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```
% MTH-351: Lab-0

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```

Problem A:

```
% Problem 1 (Answer):
tut1 = zeros(3,5)
tut2 = ones(3,5)

% Problem 2 (Answer):
size(tut1)
size(tut2)
```

```
tut1 =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0


tut2 =

     1     1     1     1     1
     1     1     1     1     1
     1     1     1     1     1


ans =

     3     5


ans =

     3     5
```

Problem B:

```
% Problem 1 (Answer):
ones_set = ones(1,5);
ones_diag = diag(ones_set)

% Problem 2 (Answer):
even_me = [6:2:25]
```

```
ones_diag =

     1     0     0     0     0
     0     1     0     0     0
     0     0     1     0     0
     0     0     0     1     0
     0     0     0     0     1


even_me =

     6     8    10    12    14    16    18    20    22    24
```

Problem C:

```
% Problem 1 (Answer):
fdj = [ 1 2 3;5 4 3; 6 5 8 ];
a = fdj+3
% Explain: adding 3 to each enteries
b = fdj-6
% Explain: substracting 6 from each enteries
c = fdj/2
% Explain: dividing each enteries by 2

% Problem 2 (Answer):
abc = 1:10
% Explain: make a row vector from 1 to 10
def = 5:14
% Explain: make a row vector from 5 to 14
ghi = 3*abc + def
% Explain: multiply matrix 'abc' by 3, then add matrix 'def' to it

% Problem 3 (Answer):
abc = [1 2 3 4;5 6 7 8]
% Explain: make 2x4 matrix that its first row contains 1, 2, 3, and 4,
 and
%         and the second row cotains 5, 6, 7, and 8

def = [4 3 2 1;8 7 6 5]
% Explain: make 2x4 matrix that its first row contains 4, 3, 2, and 1,
 and
%         and the second row cotains 8, 7, 6, and 5
```

```
abc + def
% Explain: add matrix 'abc' and matrix 'def' together

% Problem 4 (Answer):
tut1 .* tut2
% Explain: multiply matrix 'tut1', which contains only zeros, by
 matrix
%         'tut2', which contains only  ones, so it displays all zeros

tut2 .* tut1
% Explain: multiply matrix 'tut2', which contains only ones, by matrix
%         'tut1', which contains only  zeros, so it displays all zeros

tut1 ./ tut2
% Explain: divide matrix 'tut1', which contains only zeros, by matrix
%         'tut2', which contains only ones, so it displays all zeros

tut2 ./ tut1
% Explain: divide matrix 'tut2', which contains only ones, by matrix
%         'tut1', which contains only zeros, so it displays all
 Infinity

tut1 .^ 2
% Explain: matrix 'tut1', which contains all zeros, raised to the
 power of
%         two, so it displays all zeros


a =

     4     5     6
     8     7     6
     9     8    11


b =

    -5    -4    -3
    -1    -2    -3
     0    -1     2


c =

    0.5000    1.0000    1.5000
    2.5000    2.0000    1.5000
    3.0000    2.5000    4.0000


abc =

     1     2     3     4     5     6     7     8     9    10
```

```
def =

     5     6     7     8     9    10    11    12    13    14


ghi =

     8    12    16    20    24    28    32    36    40    44


abc =

     1     2     3     4
     5     6     7     8


def =

     4     3     2     1
     8     7     6     5


ans =

     5     5     5     5
    13    13    13    13


ans =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0


ans =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0


ans =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0


ans =

   Inf   Inf   Inf   Inf   Inf
   Inf   Inf   Inf   Inf   Inf
```

```
   Inf   Inf   Inf   Inf   Inf


ans =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0
```

Problem D:

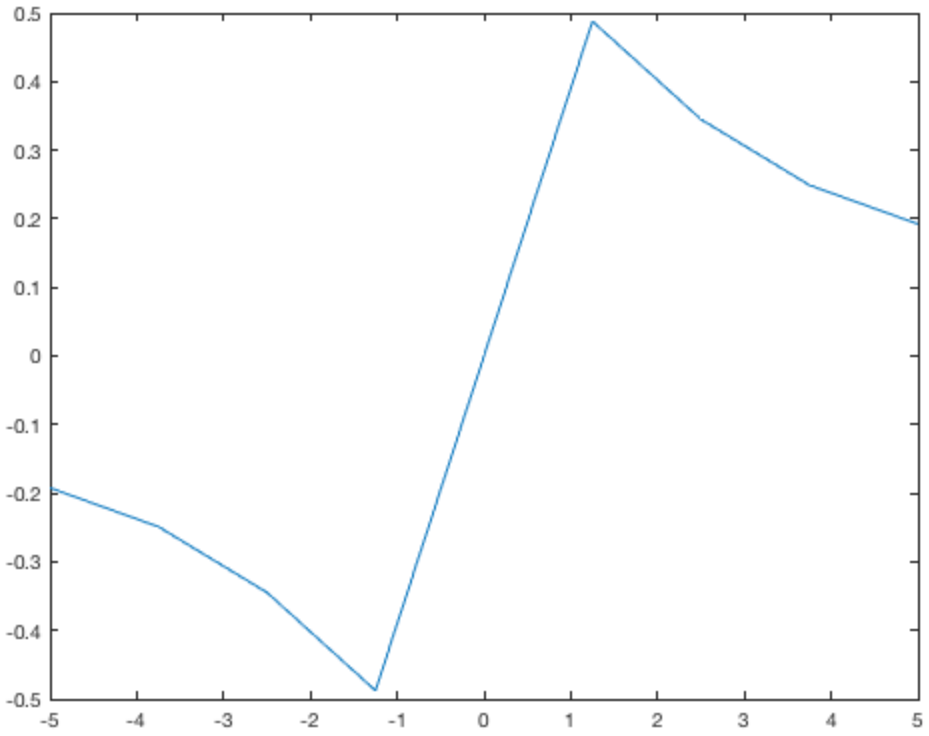
```
% Problem 1 (Answer):
% tut1 * tut2
% Explain: Syntax Error, it should be (tut1 .* tut2), as this is a
 matrix
%         mulitplication, can't because (3x5) * (3x5) can't happen

% tut2 * tut1
% Explain: Syntax Error, it should be (tut2 .* tut1), as this is a
 matrix
%         mulitplication, can't because (3x5) * (3x5) can't happen

tut1 * tut2'
% Explain: Complex conjugate transpose (3x5) * (5x3) = (3x3) matrix

tut2' * tut1
% Explain: Complex conjugate transpose (5x3) * (3x5) = (5x5) matrix

% tut1 ^ 2;
% Explain: Syntax Error, it should be (tut1 .^ 2), as this is a matrix
%         power, can't because (3x5) * (3x5) can't happen

(tut2' * tut1)^2
% Explain: [(5x3) * (3x5)] * [(5x3) * (3x5)] = [(5x5)] * [(5x5)] =
 [(5x5)]

% Problem 2 (Answer):
x = 1:123;
x*ones(1,123)'
x = 1:10;
x*ones(1,10)'

% Problem 3 (Answer):
[1:100]*ones(1,100)'

% Problem 4 (Answer):
[2:2:1001]*ones(1,500)'


ans =

     0     0     0
```

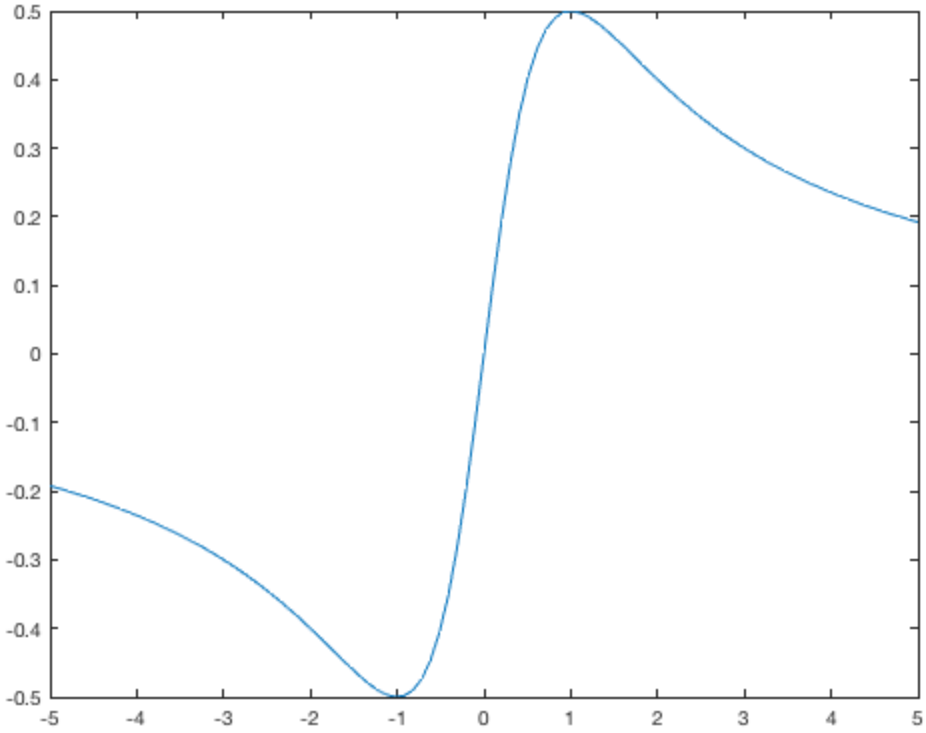
```
     0     0     0
     0     0     0


ans =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0


ans =

     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0
     0     0     0     0     0


ans =

        7626


ans =

    55


ans =

        5050


ans =

      250500
```

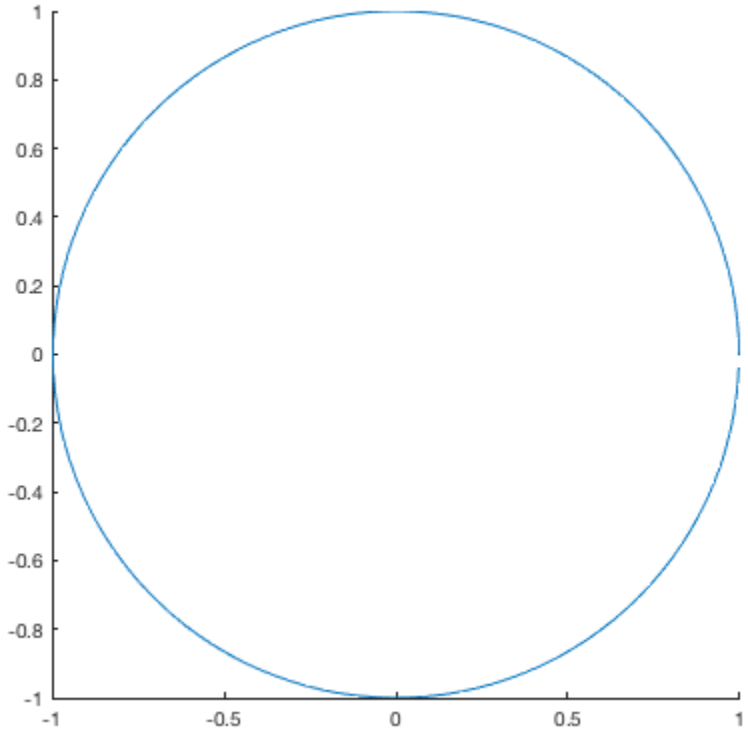
Problem E:

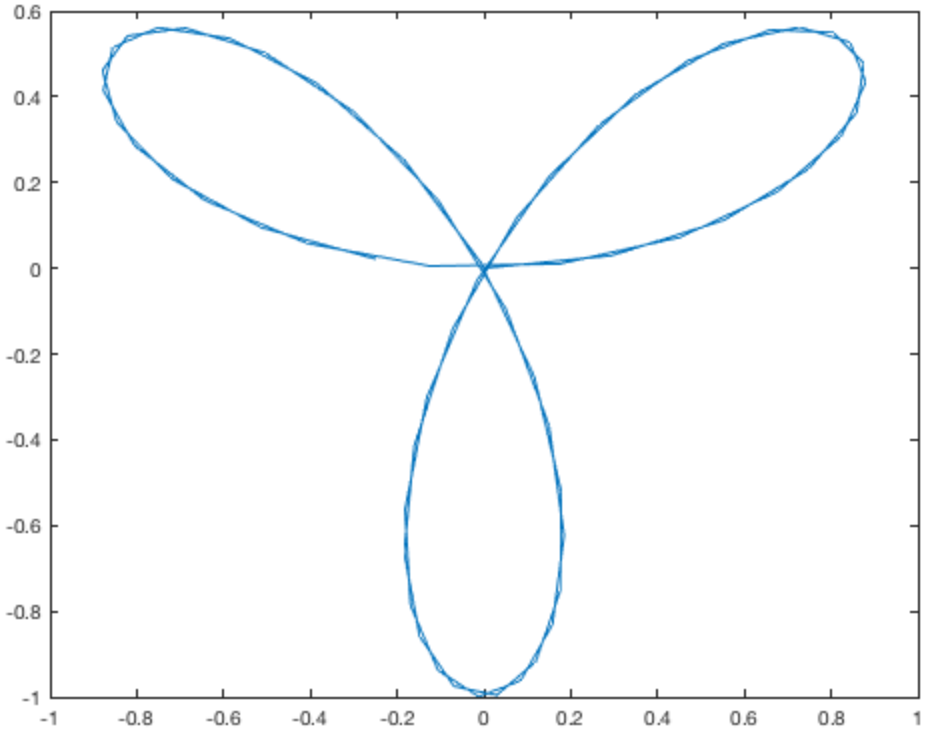
```
% Problem 1 (Answer):
figure;
x = linspace(-5, 5, 9); % 10 intervals means 9 parts
y=x./(1+x.^2);
plot(x, y)
figure;
x = linspace(-5, 5, 99);
y=x./(1+x.^2);
plot(x, y)
```

```
% Problem 2 (Answer):
figure;
theta = 0 : 0.05 : 2*pi;
hold on
axis('square')
plot(cos(theta),sin(theta))

% Explain: Shape before changes = circle, changing hold off = egg
 shaped,
%         changing axis('normal') = egg shaped

% Problem 3 (Answer):
figure;
theta = 0 : 0.1 : 2*pi;
r = sin(3*theta);
plot(r .* cos(theta), r .* sin(theta))
```




0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-5
-4
-3
-2
-1
0
1
2
3
4
5


1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1
-0.5
0
0.5
1



Problem F:

```
% Problem 1 (Answer):
help mesh
% Explain: mesh(X, Y, Z) draws a wirefram mesh with color determined
 by Z

% Problem 2 (Answer):
figure;
X = -10:0.2:10;
Y = -10:0.2:10;
[x y] = meshgrid(X,Y);
z=cos(2*(x+y));
surf(x,y,z)
```

```
 MESH   3-D mesh surface.
    MESH(X,Y,Z,C) plots the colored parametric mesh defined by
    four matrix arguments.  The view point is specified by VIEW.
    The axis labels are determined by the range of X, Y and Z,
    or by the current setting of AXIS.  The color scaling is
 determined
    by the range of C, or by the current setting of CAXIS.  The scaled
    color values are used as indices into the current COLORMAP.

    MESH(X,Y,Z) uses C = Z, so color is proportional to mesh height.
```

MESH(x,y,Z) and MESH(x,y,Z,C), with two vector arguments replacing the first two matrix arguments, must have length(x) = n and length(y) = m where [m,n] = size(Z). In this case, the vertices of the mesh lines are the triples (x(j), y(i), Z(i,j)). Note that x corresponds to the columns of Z and y corresponds to the rows.

MESH(Z) and MESH(Z,C) use x = 1:n and y = 1:m. In this case, the height, Z, is a single-valued function, defined over a geometrically rectangular grid.

MESH(...,'PropertyName',PropertyValue,...) sets the value of the specified surface property. Multiple property values can be set with a single statement.

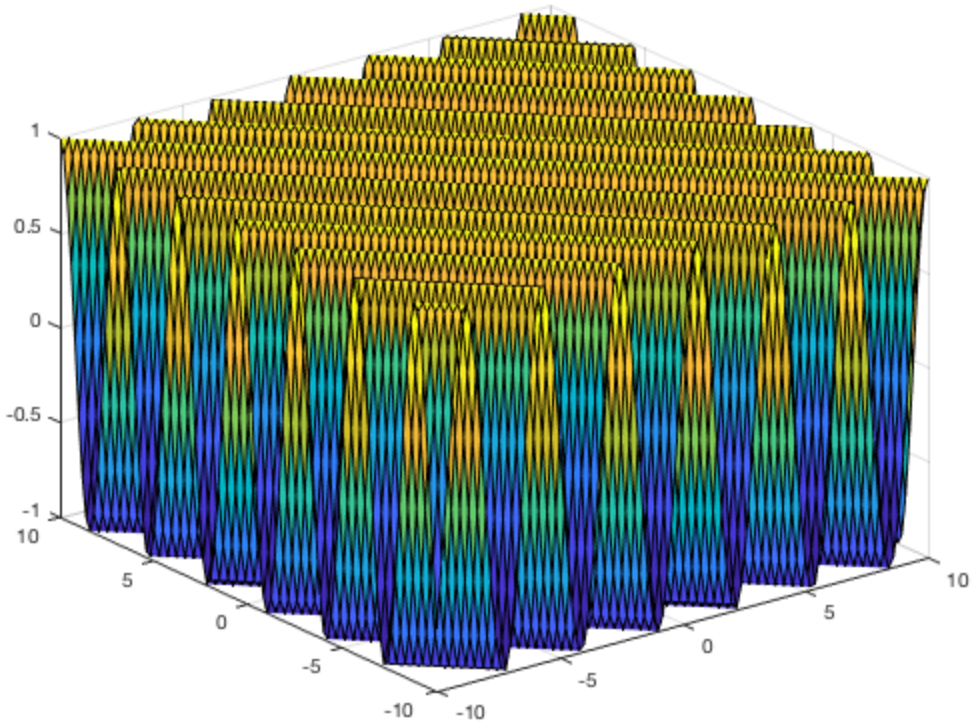
MESH(AX,...) plots into AX instead of GCA.

MESH returns a handle to a surface plot object.

AXIS, CAXIS, COLORMAP, HOLD, SHADING, HIDDEN and VIEW set figure, axes, and surface properties which affect the display of the mesh.

See also SURF, MESHC, MESHZ, WATERFALL.

Reference page in Doc Center
doc mesh



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