

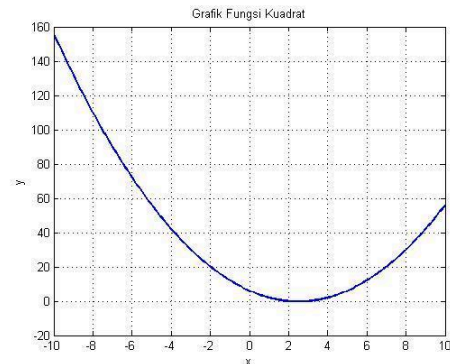
## Tugas 4 Komputasi Matematika\_662022011\_Mutiara Tyas Putri A

Membuat code berbagai grafik di Matlab

### 1. Plot fungsi kuadrat

Code :

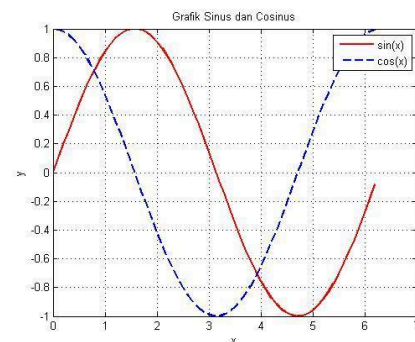
```
x = -10:0.1:10;  
y = x.^2 - 5*x + 6;  
plot(x, y, 'LineWidth', 2);  
title('Grafik Fungsi Kuadrat');  
xlabel('x'); ylabel('y');  
grid on;
```



### 2. Plot Fungsi Trigonometri (Sinus & Cosinus)

Code:

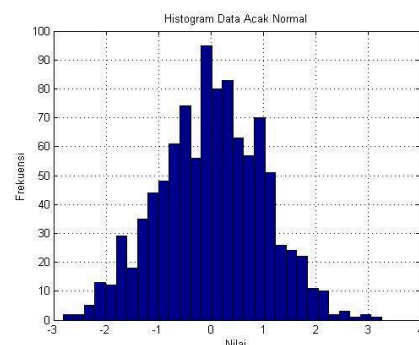
```
x = 0:0.1:2*pi;  
y1 = sin(x);  
y2 = cos(x);  
plot(x, y1, 'r', x, y2, 'b--', 'LineWidth', 2);  
legend('sin(x)', 'cos(x)');  
title('Grafik Sinus dan Cosinus');  
xlabel('x'); ylabel('y');  
grid on;
```



### 3. Histogram Data Acak Normal

Code:

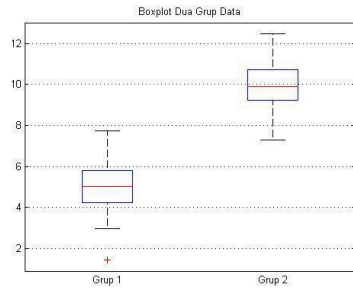
```
data = randn(1,1000);  
histogram(data, 30);  
title('Histogram Data Acak Normal');  
xlabel('Nilai'); ylabel('Frekuensi');  
grid on;
```



### 4. Boxplot Data Random

Code:

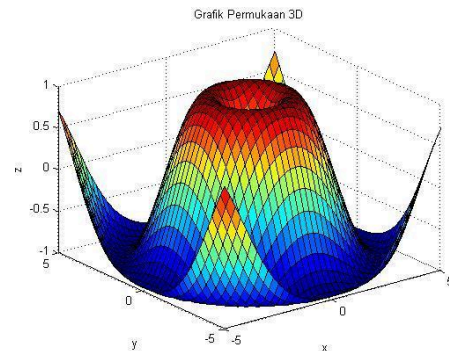
```
data = [randn(100,1)+5; randn(100,1)+10];  
group = [repmat({'Grup 1'},100,1); repmat({'Grup 2'},100,1)];  
boxplot(data, group);  
title('Boxplot Dua Grup Data');  
grid on;
```



## 5. Plot 3D Permukaan (Surface Plot)

Code:

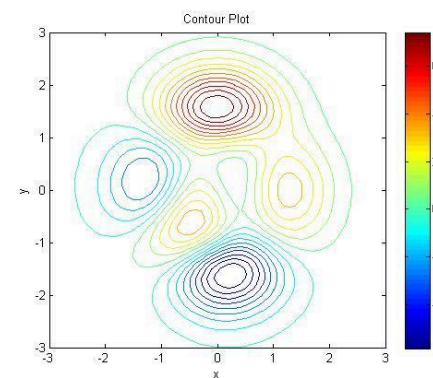
```
[x, y] = meshgrid(-5:0.25:5, -5:0.25:5);
z = sin(sqrt(x.^2 + y.^2));
surf(x, y, z);
title('Grafik Permukaan 3D');
xlabel('x'); ylabel('y'); zlabel('z');
```



## 6. Contour Plot

Code:

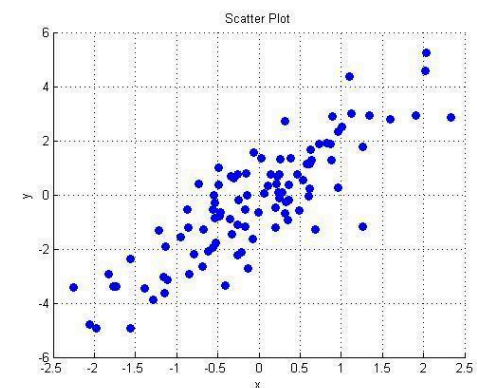
```
[x, y] = meshgrid(-3:0.1:3, -3:0.1:3);
z = peaks(x, y);
contour(x, y, z, 20);
colorbar;
title('Contour Plot');
xlabel('x'); ylabel('y');
```



## 7. Scatter Plot (Sebaran Titik)

Code:

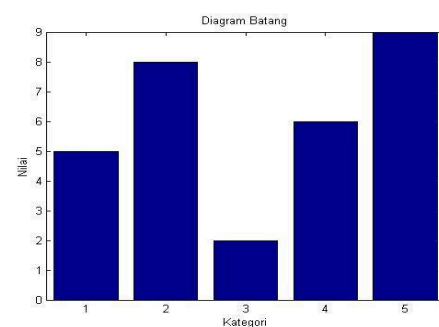
```
x = randn(100,1);
y = 2*x + randn(100,1);
scatter(x, y, 50, 'filled');
title('Scatter Plot');
xlabel('x'); ylabel('y');
grid on;
```



## 8. Bar Chart (Diagram Batang)

Code:

```
data = [5, 8, 2, 6, 9];
bar(data);
title('Diagram Batang');
xlabel('Kategori'); ylabel('Nilai');
```

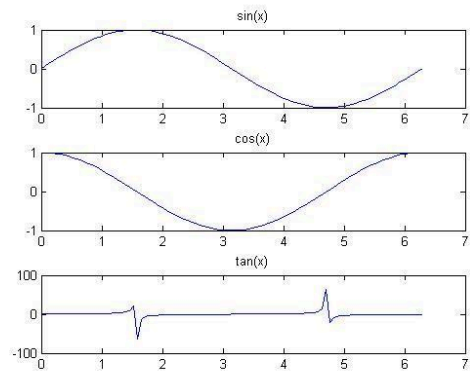


```
xticklabels({'A','B','C','D','E'});
```

### 9. Plot Banyak Fungsi dalam Subplot

Code:

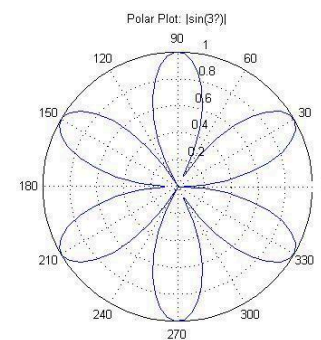
```
x = linspace(0, 2*pi, 100);
y1 = sin(x);
y2 = cos(x);
y3 = tan(x);
subplot(3,1,1); plot(x, y1); title('sin(x)');
subplot(3,1,2); plot(x, y2); title('cos(x)');
subplot(3,1,3); plot(x, y3); title('tan(x)');
```



### 10. Polar Plot

Code:

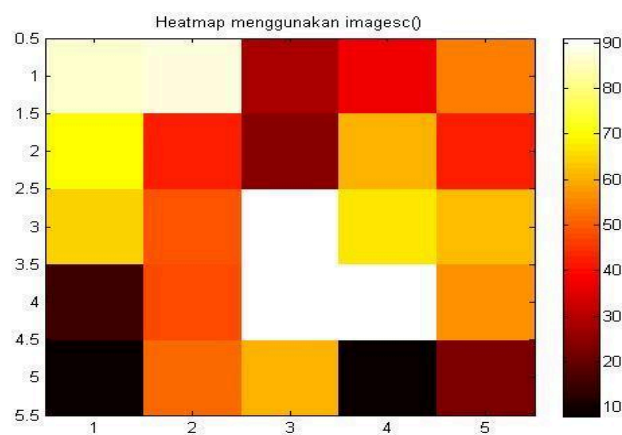
```
theta = linspace(0, 2*pi, 100);
rho = abs(sin(3*theta));
polarplot(theta, rho, 'LineWidth', 2);
title('Polar Plot: |sin(3θ)|');
```



### 11. Heatmap (Peta Panas)

Code:

```
data = randi(100, 5, 5);
heatmap(data);
title('Heatmap (Peta Panas)');
```

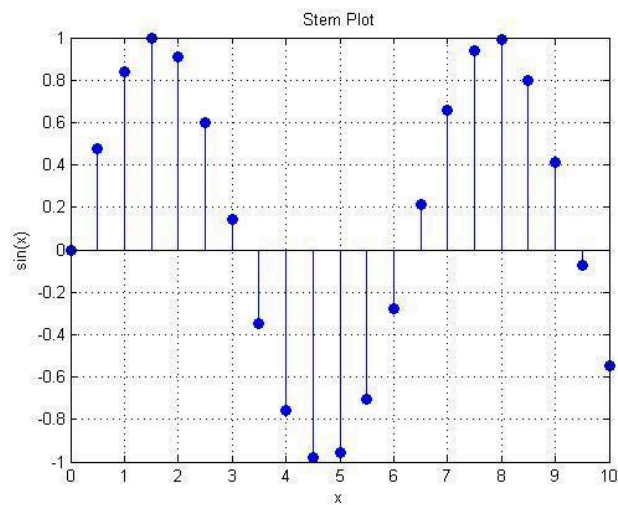


### 12. Stem Plot (Grafik Batang Diskrit)

Code:

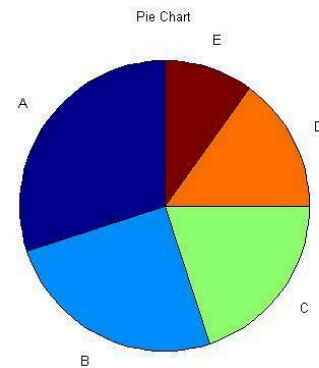
```
x = 0:0.5:10;
y = sin(x);
stem(x, y, 'filled');
title('Stem Plot');
```

```
xlabel('x'); ylabel('sin(x)');
grid on;
```



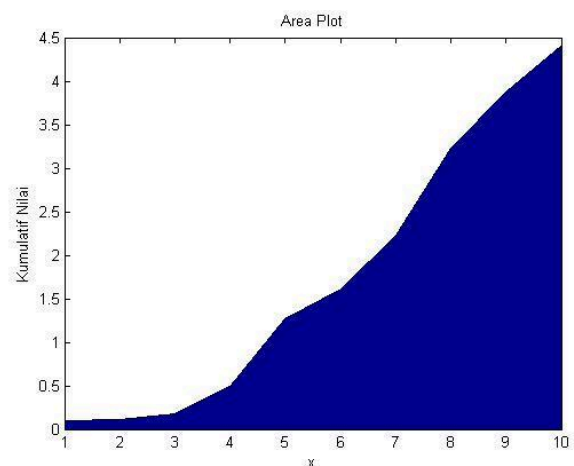
### 13. Pie Chart (Diagram Lingkaran)

```
Code:
data = [30, 25, 20, 15, 10];
labels = {'A','B','C','D','E'};
pie(data, labels);
title('Pie Chart');
```



### 14. Area Plot (Diagram Luas)

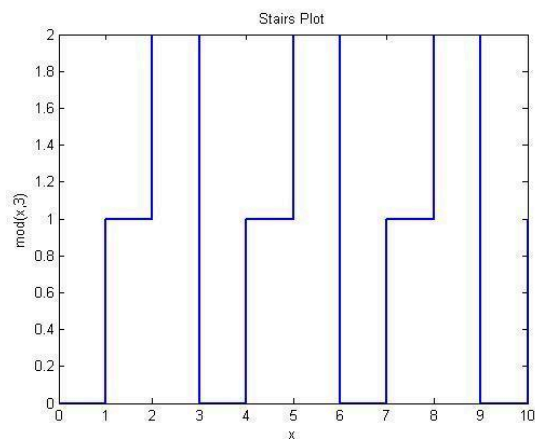
```
Code:
x = 1:10;
y = cumsum(rand(1,10));
area(x, y);
title('Area Plot');
xlabel('x'); ylabel('Kumulatif Nilai');
```



### 15. Stairs Plot (Tangga Diskrit)

```
Code:
x = 0:10;
y = mod(x, 3);
stairs(x, y, 'LineWidth', 2);
title('Stairs Plot');
```

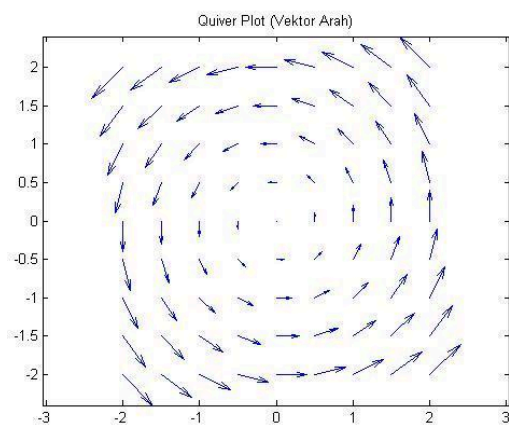
```
xlabel('x'); ylabel('mod(x,3)');
```



#### 16. Quiver Plot (Vektor Panah 2D)

Code:

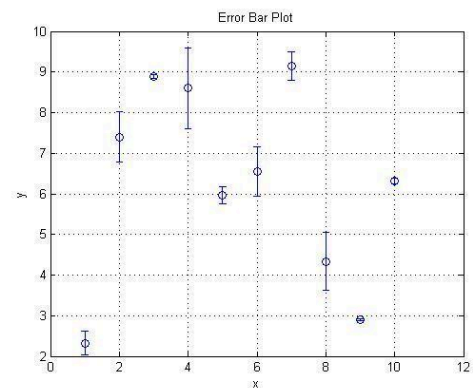
```
[x, y] = meshgrid(-2:0.5:2, -2:0.5:2);
u = -y;
v = x;
quiver(x, y, u, v);
title('Quiver Plot (Vektor Arah)');
axis equal;
```



#### 17. Error Bar Plot

Code:

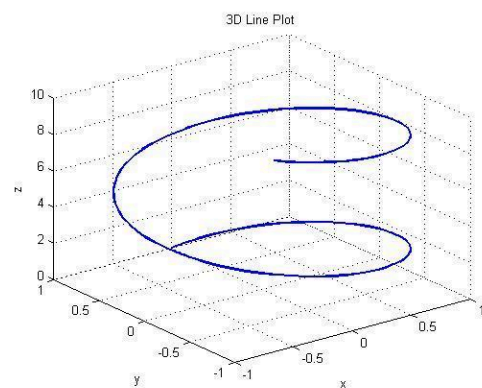
```
x = 1:10;
y = rand(1,10)*10;
e = rand(1,10);
errorbar(x, y, e, 'o');
title('Error Bar Plot');
xlabel('x'); ylabel('y');
grid on;
```



#### 18. 3D Line Plot

Code:

```
t = 0:0.1:10;
x = sin(t);
y = cos(t);
z = t;
plot3(x, y, z, 'LineWidth', 2);
title('3D Line Plot');
xlabel('x'); ylabel('y'); zlabel('z');
```

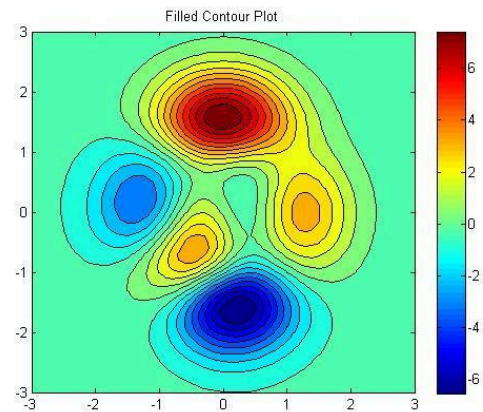


grid on;

### 19. Filled Contour Plot

Code:

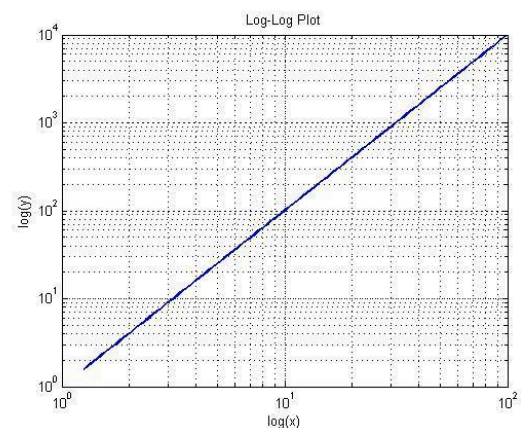
```
[x, y] = meshgrid(-3:0.1:3, -3:0.1:3);  
z = peaks(x, y);  
contourf(x, y, z, 20);  
colorbar;  
title('Filled Contour Plot');
```



### 20. Log-Log Plot

Code:

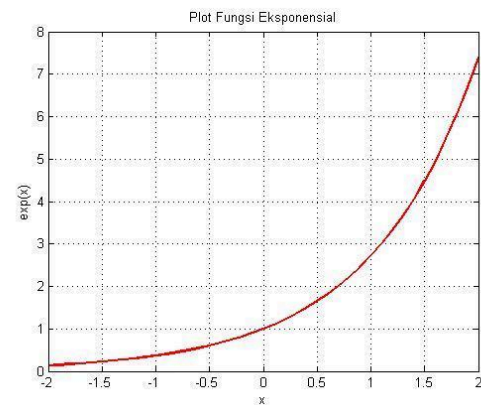
```
x = logspace(0.1, 2, 100);  
y = x.^2;  
loglog(x, y, 'LineWidth', 2);  
title('Log-Log Plot');  
xlabel('log(x)'); ylabel('log(y)');  
grid on;
```



### 21. Plot Fungsi Eksponensial

Code:

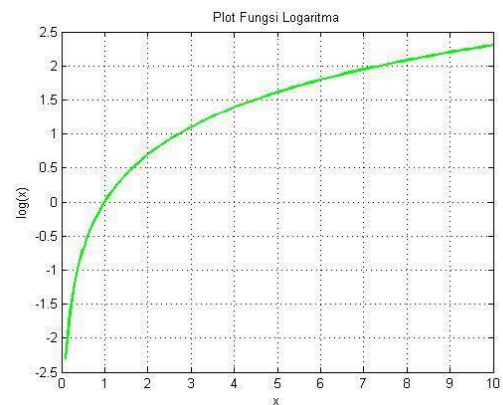
```
figure;  
x = -2:0.1:2;  
y = exp(x);  
plot(x, y, 'r', 'LineWidth', 2);  
title('Plot Fungsi Eksponensial');  
xlabel('x'); ylabel('exp(x)');  
grid on;
```



### 22. Plot Fungsi Logaritma

Code:

```
figure;  
x = 0.1:0.1:10;  
y = log(x);  
plot(x, y, 'g', 'LineWidth', 2);  
title('Plot Fungsi Logaritma');  
xlabel('x'); ylabel('log(x)');  
grid on;
```

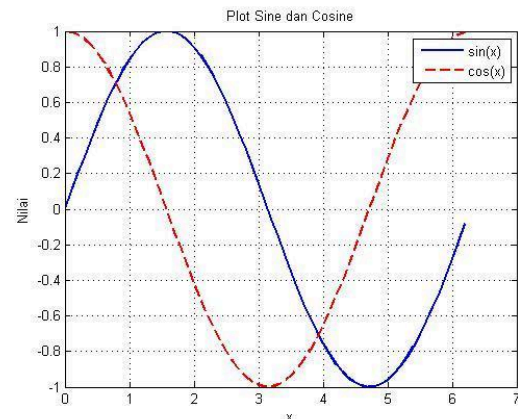




### 23. Plot Cosine dan Sine Bersamaan

Code:

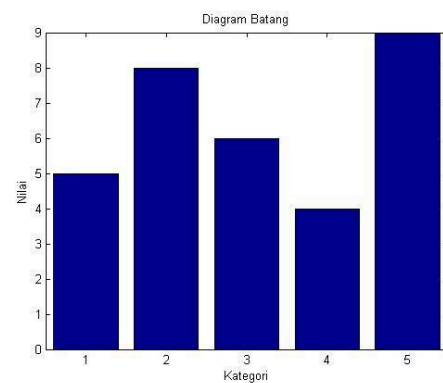
```
figure;
x = 0:0.1:2*pi;
plot(x, sin(x), 'b', x, cos(x), 'r--',
'LineWidth', 2);
legend('sin(x)', 'cos(x)');
title('Plot Sine dan Cosine');
xlabel('x'); ylabel('Nilai');
grid on;
```



### 24. Bar Chart

Code:

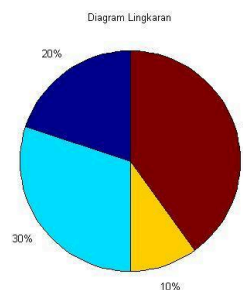
```
figure;
data = [5 8 6 4 9];
bar(data);
title('Diagram Batang');
xlabel('Kategori'); ylabel('Nilai');
```



### 25. Pie Chart

Code:

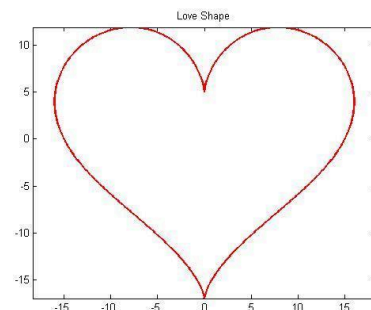
```
figure;
data = [20 30 10 40];
pie(data);
title('Diagram Lingkaran');
```



### 26. Love Shape

Code:

```
figure;
t = linspace(0, 2*pi, 1000);
x = 16*sin(t).^3;
y = 13*cos(t) - 5*cos(2*t) - 2*cos(3*t) - cos(4*t);
plot(x, y, 'r', 'LineWidth', 2);
axis equal;
title('Love Shape');
```



### 27. Butterfly Curve

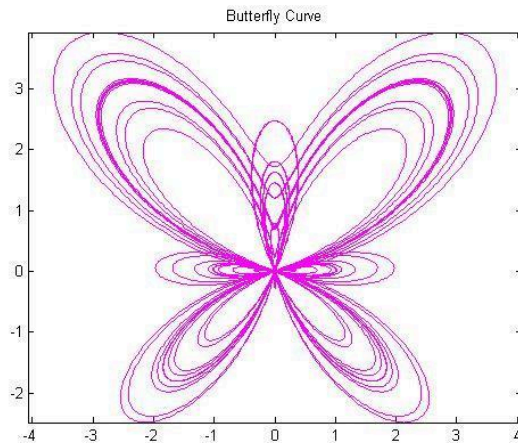
Code:

```
figure;
```

```

t = linspace(0, 24*pi, 10000);
x = sin(t) .* (exp(cos(t)) - 2*cos(4*t) - sin(t/12).^5);
y = cos(t) .* (exp(cos(t)) - 2*cos(4*t) - sin(t/12).^5);
plot(x, y, 'm');
axis equal;
title('Butterfly Curve');

```

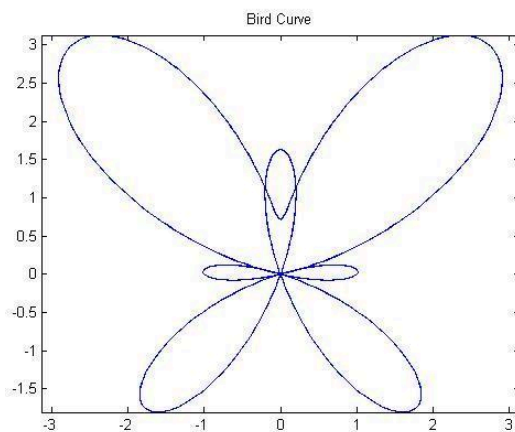


## 28. Bird Curve

```

Code:
figure;
t = linspace(-2*pi, 2*pi, 1000);
x = sin(t).*(exp(cos(t)) - 2*cos(4*t));
y = cos(t).*(exp(cos(t)) - 2*cos(4*t));
plot(x, y, 'b');
axis equal;
title('Bird Curve');

```



## 29. Leaf Curve

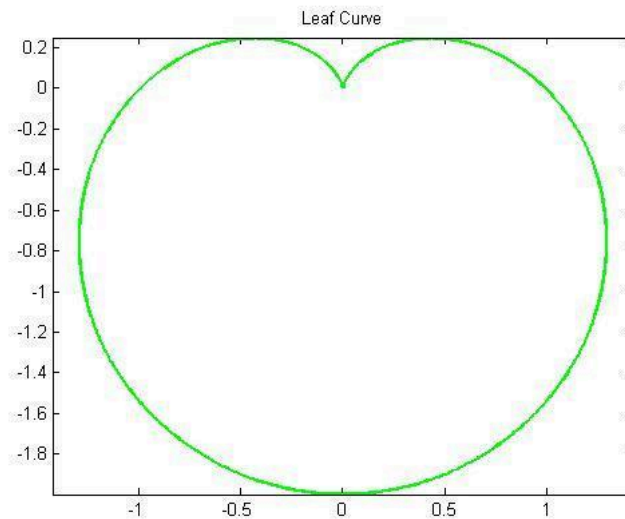
```

Code:

```



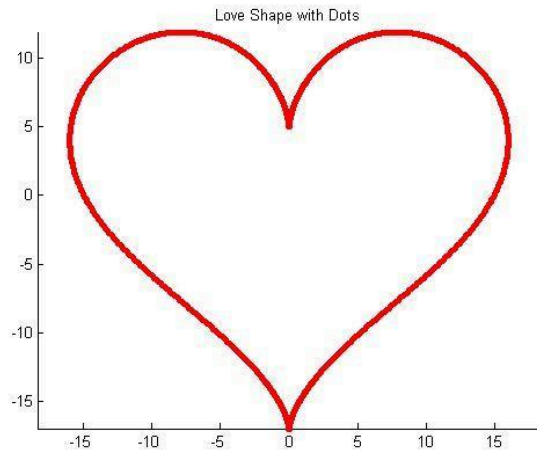
```
figure;
t = linspace(0, 2*pi, 1000);
r = 1 - sin(t);
x = r .* cos(t);
y = r .* sin(t);
plot(x, y, 'g', 'LineWidth', 2);
axis equal;
title('Leaf Curve');
```



### 30. Heart Filled with Dots

Code:

```
figure;
t = linspace(0, 2*pi, 1000);
x = 16*sin(t).^3;
y = 13*cos(t) - 5*cos(2*t) - 2*cos(3*t) - cos(4*t);
scatter(x, y, 10, 'r', 'filled'); % Gunakan titik-titik
axis equal;
title('Love Shape with Dots');
```



### 31. Line Plot with Confidence Bounds

Code:

```
figure;
```

```
% Data utama
```

```
x = 1:20;
```

```
y = sin(x/2) + 0.1*x;
```

```
% Batas kepercayaan (misal:  $\pm 0.3$ )
```

```
lower = y - 0.3;
```

```
upper = y + 0.3;
```

```
% Gambar area batas kepercayaan dengan fill manual
```

```
hold on;
```

```
fill([x, fliplr(x)], [upper, fliplr(lower)], [0.9 0.9 0.9], 'EdgeColor', 'none'); % area
```

```
abu-abu
```

```
plot(x, y, 'b', 'LineWidth', 2); % garis utama
```

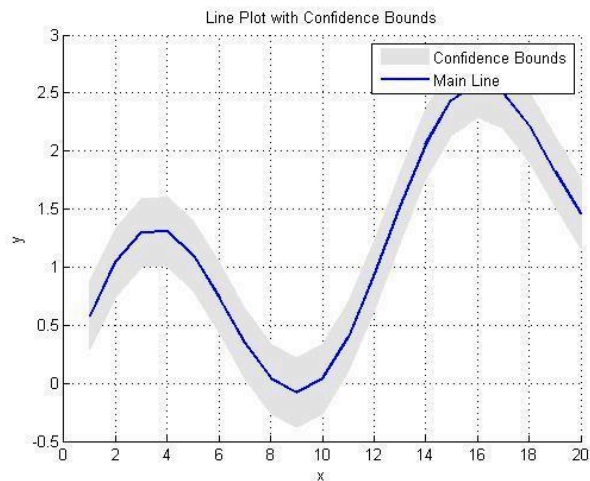
```
hold off;
```

```
title('Line Plot with Confidence Bounds');
```

```
xlabel('x'); ylabel('y');
```

```
legend('Confidence Bounds', 'Main Line');
```

```
grid on;
```



### 32. Plot Dates and Time

Code:

figure;

% Data tanggal (pakai format serial number MATLAB)

% Misalnya dari 1 Januari 2024 sampai 10 Januari 2024

tanggal = datenum(2024, 1, 1:10);

% Data nilai y

nilai = rand(1, 10) \* 10;

% Plot dengan sumbu x berbasis tanggal

plot(tanggal, nilai, '-o', 'LineWidth', 2);

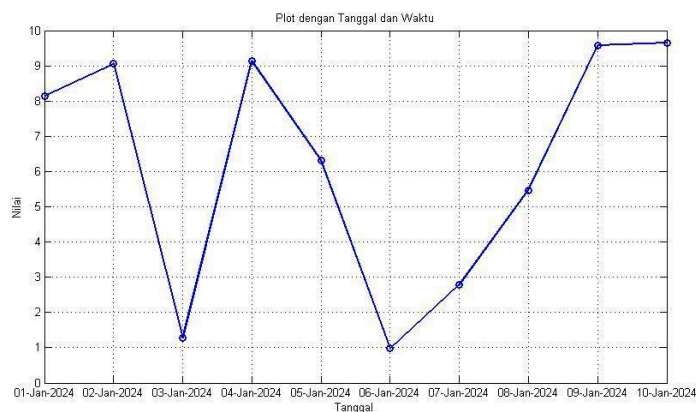
datetick('x', 'dd-mmm-yyyy', 'keepticks'); % Tampilkan format tanggal

xlabel('Tanggal');

ylabel('Nilai');

title('Plot dengan Tanggal dan Waktu');

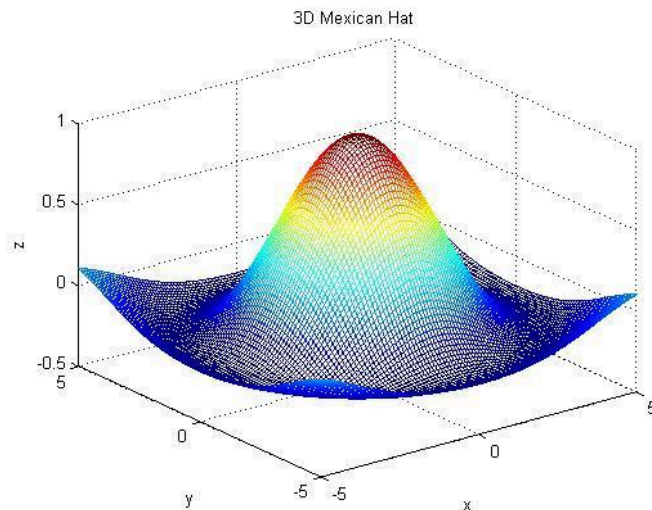
grid on;



### 33. 3D Hat (Topi Meksiko)

Code:

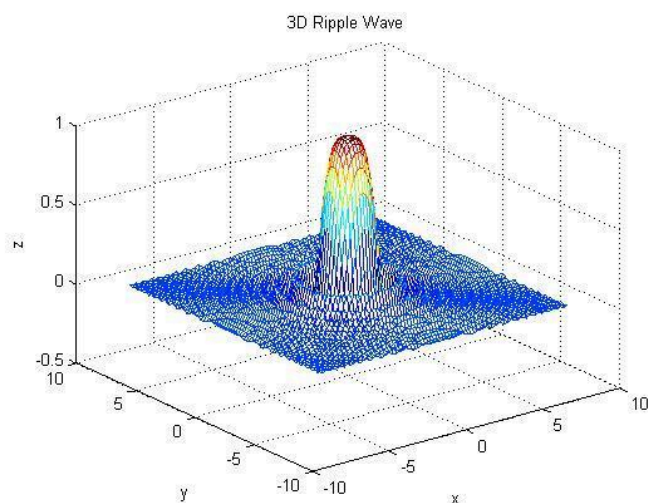
```
figure;  
[x, y] = meshgrid(-5:0.1:5, -5:0.1:5);  
r = sqrt(x.^2 + y.^2) + eps;  
z = sin(r)./r;  
mesh(x, y, z); % gunakan mesh agar kompatibel  
title('3D Mexican Hat');  
xlabel('x'); ylabel('y'); zlabel('z');
```



#### 34. 3D Ripple

Code:

```
figure;  
[x, y] = meshgrid(-8:0.2:8, -8:0.2:8);  
z = sin(x.^2 + y.^2)./(x.^2 + y.^2 + eps);  
mesh(x, y, z);  
title('3D Ripple Wave');  
xlabel('x'); ylabel('y'); zlabel('z');
```



### 35. 3D Mountain

Code:

```
figure;
```

```
[x, y] = meshgrid(-5:0.1:5, -5:0.1:5);
```

```
z = exp(-0.1*(x.^2 + y.^2)) .* cos(2*x) .* cos(2*y);
```

```
mesh(x, y, z);
```

```
title('3D Mountain');
```

```
xlabel('x'); ylabel('y'); zlabel('z');
```

