9.81;
H_0 = 2000;
t_0 = 0;
t_open = 30;

% koeff. för luftmotstånd
k_fri = m*g/(v_fri*v_fri);
k_stop = m*g/(v_stop*v_stop);

% -----FRITT FALL-----
k = k_fri;

[T_fri H_fri] = ode45(@F_711,[t_0 t_open],[H_0 0]);
plot(T_fri,H_fri(:,1)),figure(2),plot(T_fri,H_fri(:,2))
% -----

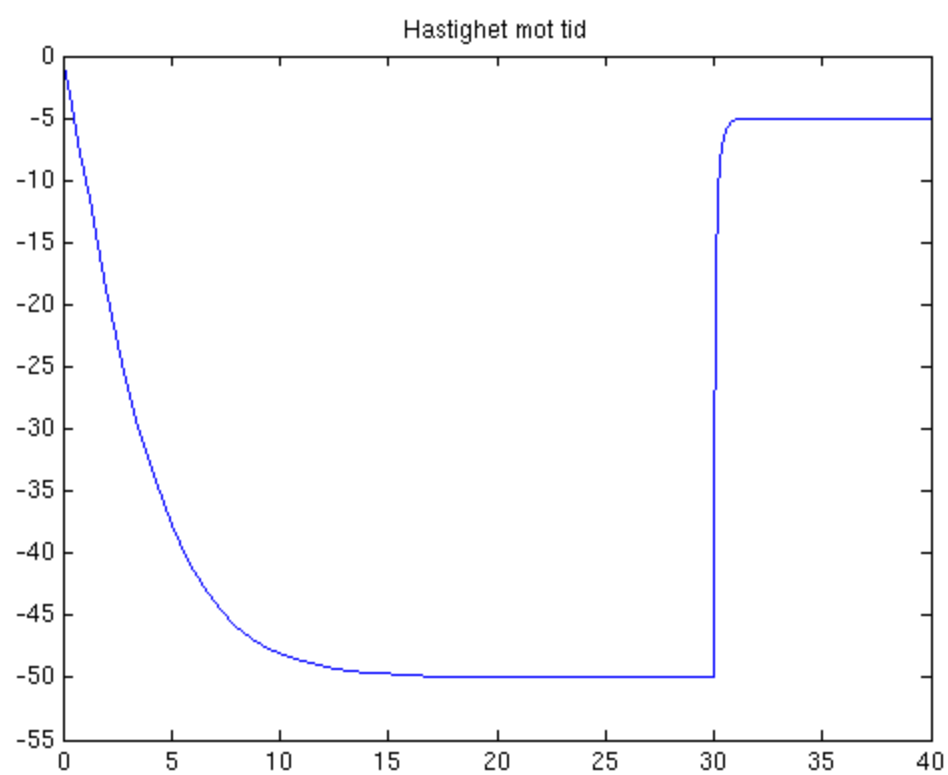
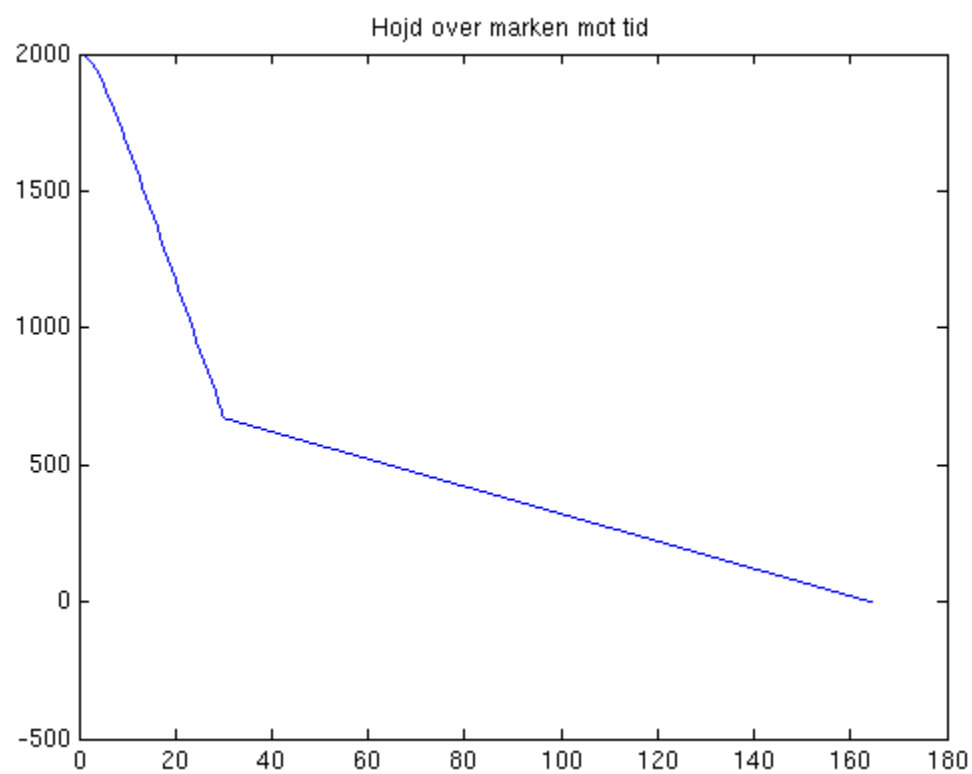
% -----INBROMSNING-----
k = k_stop;

% Lösning med rk4 tills marken
H = H_fri(end,:);
dt = 0.01;
t = T_fri(end);
T_stop = t;
H_stop = H;

while H(1) > 0
    k1 = dt*F_711(t, H);
    k2 = dt*F_711(t+dt/2,H+k1/2);
    k3 = dt*F_711(t+dt/2,H+k2/2);
    k4 = dt*F_711(t+dt,H+k3);
    H = H + (k1+2*k2+2*k3+k4)/6;
    t = t+dt;
    T_stop = [T_stop ; t];
    H_stop = [H_stop ; H];
end

figure(1), hold on
plot(T_stop,H_stop(:,1)), title('Höjd över marken mot tid')
figure(2), hold on, plot(T_stop,H_stop(:,2)), axis([0 40 -55 0]),
title('Hastighet mot tid')
disp(['Det tog ' num2str(T_stop(end)) ' sekunder att nå marken'])
disp(['Nedslagshastighet: ' num2str(H_stop(end,2)) ' m/s'])
```

*Det tog 164.45 sekunder att nå marken
Nedslagshastighet: -5 m/s*



Published with MATLAB® 7.10