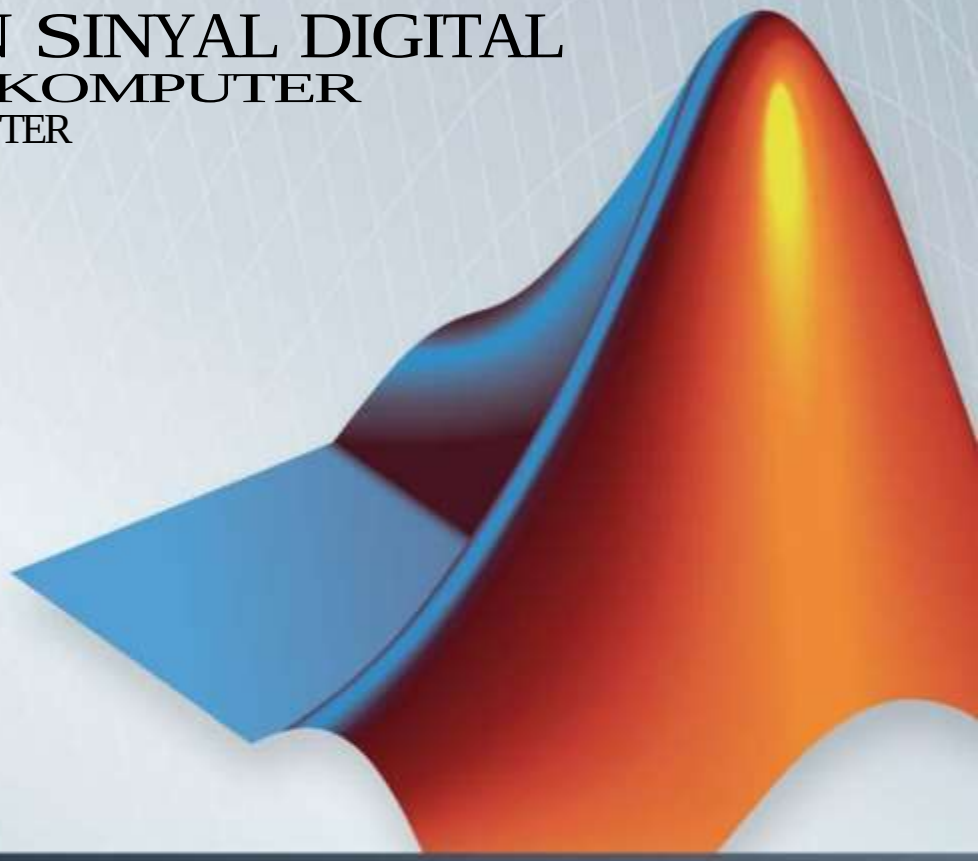
Pertemuan 6-7

# PENGENALAN MATLAB
# PENGOLAHAN SINYAL DIGITAL

## PRODI SISTEM KOMPUTER

FAKULTAS ILMU KOMPUTER
IIB DARMAJAYA



MATLAB®

**RETNO DWI HANDAYANI, S.Kom.,MTI**

MathWorks®

**7. Sinyal-Sinyal Dasar Dalam Pengolahan Sinyal Digital**

Pada bagian ini akan dicontohkan cara menghasilkan bentuk sinyal-sinyal dasar, diantaranya adalah :

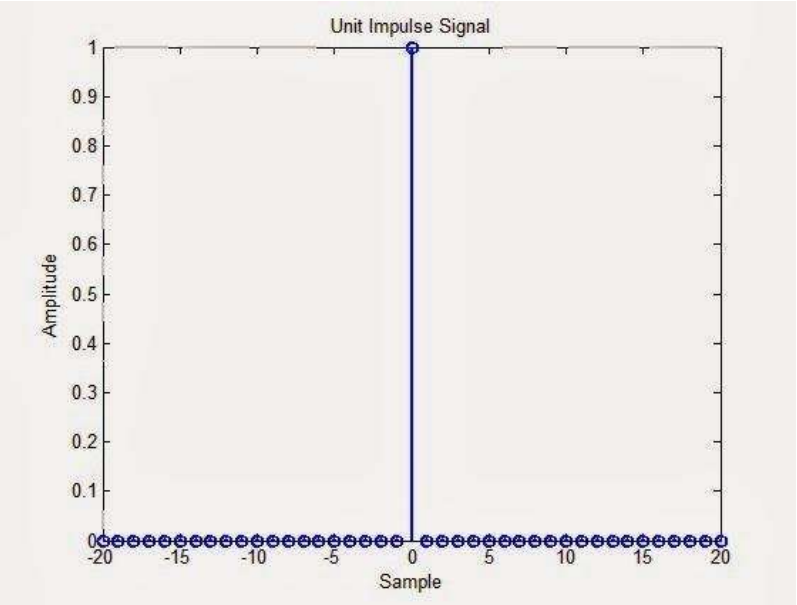
1. Impulse Signal
2. Step Signal
3. Ramp Signal
4. Square Wave
5. Sine Wave
6. Cosine Wave
7. Circle
8. Sawtooth wave
9. Triangular wave
10. Exponentially Growing Signal
11. Exponentially decaying Signal

**Point untuk diperhatikan :**

- Pada contoh ini digunakan kedua jenis sinyal baik itu diskrit maupun kontinu.
- ***stem*** digunakan untuk plot sinyal diskrit
- ***plot*** digunakan untuk plot sinyal kontinu
- ***filled*** digunakan untuk mengisi lingkaran kecil dengan warna
- ***Linewidth*** digunakan untuk menjelaskan ketebalan garis yang digunakan dalam plot

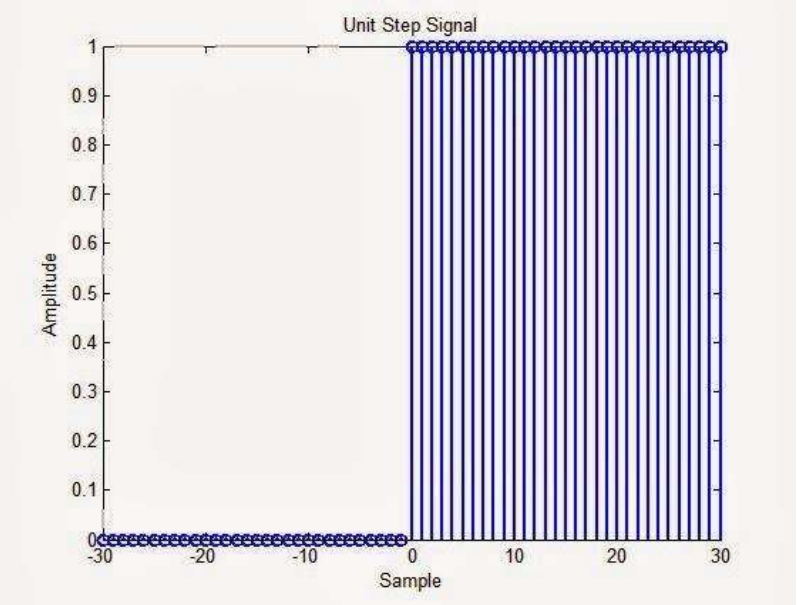
**7.1 Impulse Signal**

```
clc;
clear all;
close all;
n=-20:20; % specify index n
delta=(n==0);          % define the delta sequence
stem(n,delta,'LineWidth',2) % plot the delta sequence
xlabel('Sample');
ylabel('Amplitude');
title('Unit Impulse Signal');
```



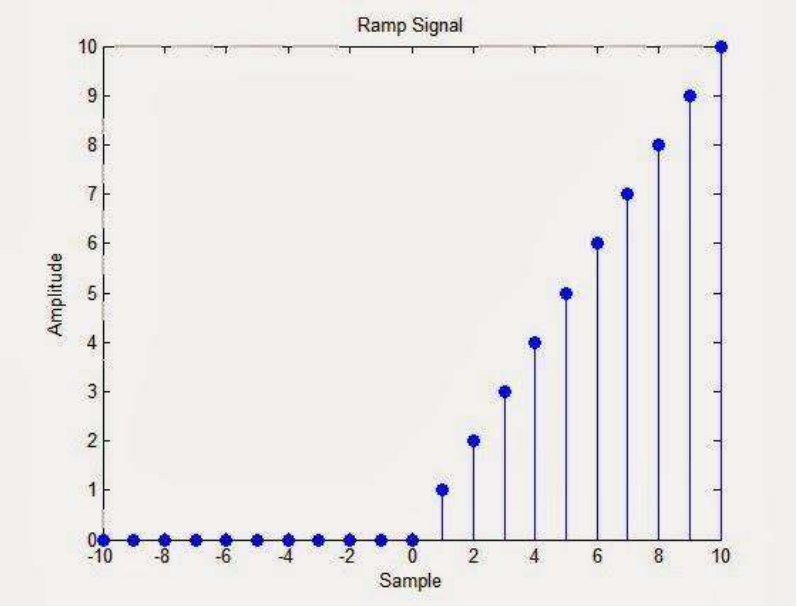

**7.2 Step Signal**

```
clc;
clear all;
close all;
n=-30:30; % specify index n
step_sig=(n>=0); % define the unit step sequence
stem(n, step_sig,'LineWidth',2) % plot the unit step sequence
xlabel('Sample');
ylabel('Amplitude');
title('Unit Step Signal');
```



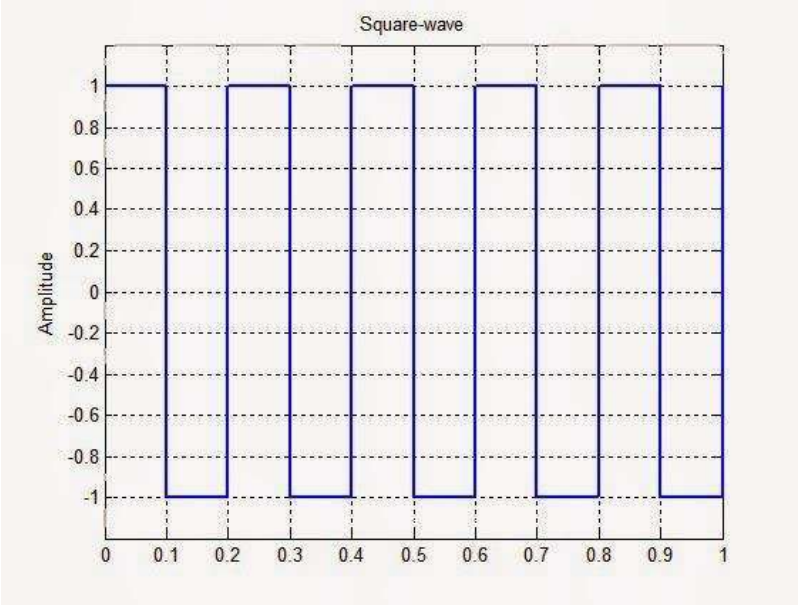

**7.3 Ramp Signal**

```
n=-10:10; % define index n
ramp=n.*(n>=0); % define a ramp
stem(n,ramp, 'filled')
xlabel('Sample');
ylabel('Amplitude');
title('Ramp Signal');
```



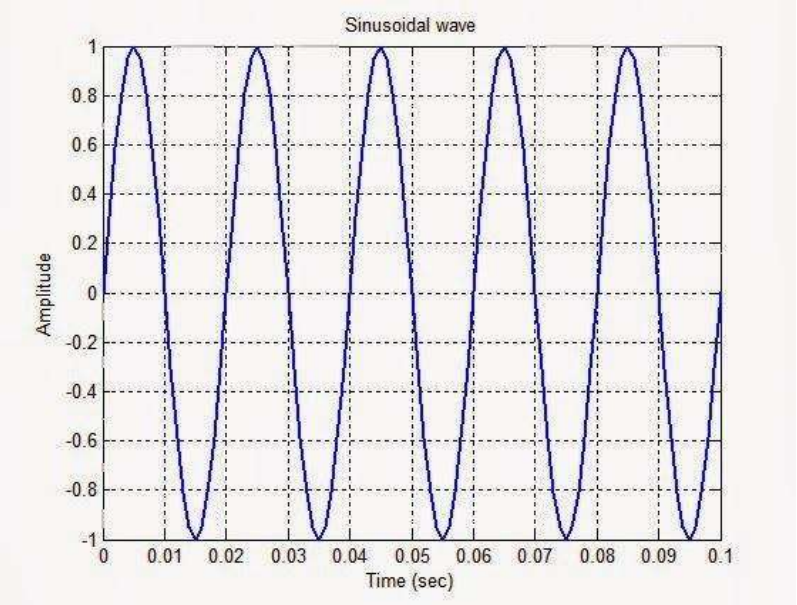
**7.4 Square Wave**

```
t=(0:0.001:1) % time base
x=square(2*pi*5*t); % squarewave generator
plot(t,x,'LineWidth',2);grid % plot squarewave
axis([0 1 -1.2 1.2]); % scale axes
title('Square-wave') % add title
ylabel('Amplitude'); % label
```



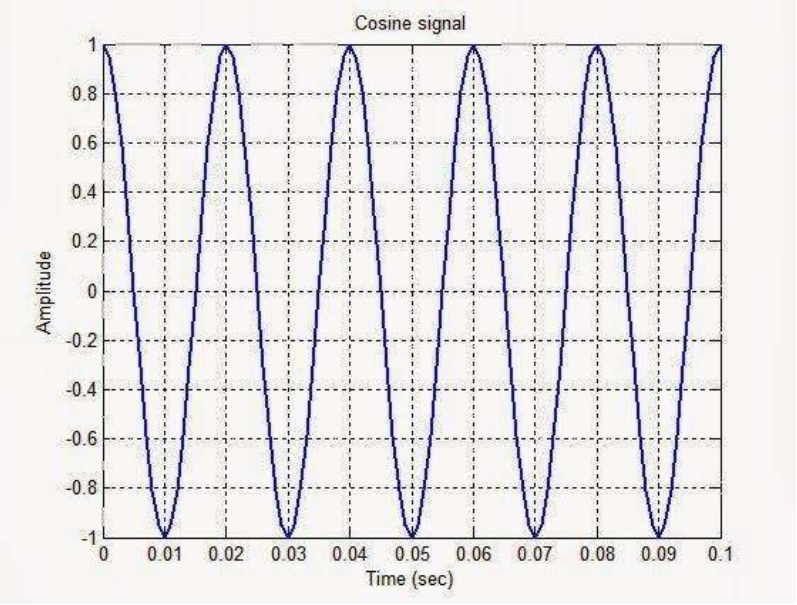

**7.5 Sine Wave**

```
Fs=1000; % sampling frequency
Ts=1/Fs; % sampling interval
t=0:Ts:0.1; % sampling instants
x=sin(2*pi*50*t); % signal vector
plot(t,x,'LineWidth',2);grid % plot the signal
xlabel('Time (sec)') % add label to the horizontal axis
ylabel('Amplitude') % add label to the vertical axis
title('Sinusoidal wave') % add title to the plot
```

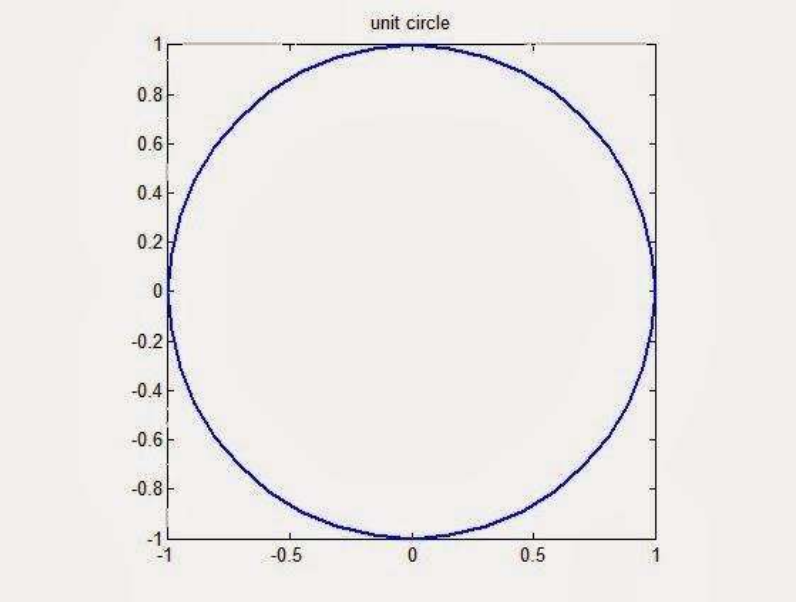



**7.6 Cosine Wave**

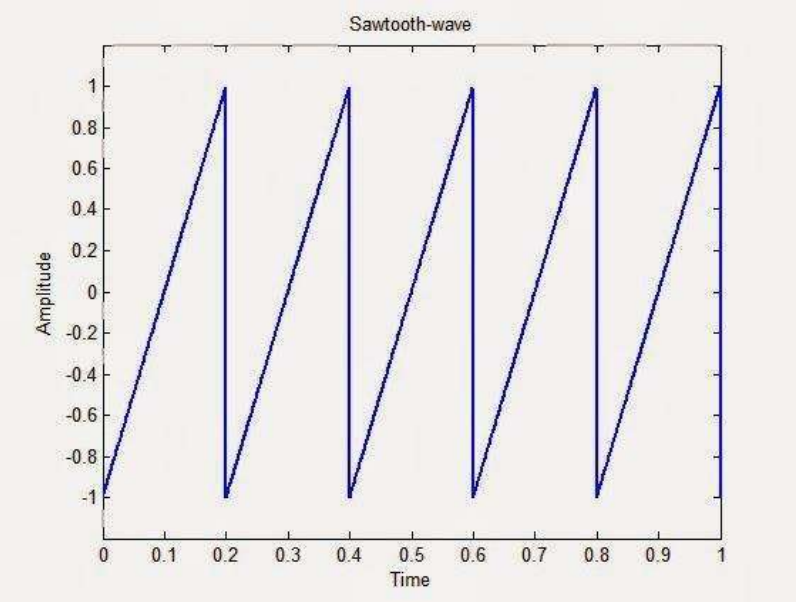
```
Fs=1000; % sampling frequency
Ts=1/Fs; % sampling interval t=0:Ts:0.1; %
sampling instants x=cos(2*pi*50*t); %
signal vector plot(t,x,'LineWidth',2);grid %
plot the signal
xlabel('Time (sec)') % add label to the horizontal axis
ylabel('Amplitude') % add label to the vertical axis
title('Cosine signal') % add title to the plot
```



**7.7 Circle** t=0:pi/20:2*pi;
plot(sin(t),cos(t),'lineWidth',2)
axis square
title('unit circle')

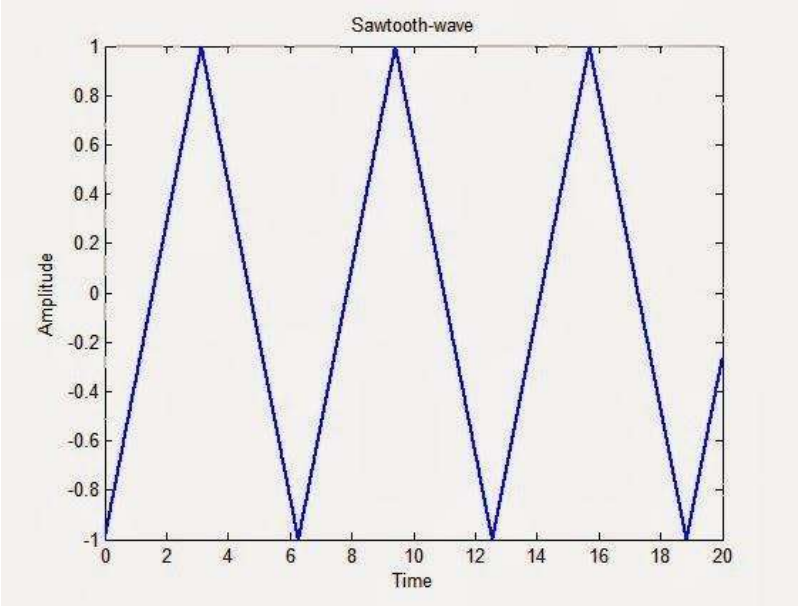



**7.8 Sawtooth wave**
t=(0:0.001:1) % time
z= sawtooth(2*pi*5*t); % sawtooth wave
plot(t,z,'LineWidth',2);% plot sawtooth wave
title('Sawtooth-wave') % add title
ylabel('Amplitude') % label the vertical axis
xlabel('Time') % label the horizontal axis
axis([0 1 -1.2 1.2])



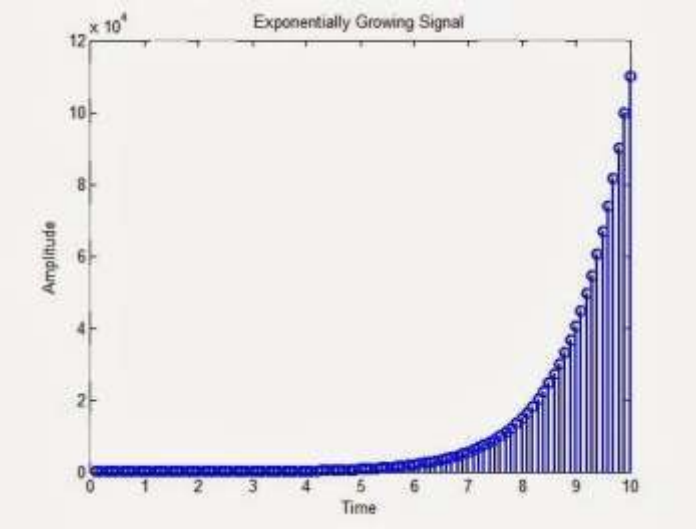
**7.9 Triangular wave**

```
clc;clear all;
N=20; % number of samples
x=0:0.1/N:20;
tri=sawtooth(x,0.5); % width=0.5 for Triangular signal
plot(x,tri,'LineWidth',2);% plot sawtooth wave
title('Sawtooth-wave') % add title
ylabel('Amplitude') % label the vertical axis
xlabel('Time') % label the horizontal axis
```




**7.10 Exponentially Growing Signal**

```
N=10; %Number of samples
A=5;  %Maximum Amplitude
t=0:0.1:N;
x=A*exp(t);
figure,stem(t,x,'LineWidth',2);
xlabel('Time'); ylabel('Amplitude');
title('Exponentially Growing Signal');
```




**7.11 Exponentially decaying Signal**

```
N=10; %Number of samples
A=5;  %Maximum Amplitude
t=0:0.1:N;
x=A*exp(-t);
figure,stem(t,x,'LineWidth',2);
xlabel('Time');
ylabel('Amplitude');
title('Exponentially Decaying Signal');
```