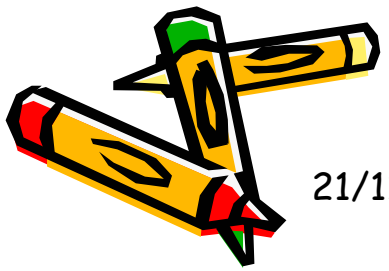
Lampiran……..

Penggunaan Perangkat Lunak untuk Simulasi

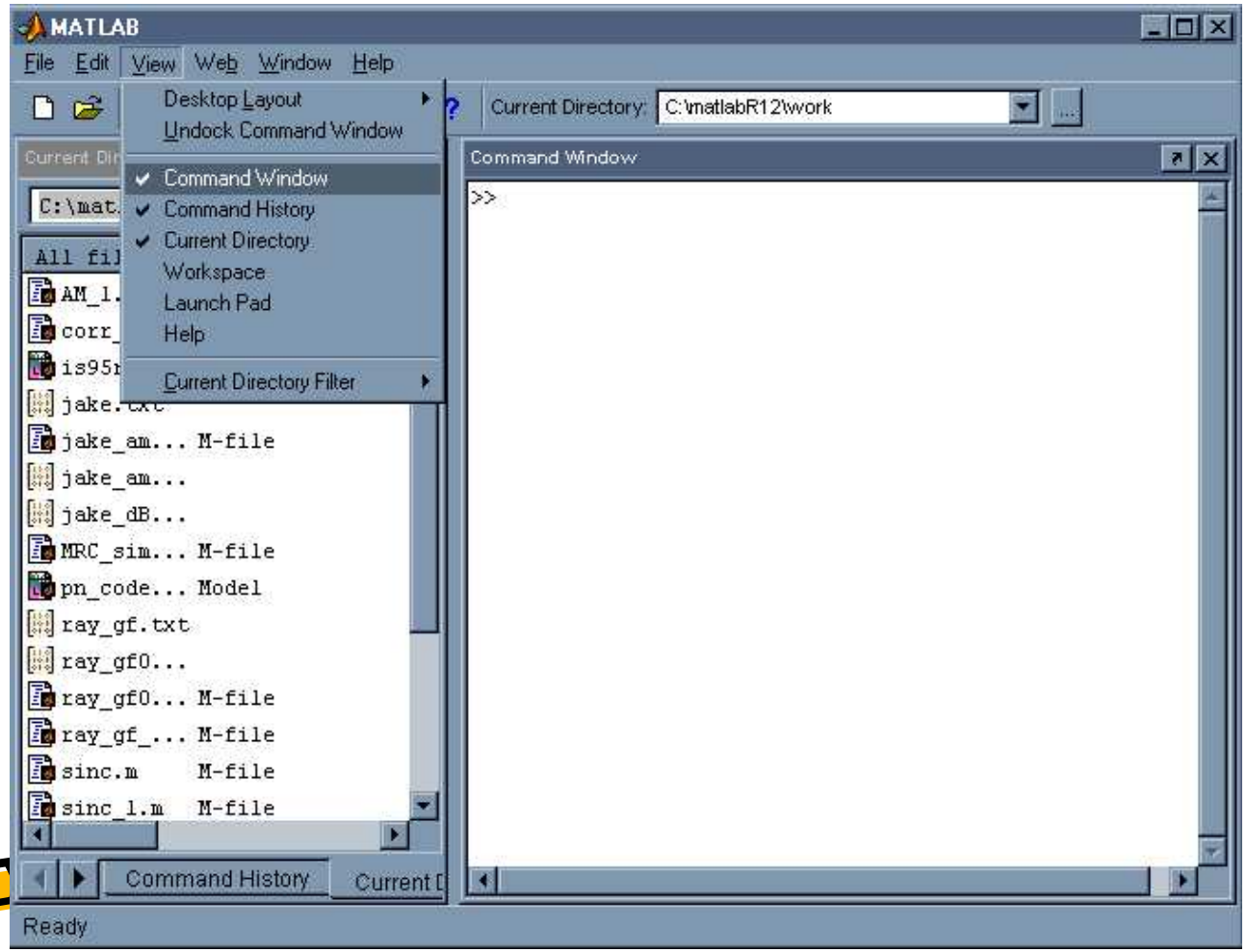
Disini kita bisa mengggunakan perangkat lunak untuk penyelesaian masalah Sinyal-Sistem dengan bahasa pemrograman seperti:

- C
- Delphi
- Java
- **Matlab**
- Matcad
- dll

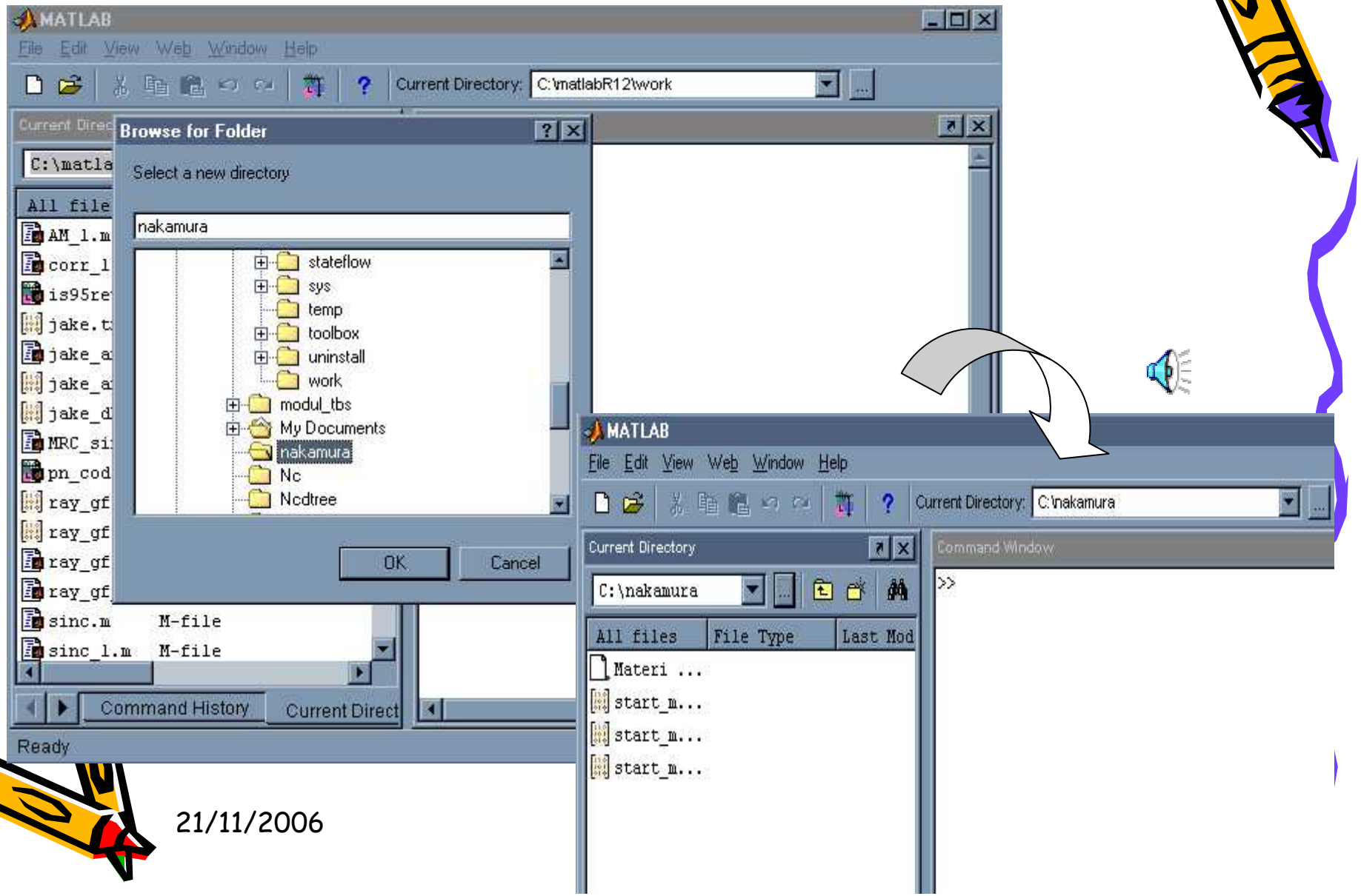
Kita pilih salah satu dalam pelatihan ini



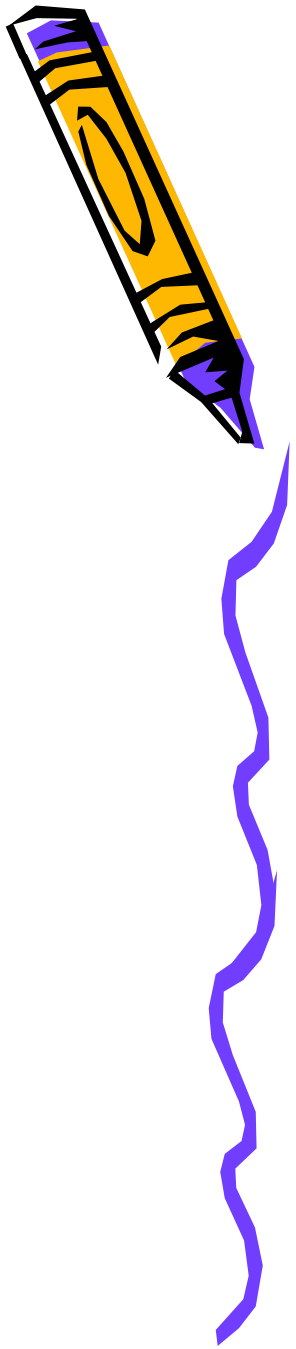
Membuka Matlab:



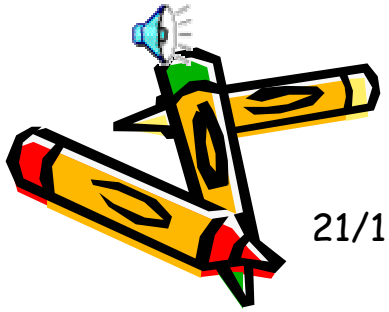
Menentukan direktori tempat bekerja:



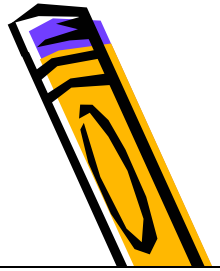
Perintah Help



```
>> help sin

 SIN     Sine.
    SIN(X) is the sine of the elements of X.

 Overloaded methods
    help sym/sin.m
```



1. Memulai suatu operasi aritmatika



Bentuk Jumlahan:

```
a=2; b=3;
c=a+b
c =
    5
```

Bentuk Pembagian:

```
a=34;
b=3;
c=a/b
c =
   11.3333
```

Bentuk Perkalian:

Menghitung volume pada suatu bola dengan jari-jari r=2.
Anda ingat bahwa persamaan matematik untuk volume suatu bola dengan jari-jari r adalah:

$$\text{Volume} = (4/3)\pi r^3$$

Anda dapat menyelesaikan dengan mengetik seperti berikut:

```
r=2;
vol=(4/3)*pi*r^3;
vol
```

Hasilnya adalah:

```
vol =
    33.5103
```

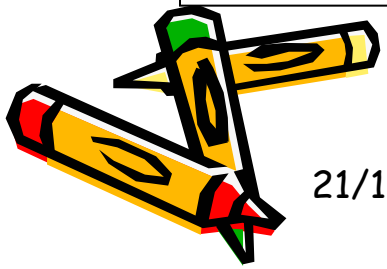
2. Bentuk Perulangan

```
>> for x=1:9
y=x^2-5*x-3
end

y =    -7
y =    -9
y =    -9
y =    -7
y =    -3
y =     3
y =    11
y =    21
y =    33
```

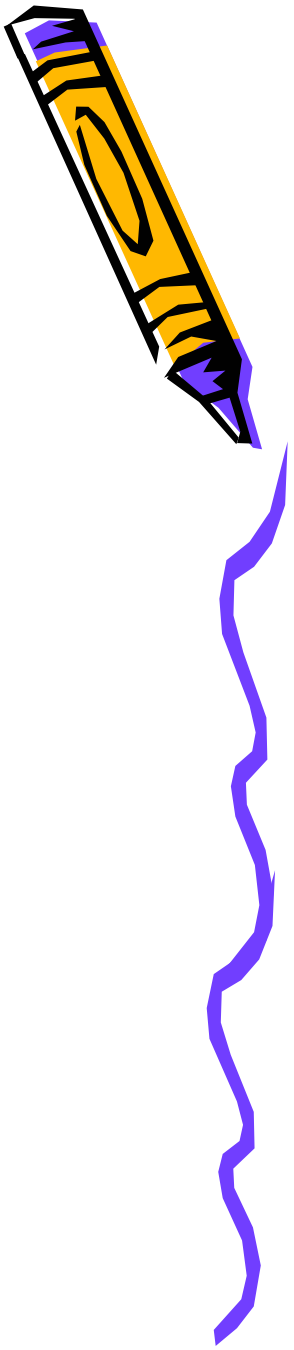
```
for x=[-2 0 15 6]
y=x^2-5*x-3
end

y =    11
y =    -3
y =   147
y =     3
```

```
for x=0:.5:10
y=sin(x);
if y<0,y=0;end
y
end
```

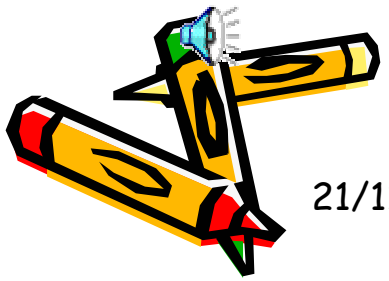
```
y =     0
y =    0.4794
y =    0.8415
y =    0.9975
y =    0.9093
y =    0.5985
y =    0.1411
y =     0
y =     0
y =     0
y =     0
y =     0
y =     0
y =    0.2151
y =    0.6570
y =    0.9380
y =    0.9894
y =    0.7985
y =    0.4121
y =     0
y =     0
```



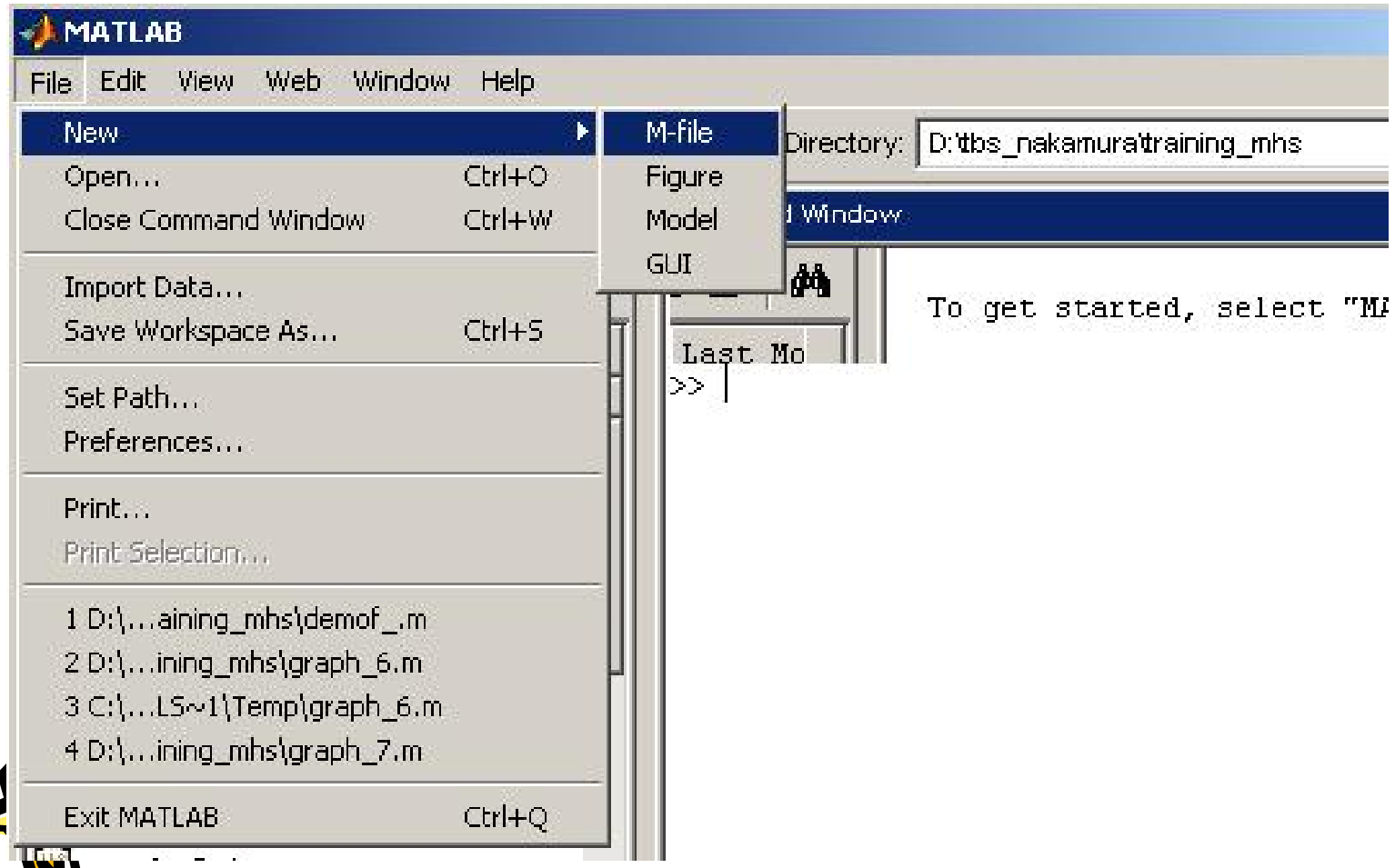
3. Bentuk Input



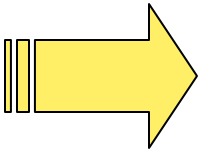
```
r=0;
while r<10
r=input('Masukkan nilai radius: ');
if r<0,break,end
vol=(4/3)*pi*r^3;
fprintf('Volume= %7.3f\n',vol)
end
Masukkan nilai radius: 3
Volume= 113.097
```



4. Membuat File *.m



5. Membuat Fungsi



Buat fungsi demof_.m dengan mengetik seperti berikut:

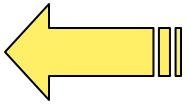
```
function y=demof_(x)
y=(2*x.^3 + 7*x.^2 + 3*x-1)./(x.^2-3*x + 5*exp(-x));
```

Untuk memanggilnya:

```
x=0:1:10;
y=demof_(x);
y
```

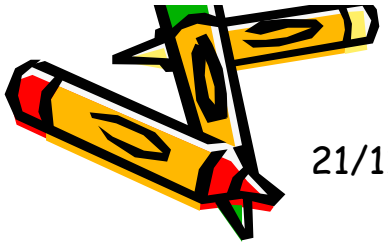
Memanggilnya dengan:

```
m=[1 5 3 4 6 5 8 9 2 4];
[m,s]=mean_stdv(x)
```



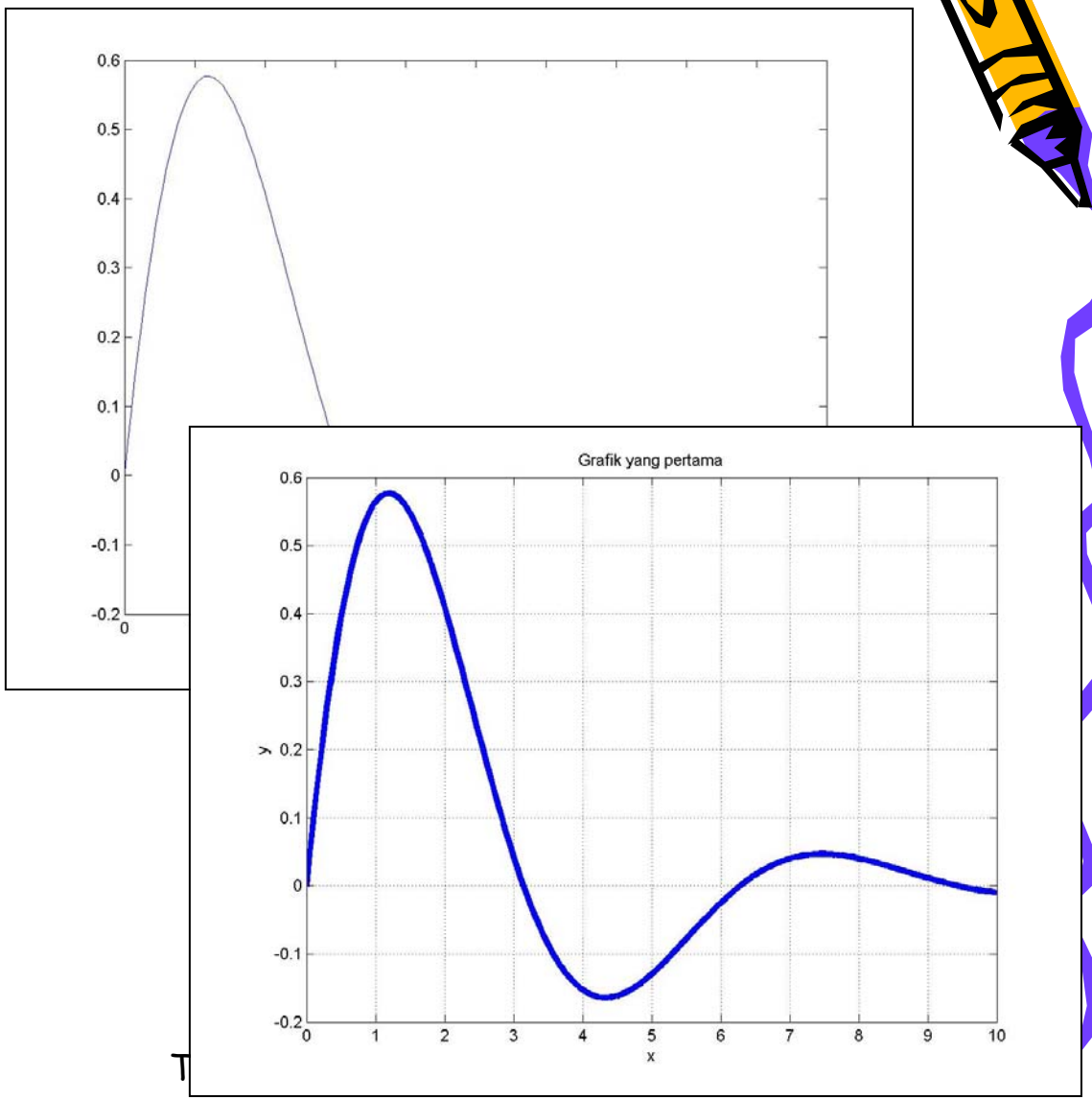
Buat fungsi kedua sbb:

```
function [mean,stdv]=mean_stdv(x)
n=length(x);
mean=sum(x)/n;
stdv=sqrt(sum(x.^2)/n-mean.^2);
```



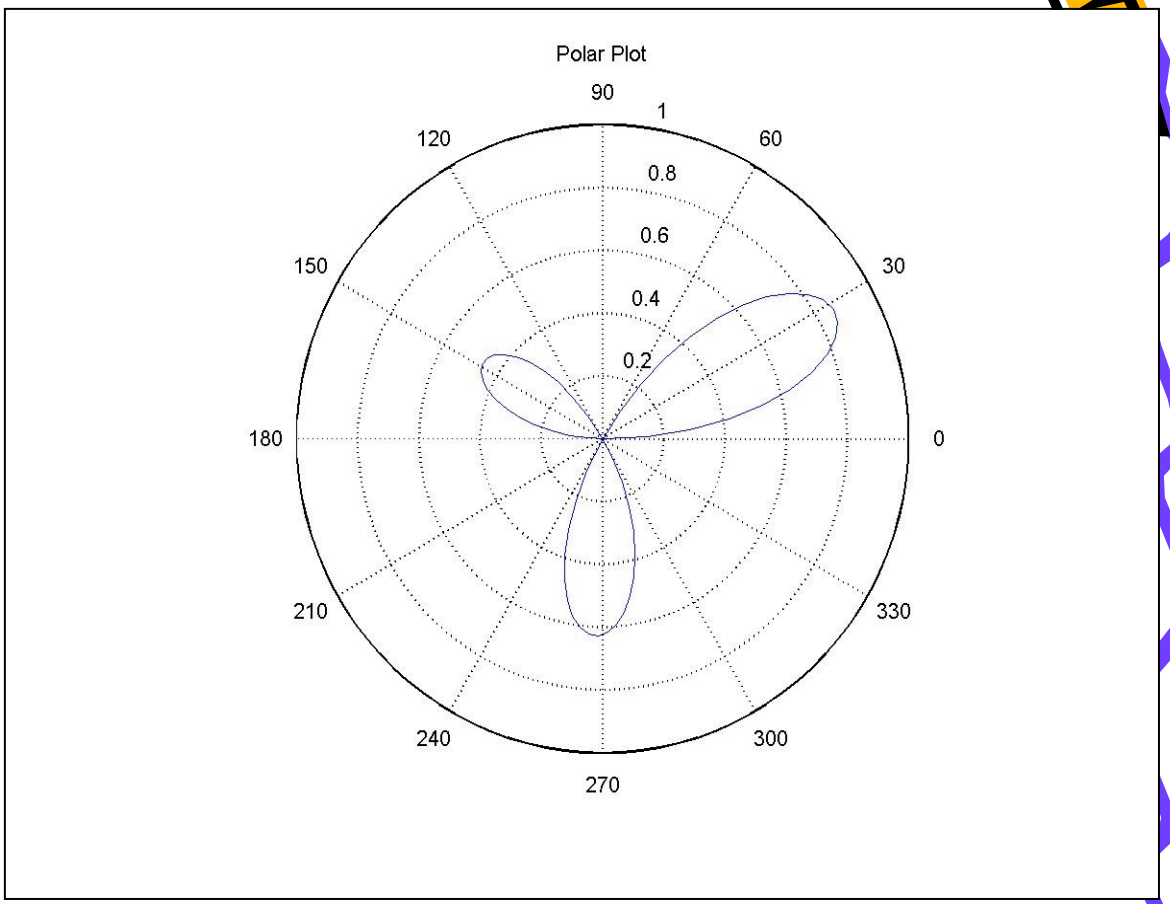
6. Membuat Grafik

```
%File Name:graph_1.m
n=201;
delx=10/(n-1);
for k=1:n
    x(k)=(k-1)*delx;
    y(k)=sin(x(k))*exp(-0.4*x(k));
end
%plot(x,y)

plot(x,y,'linewidth',4)
title('Grafik yang pertama')
xlabel('x');ylabel('y');
grid
```



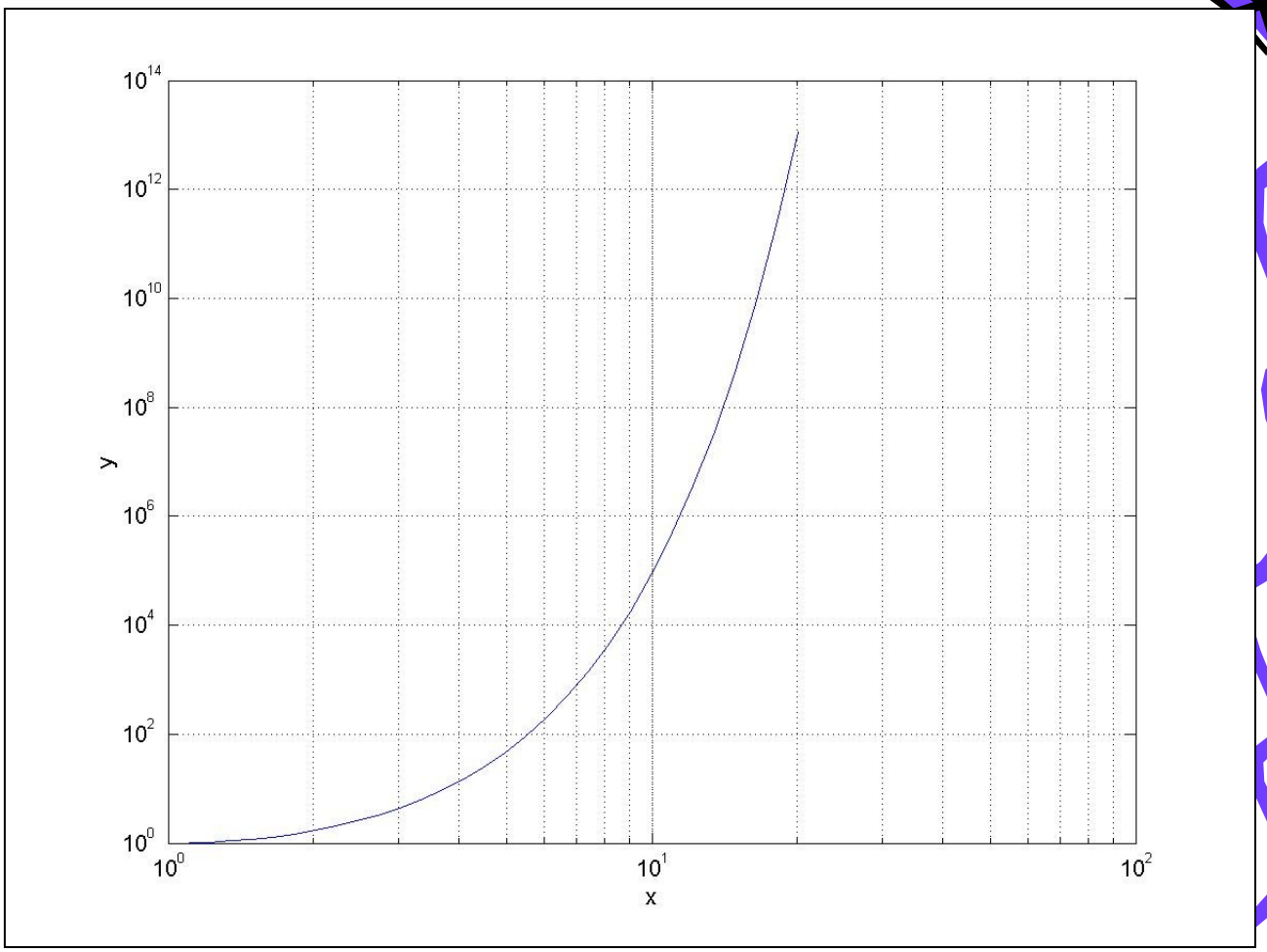
Membuat Grafik Polar

```
%File Name:graph_3.m
t=0:0.05:pi+0.1;
y=sin(3*t).*exp(-0.3*t);
polar(t,y)
title('Polar Plot')
grid
```



Grafik Semilog

```
%File Name:graph_4.m
t=.1:.1:3;
x=exp(t);
y=exp(t.*sinh(t));
loglog(x,y)
%semilogy(x,y)
grid
xlabel('x');ylabel('y')
```

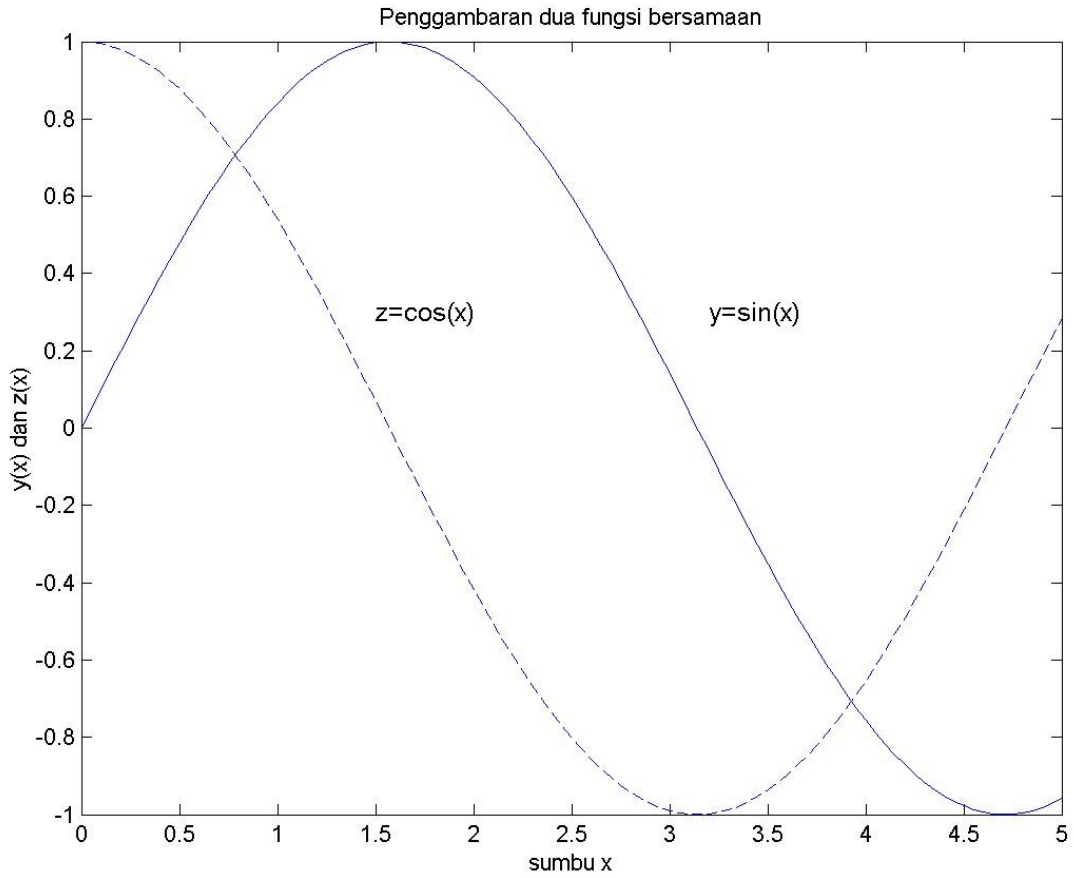


21/11/2006

Grafik dua fungsi

```
%File Name:graph_5.m
x=0:0.05:5;
y=sin(x);
plot(x,y)
hold on
z=cos(x);
plot(x,z,'--')
```

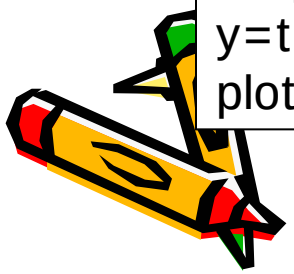
```
title('Penggambaran dua fungsi bersamaan')
xlabel('sumbu x');ylabel('y(x) dan z(x)')
text(3.2,0.3,'y=sin(x)','fontsize',12)
text(1.5,0.3,'z=cos(x)','fontsize',12)
```



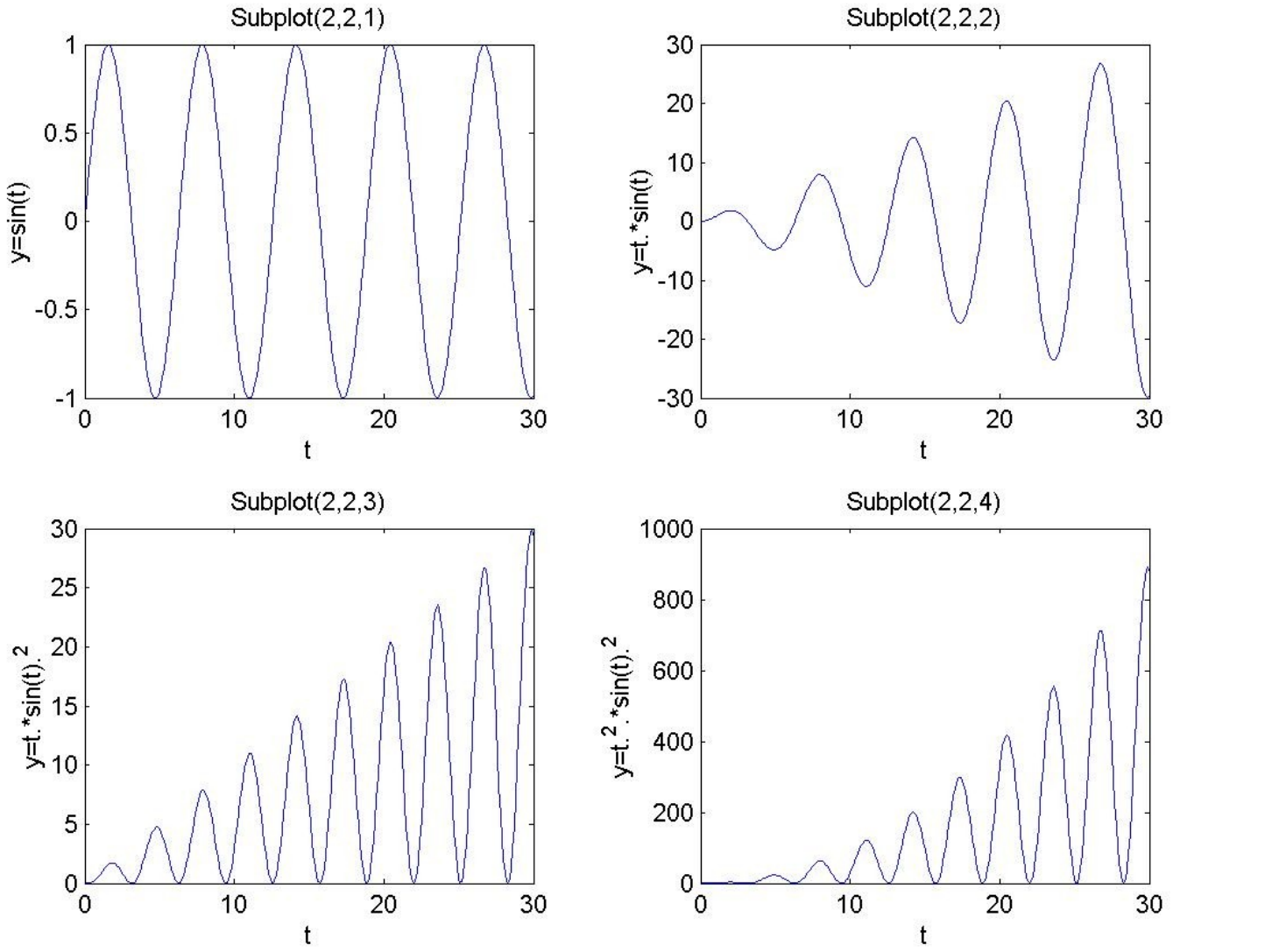
21/11/2006

Grafik dengan banyak tampilan

```
%File Name: graph_6.m
clear;clf
t=0:.1:30;
subplot(2,2,1)
y=sin(t);
plot(t,y),title('Subplot(2,2,1)'),ylabel('y=sin(t)'),xlabel('t')

subplot(2,2,2)
y1=t.*sin(t);
plot(t,y1),title('Subplot(2,2,2)'),ylabel('y=t.*sin(t)'),xlabel('t')

subplot(2,2,3)
y=t.*sin(t).^2;
plot(t,y),title('Subplot(2,2,3)'),ylabel('y=t.*sin(t).^2'),xlabel('t')

subplot(2,2,4)
y=t.^2.*sin(t).^2;
plot(t,y),title('Subplot(2,2,4)'),ylabel('y=t.^2.*sin(t).^2'),xlabel('t')
```

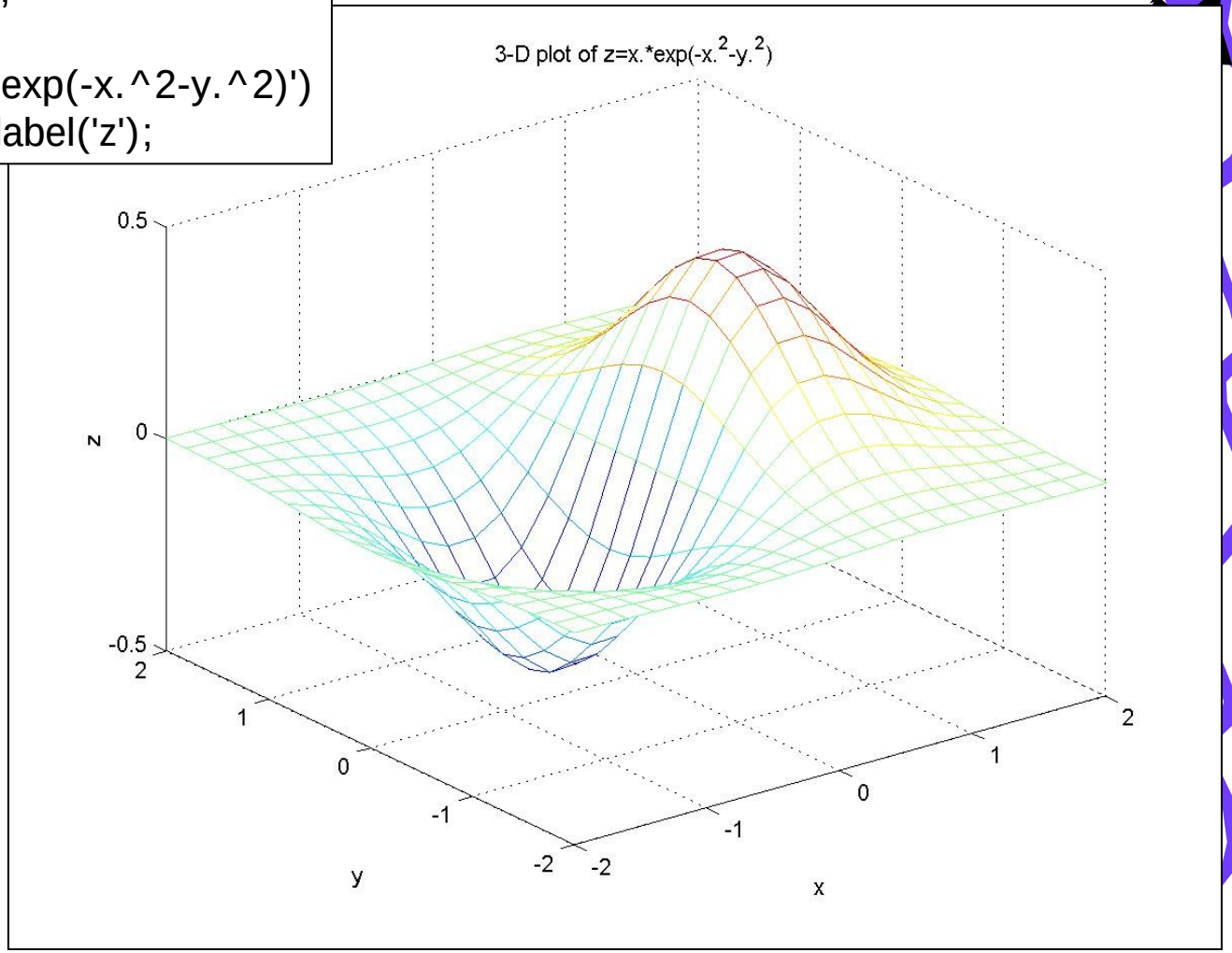


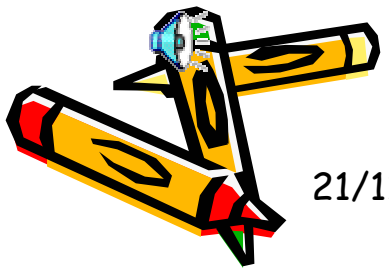
Hasilnya...


Subplot(2,2,1)
y=sin(t)
t
Subplot(2,2,2)
y=t.*sin(t)
t
Subplot(2,2,3)
y=t.*sin(t).^2
t
Subplot(2,2,4)
y=t.^2.*sin(t).^2
t

Grafik 3 Dimensi

```
%File Name: graph_7.m
clear,clf
x_title=-2:.2:2;
y_title=-2:.2:2;
[x,y]=meshgrid(x_title,y_title);
z=x.*exp(-x.^2-y.^2);
mesh(x,y,z)
title('3-D plot of z=x.*exp(-x.^2-y.^2)')
xlabel('x');ylabel('y');zlabel('z');
```

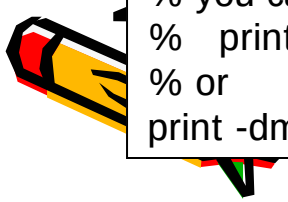


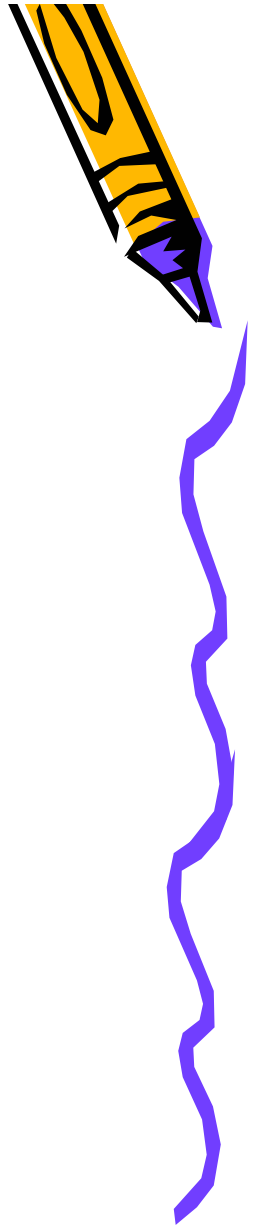


21/11/2006

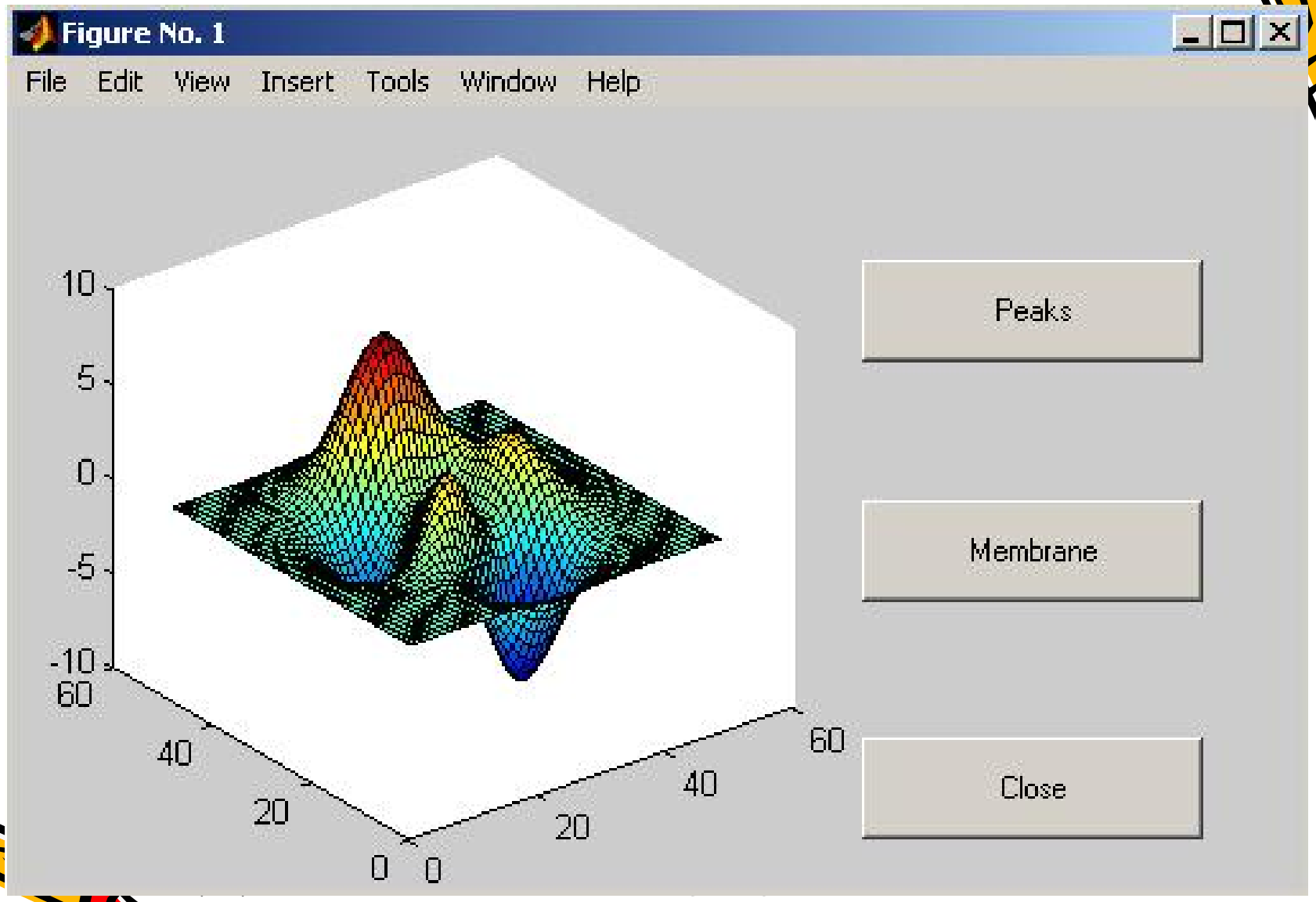
Mengenal Matlab GUI

```
% Create the figure
fig = figure('Units' , 'points' , 'Position', [30 30 380 230]);
% Create the axes and make it so they are cleared when clicked on
ax  =   axes('Units'        , 'points', ...
             'Position'     , [30 15 200 200], ...
             'ButtonDownFcn', 'cla');
% Change the viewing angle and cause subsequent plots to be placed
% on the same axes
view(3)
hold on
% Create the uicontrol pushbuttons
String = {'Close'    , 'Membrane'           , 'Peaks' };
Call = {'close(gcf)' , 'cla;surf(membrane)' , 'cla;surf(peaks)' };
for lp=1:3,
  ui(lp) = uicontrol('Style'   , 'pushbutton', ...
                     'Units'   , 'points', ...
                     'Position', [250 15+(lp-1)*70 100 30], ...
                     'Callback', Call{lp}, ...
                     'String'  , String{lp});
end
% Save the figure
% Notice you will get simple_gui1.m and simple_gui1.mat
% To load the figure, type simple_gui1
% To save this figure to an M-file that can be called to recreate the GUI,
% you can use either the line
%   print(gcf,'-dmfile','simple_gui1')
% or
print -dmfile simple_gui1
```





Tampilan GUI 1



Tampilan GUI 2