```
function yd=NOTANK6(t,y)

global m Jxx Jyy GM Fn Aw ww we Zzpp Kfpp Ztpp Mtpp Zzp Ztp Mtp Kfp Kfmod Znzc Znzs
Zntc Znts Zffnc Zffns Knfc Knfs ...
       Knnfc Knnfs Knzfc Knzfs Knftc Knfts Mnzc Mnzs Mntc Mnts Mffnc Mffns Zw alfa3
Mw alfa5

% caratteristiche meccaniche
m=170.30;
Jxx=1223.162;
Jyy=5189.109;

%condizioni di prova TS ship
GM=0.37;
Fn=0.20;
Aw=0.6;
ww=1.249;
we=1.717;

%coefficienti massa aggiunta
Zzpp=200;
Kfpp=186;
Ztpp=200;
Mtpp=5500;
Mzpp=200;

%coefficienti di smorzamento
Zzp=330;
Ztp=410;
Mzp=410;
Mtp=10750;

%coefficienti idrostatici
Zz=1245.142;
Kf=669.8;
Mt=37816.031;
Zt=912.689;
Mz=912.689;
Zzz=-442.643;
Zzt=-2433.967;
Zff=-2470.790;
Ztt=-35268.221;
Kzf=-2470.790;
Kft=-11194.741;
Mzz=-2433.967;
Mzt=-35268.221;
Mff=-11194.741;
Mtt=-251664.402;
Zffz=4297.468;
Zfft=25664.745;
Kzzf=4297.468;
Kfff=-728.900;
Kttf=289817.461;
Mffz=25664.745;
Mfft=289817.461;
Kzft=25664.745;
K5f=330.2;
```

```
K7f=-206.7;


%ikeda
Kfp=350;
Kfmod=40;

%coefficienti onda
Znzc=80;
Znzs=240;
Zntc=-100;
Znts=3450;
Zffnc=-600;
Zffns=-1300;
Knfc=1100;
Knfs=1250;
Knnfc=-600;
Knnfs=150;
Knzfc=-1250;
Knzfs=-2700;
Knftc=-2000;
Knfts=-31000;
Mnzc=-100;
Mnzs=3500;
Mntc=-2000;
Mnts=24000;
Mffnc=-500;
Mffns=-15500;

%forzanti
Zwo=440;
alfa3=0.369;
Mwo=3000;
alfa5=-1.4;

yd=zeros(6,1);




%derivatives

yd(1)=(-Zzp*y(1)-Ztpp*(yd(5))-Ztp*y(5)-Zz*y(2)-Zt*y(6)-0.5*Zzz*y(2)^2-...
    0.5*Zff*y(4)^2-0.5*Ztt*y(6)^2-Zzt*y(2)*y(6)-0.5*Zffz*y(4)^2*y(2)-
0.5*Zfft*y(4)^2*y(6)-Aw*(Znzc*cos(we*t)+Znzs*sin(we*t))*y(2)-...
    Aw*(Zntc*cos(we*t)+Znts*sin(we*t))*y(6)-
Aw*(Zffnc*cos(we*t)+Zffns*sin(we*t))*y(4)^2+Zwo*cos(we*t+alfa3))/(m+Zzpp);
yd(2)=y(1);
yd(3)=(-Kfp*y(3)-Kfmod*y(3)*abs(y(3))-Kf*y(4)-Kzf*y(2)*y(4)-Kft*y(4)*y(6)-
0.5*Kzzf*y(2)^2*y(4)-1/6*Kfff*y(4)^3-0.5*Kttf*y(6)^2*y(4)-...
    Kzft*y(2)*y(4)*y(6)-Aw^2*(Knnfc*cos(2*we*t)+Knnfs*sin(2*we*t))*y(4)-
1/120*K5f*y(4)^5-1/5040*K7f*y(4)^7-Aw*(Knfc*cos(we*t)+Knfs*sin(we*t))*y(4)-...
    Aw*(Knzfc*cos(we*t)+Knzfs*sin(we*t))*y(2)*y(4)-
Aw*(Knftc*cos(we*t)+Knfts*sin(we*t))*y(4)*y(6))/(Jxx+Kfpp);
yd(4)=y(3);
yd(5)=(-Mtp*y(5)-Mzpp*(yd(1))-...
```

```
    Mzp*y(1)-Mz*y(2)-Mt*y(6)-0.5*Mzz*y(2)^2-0.5*Mff*y(4)^2-0.5*Mtt*y(6)^2-
Mzt*y(2)*y(6)-...
    0.5*Mffz*y(4)^2*y(2)-0.5*Mfft*y(4)^2*y(6)-
Aw*(Mffnc*cos(we*t)+Mffns*sin(we*t))*y(4)^2-
Aw*(Mnzc*cos(we*t)+Mnzs*sin(we*t))*y(2)-...
    Aw*(Mntc*cos(we*t)+Mnts*sin(we*t))*y(6)+Mwo*cos(we*t+alfa5))/(Jyy+Mtpp);
yd(6)=y(5);




close all
clear all
clc
h1 = figure;
set(h1, 'Units', 'normalized', 'Position', [0 0 1 0.9]);
whitebg(h1, 'black')
t0=0;
t1=100;


[t, xa] = ode45 ('NOTANK6', [t0 t1], [0,0.001,0,-0.8*pi/180,0,0.8*pi/180])

subplot (3,1,1);
plot (t,xa(:,2),'r')

grid on

subplot (3,1,2);
plot (t,xa(:,4)*180/pi,'r')

grid on

subplot (3,1,3);
plot (t,xa(:,6)*180/pi,'r','LineWidth',2)
hold on
grid on
clc
```