

AMS 595.03 MATLAB Part 4

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Plotting.....1

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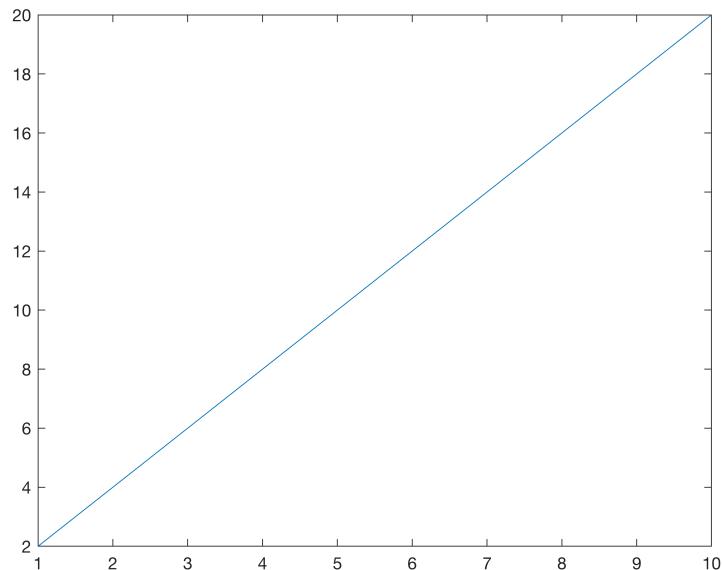
For further reading, Ch. 12 of [Attaway](#) and Ch. 9 of [Lockhart/Tilleson](#) also cover some of the topics of this lecture.

Plotting

```
y = 2 * (1 : 10)
```

```
y = 1x10  
2 4 6 8 10 12 14 16 18 20
```

```
figure;  
plot( y );
```



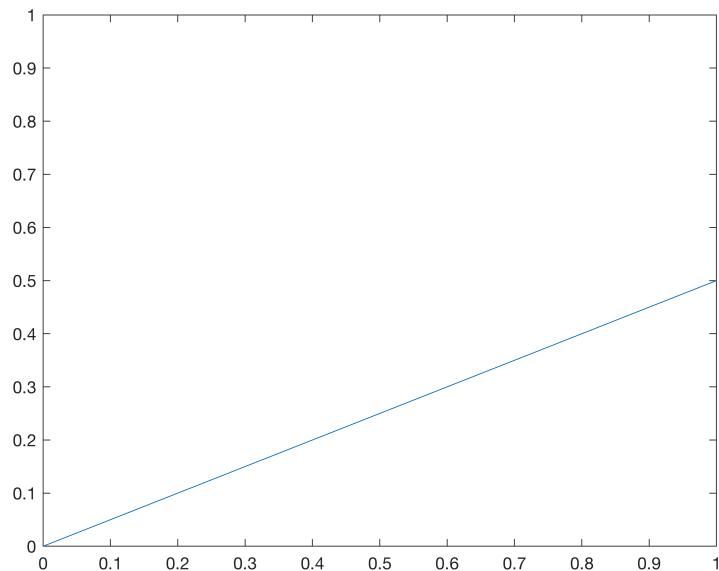
```
x = 0 : 0.1 : 1
```

```
x = 1x11  
0 1.000000000000000e-01 2.000000000000000e-01 ...
```

```
y = 0.5 * x
```

```
y = 1x11
0      5.00000000000000e-02      1.00000000000000e-01 ...
```

```
plot( x, y);
axis( [0, 1, 0, 1]);
```



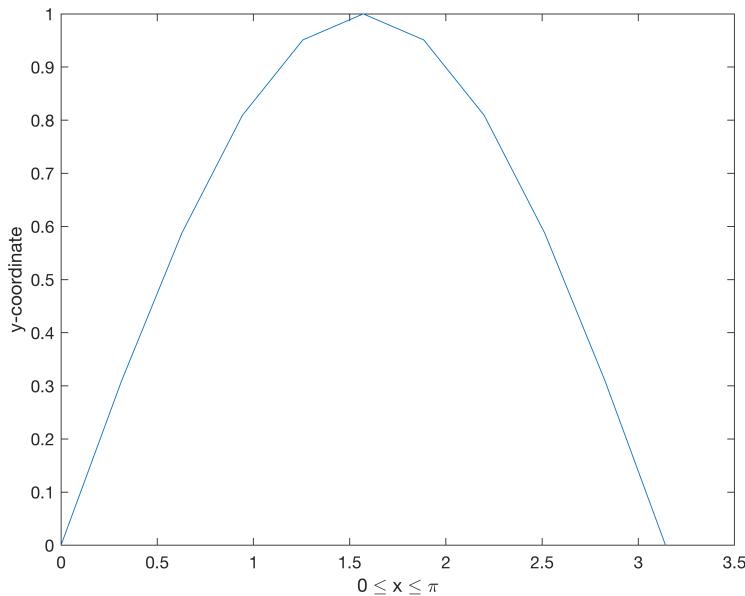
```
x = 0 : pi / 10 : pi
```

```
x = 1x11
0      3.141592653589793e-01      6.283185307179586e-01 ...
```

```
y = sin( x)
```

```
y = 1x11
0      3.090169943749474e-01      5.877852522924731e-01 ...
```

```
plot( x, y);
xlabel( '0 \leq x \leq \pi');
ylabel( 'y-coordinate');
```



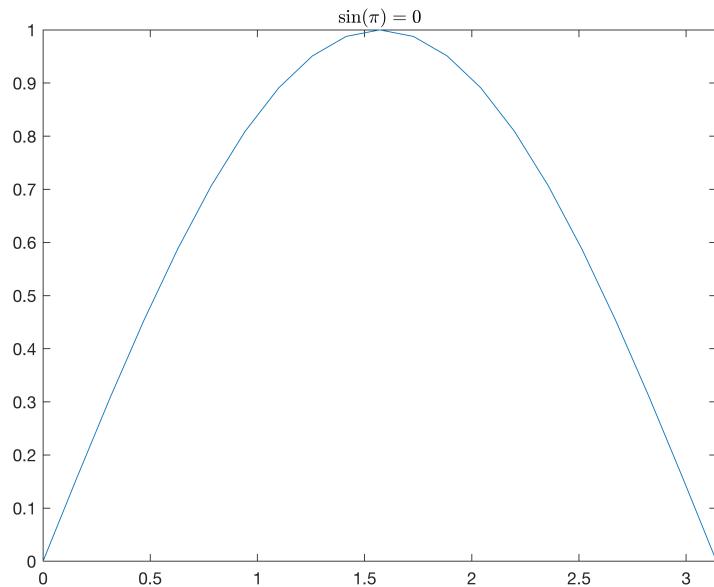
```
x = 0 : pi / 20 : pi
```

```
x = 1x21
0      1.570796326794897e-01      3.141592653589793e-01 ...
```

```
y = sin( x)
```

```
y = 1x21
0      1.564344650402309e-01      3.090169943749474e-01 ...
```

```
plot( x, y);
xlim( [0, pi]);
title( '$$\sin( \pi) = 0$$', 'Interpreter', 'latex');
```



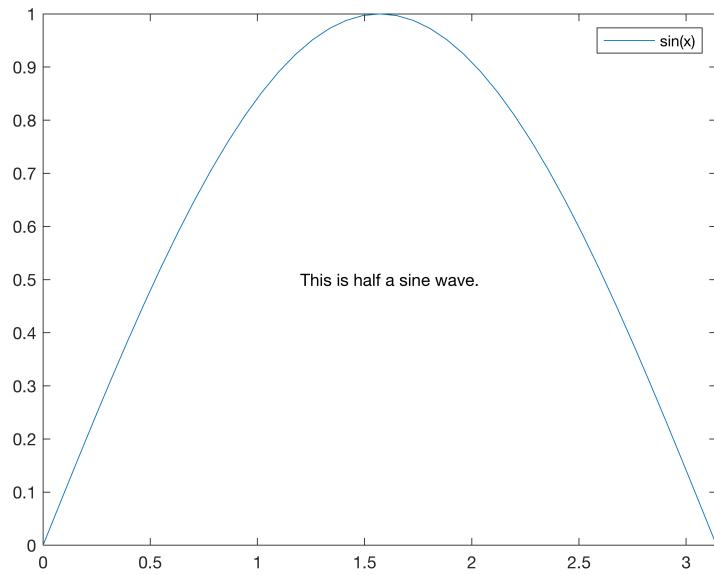
```
x = 0 : pi / 40 : pi
```

```
x = 1x41
0      7.853981633974483e-02      1.570796326794897e-01 ...
```

```
y1 = sin( x)
```

```
y1 = 1x41
0      7.845909572784494e-02      1.564344650402309e-01 ...
```

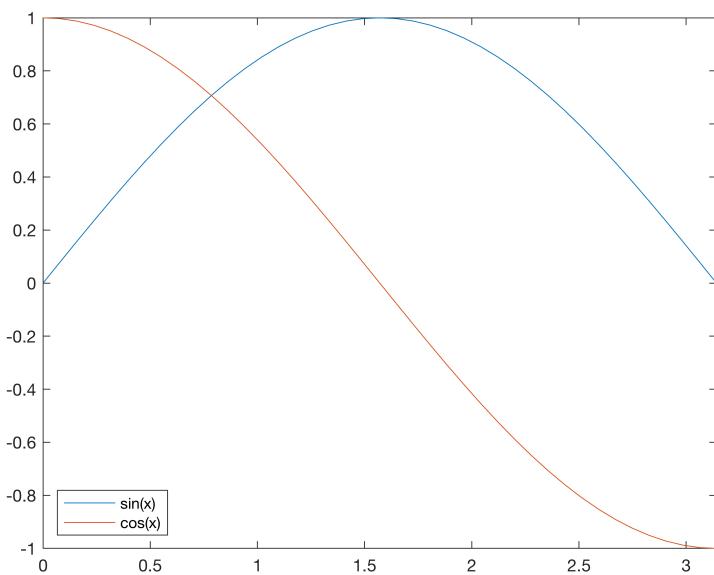
```
plot( x, y1);
xlim( [0, pi]);
text( 1.2, 0.5, 'This is half a sine wave.');
legend( 'sin(x)' );
```



$$y^2 = \cos(x)$$

y2 = 1x41
1.00000000000000e+00 9.969173337331280e-01 9.876883405951378e-01 ...

```
plot( x, y1, x, y2);
xlim( [0, pi]);
legend( 'sin(x)', 'cos(x)', 'location', 'SouthWest');
```



```

y1 = sin( x + 0.5);
plot( x, y1, 'b--');
xlim( [0, pi]);
hold( 'on');

```

```

y2 = sin( x + 0.25);
plot( x, y2, 'r:', 'LineWidth', 2);
y3 = sin( x)

```

```

y3 = 1x41
0      7.845909572784494e-02      1.564344650402309e-01 ...

```

```

plot( x, y3, 'g-.');
y4 = sin( x - 0.25)

```

```

y4 = 1x41
-2.474039592545229e-01     -1.706213029681449e-01     -9.278670961162754e-02 ...

```

```

plot( x, y4, 'co');
y5 = sin( x - 0.5)

```

```

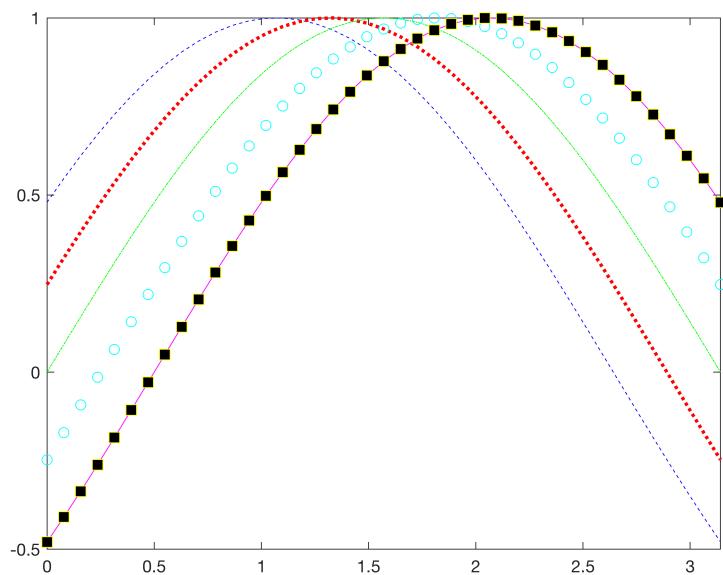
y5 = 1x41
-4.794255386042030e-01     -4.090932954364267e-01     -3.362388560649597e-01 ...

```

```

plot( x, y5, '-ms', 'MarkerSize', 8, ...
      'MarkerEdgeColor', 'y', 'MarkerFaceColor', 'k');
hold( 'off');
saveas( gcf, 'figure', 'jpg');
saveas( gcf, 'figure', 'pdf');

```

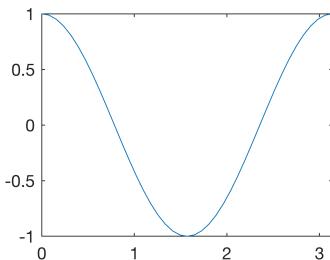
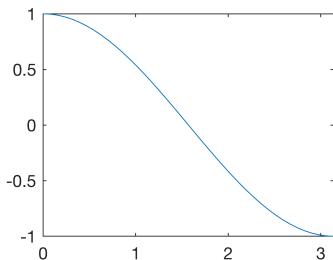
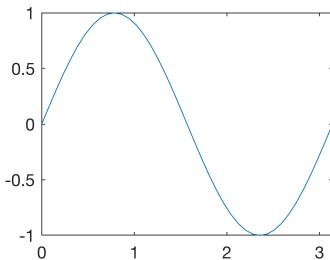
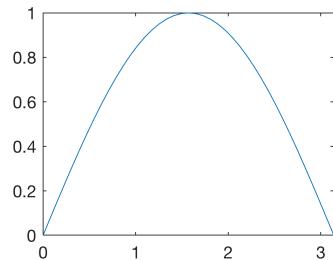


```

figure;
subplot( 2, 2, 1);
plot( x, sin( x));
subplot( 2, 2, 2);
plot( x, sin( 2 * x));
subplot( 2, 2, 3);
plot( x, cos( x));
subplot( 2, 2, 4);

```

```
plot( x, cos( 2 * x ));
```



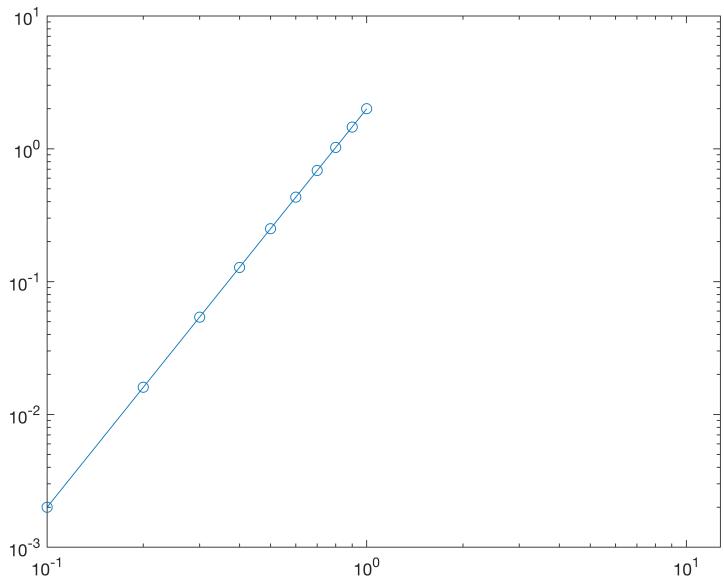
```
x = 0 : 0.1 : 1
```

```
x = 1x11
0      1.000000000000000e-01      2.000000000000000e-01 ...
```

```
y = 2 * x .^ 3
```

```
y = 1x11
0      2.000000000000000e-03      1.600000000000000e-02 ...
```

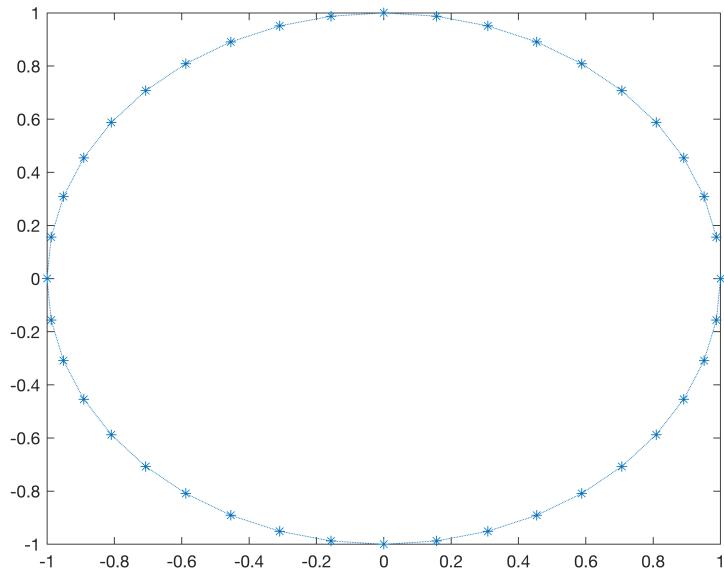
```
figure;
loglog( x, y, '-o' );
axis( 'equal' );
```



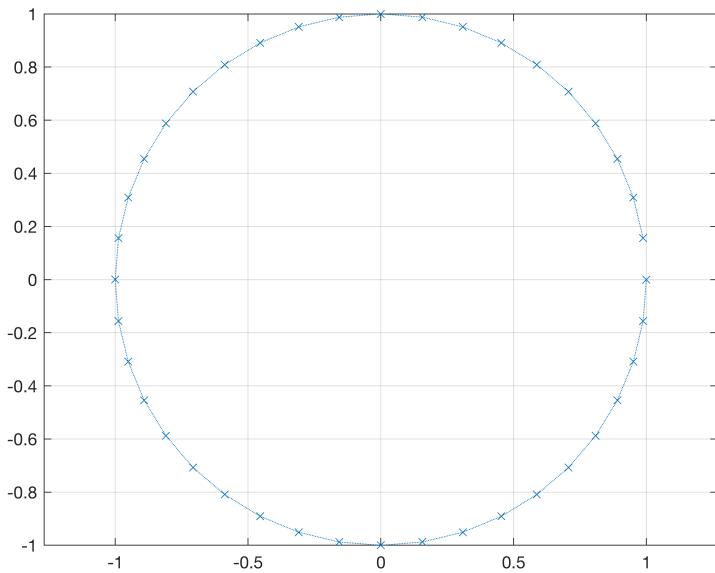
```
theta = pi / 20 : pi / 20 : 2 * pi
```

```
theta = 1x40
1.570796326794897e-01      3.141592653589793e-01      4.712388980384690e-01 ...
```

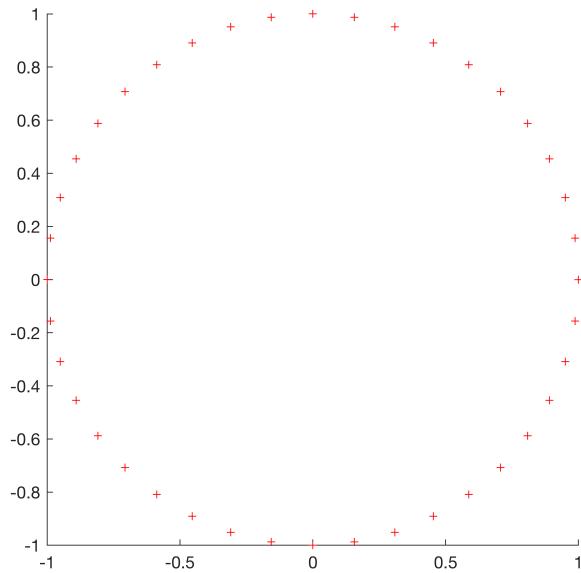
```
z = exp( li * theta)
plot( z, ':*' );
```



```
plot( z, ':x' );
axis( 'equal' );
grid( 'on' );
```



```
scatter( real( z), imag( z), 20, 'r+' );
axis( 'square' );
```



```
figure;
hold( 'on' );
axis( [-1, 1, -1, 1])
axis( 'square' );
axis( 'manual' );
axis( 'off' );
video = VideoWriter( 'roots_of_unity.avi' );
open( video );
for i = 1 : length( z )
```

```

scatter( real( z( i)), imag( z( i)), 'filled');
drawnow;
writeVideo( video, getframe( gcf));
end
hold( 'off');

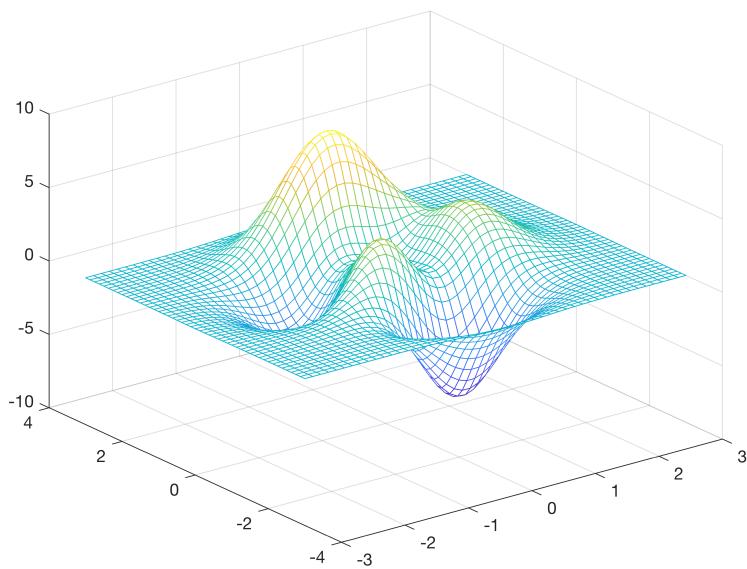
```



```

close( video);
[X, Y, Z] = peaks;
mesh( X, Y, Z);

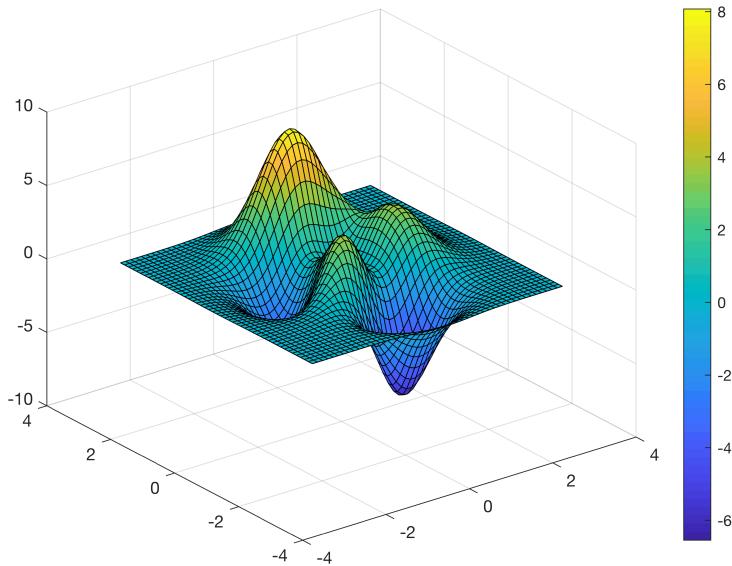
```



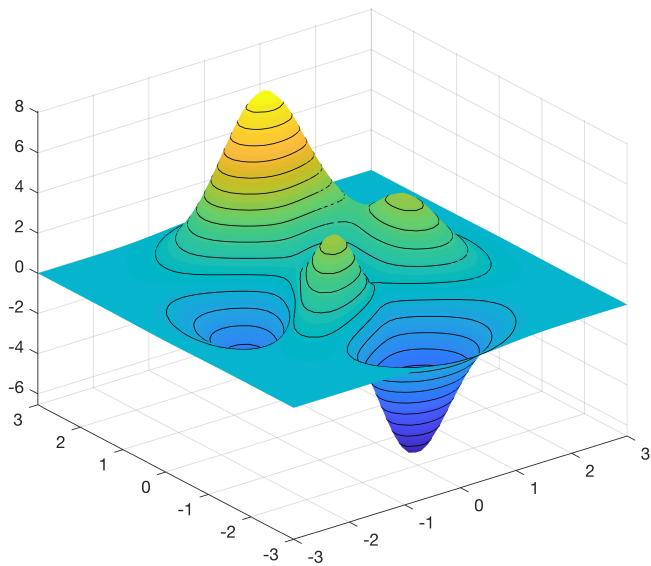
```

surf( X, Y, Z);
colormap( 'parula');
colorbar;

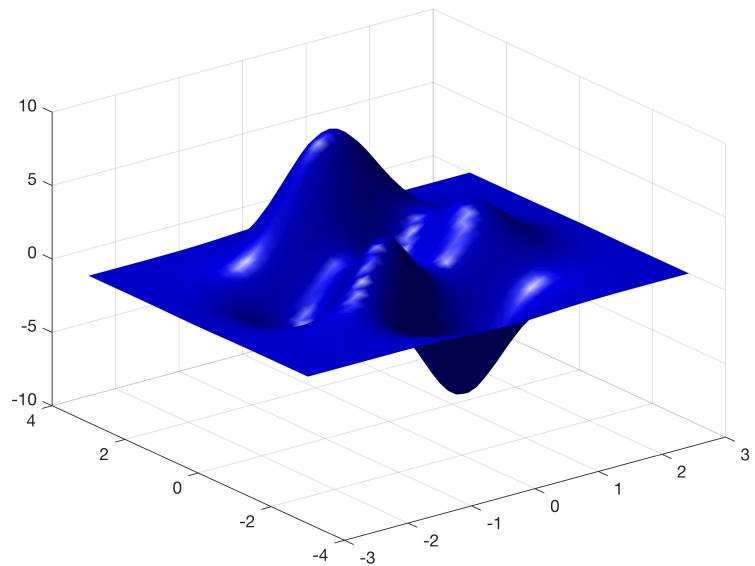
```



```
surf( X, Y, Z);
shading( 'interp' );
hold( 'on' );
contour3( X, Y, Z, 20, 'k' );
hold( 'off' );
```



```
surf( X, Y, Z, 'FaceColor', 'b', 'EdgeColor', 'none' );
camlight( 'left' );
lighting( 'gouraud' );
```



life