

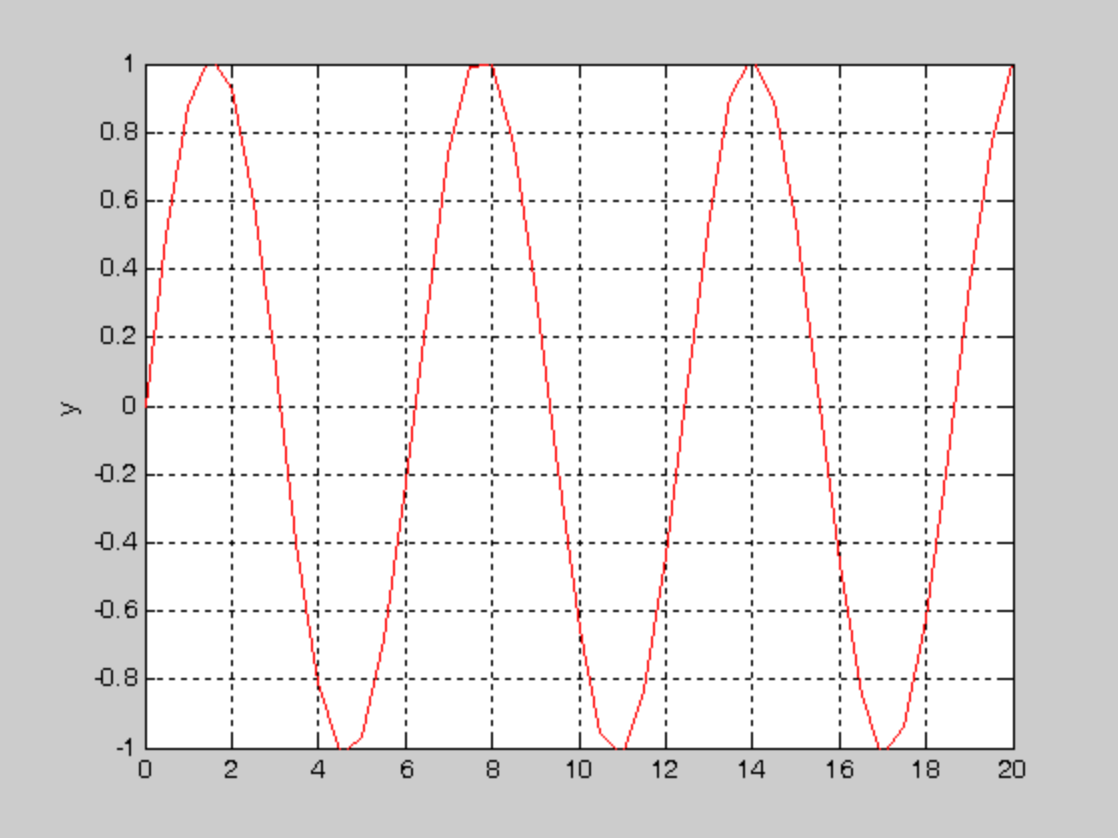
Program Solusi Numerik dengan Metoda Beda Hingga

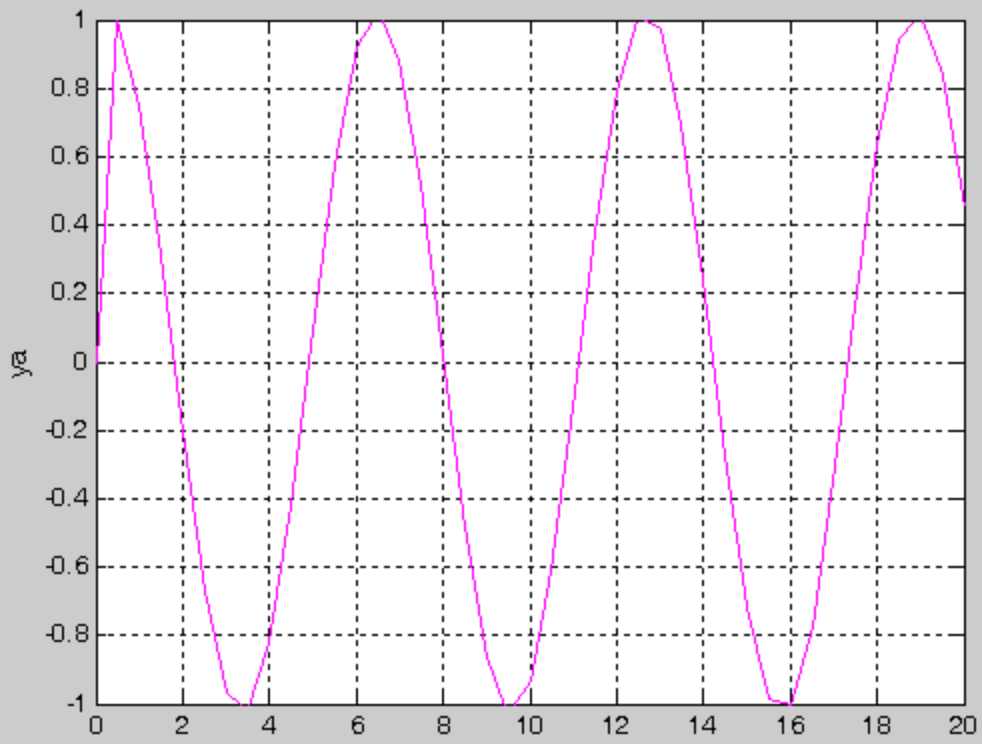
```
clear;clc;
time= input ('time= ');
n = input('jumlah iterasi= ');
eps = 0.001;
dt = time/n;
T = [0:dt:time]';
y = zeros(n,1);
ya = zeros(n,1);
y0 = 0;
ya0 = 1;
for k=0:n-1
    if k==0
        ya(k+1)=ya0-dt*(eps*(ya0^3)+y0);
        y(k+1)=ya0*dt+y0;
    else
        ya(k+1)=ya(k)-dt*(eps*((ya(k))^3)+y(k));
        y(k+1)=ya(k+1)*dt+y(k);
    end
end
end
Y=[y0;y];
figure(4);
plot(T,Y,'r');
axis([0 20,-1 1]);
ylabel('y');

grid on

Y1=[y0;ya];
figure(5);
plot(T,Y1,'m');
axis([0 20,-1 1]);
ylabel('ya');

grid on
```





Program Solusi Numerik dengan Metoda Runge Kutta

```
function dy = rungekutta(t,y)

epsilon=0.001

dy = zeros(2,1);
dy(1)=y(2);
dy(2)=-epsilon*y(2)^3-y(1);

clear;clc;

y0=[0 1]

waktu=[0:0.5:20]
% waktu awal = 0
% dt = 0.5
% waktu akhir = 10

[T, Y] = ode45(@program_topter,waktu,y0);

figure(1)
plot(T, Y(:,1), T, Y(:,2));
legend('dy1', 'dy2')

grid on

figure(2)
plot(T, Y(:,1))
ylabel('dy1')

grid on

figure(3)
plot(T, Y(:,2))
ylabel('dy2')

grid on
```

