**Assignment - 1**

**Date – 5/9/20**

**Problem A**:

Consider the systems of equations involving two variables

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 2x+3y | | |  | | --- | | = | | |  | | --- | | 1 | |  | | |  | | --- | | x-y | | |  | | --- | | = | | |  | | --- | | 2 | |  | | |

Set up a vector x of integers from -10 to 10 and draw the graph using the MATLAB routine plot(x,y). Use the MATLAB routines grid to put up some grid lines on the graph, and hold to hold the graph and not erase it when you plot a second draft. Read of the graph the solution of this system.

**Solution A:**

x = [-10:10]

y = (1-2\*x)/3;

z = x-2;

plot (x, y, x, z)

grid on

set (gca, 'xtick', -10:1:10)

set (gca, 'ytick', -15:1:10)

print -dpng figure.png

**Problem B.**

Solve the linear system

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 3x1+6x2-4x3 | | |  | | --- | | = | | |  | | --- | | 1 | |  | | |  | | --- | | x1+x2-x3 | | |  | | --- | | = | | |  | | --- | | 2 | |  | | |  | | --- | | x1-2x2+x3 | | |  | | --- | | = | | |  | | --- | | -1 | |  | |  | |

as the matrix problem.

**Solution B:**

a = [3 6 -4;1 1 -1;1 -2 1];

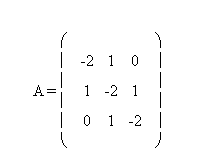
b = [1 2 -1];

format rat

x = b\*inv(a)

**Problem C**:

Let



|  |
| --- |
|  |

Compute det(A) and inv(A) in MATLAB.

Compute det(A) by hand and verify the determinant calculated by MATLAB. Use MATLAB to check that inv(A) is the inverse of A by computing inv(A)\*A and A\*inv(A).

**Solution C:**

a = [-2 1 0;1 -2 1;0 1 -2];

format rat

b = inv(a)

c = det(a)

e = a\*b

f = b\*a

**Problem D:**

Find the cubic polynomial p = x3+ax2+bx+c which roots are 1, root2 and pi. Plot p over the interval [0;4].

**Solution D:**

r = [1, sqrt (2), pi];

p = poly(r)

x = [0:0.1:4];

plot (x, polyval (p, x))

print -dpng figure.png

**Problem E:**

Find the roots of p = x4-2x3-13x2+14x+2. Plot p over the interval [-5;5].

**Solution E:**

p = [1 -2 -13 14 2];

r=roots(p)

x = [-5:0.1:5];

plot (x, polyval (p, x)), axis ([-5 5 -100 500])

print -dpng figure.png

**Problem F:**

Consider the set of parametric equations:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | x | | |  | | --- | | = | | |  | | --- | | (cos5t)(3-2sin7t) | |  | | |  | | --- | | y | | |  | | --- | | = | | |  | | --- | | (sin5t)(3-2sin7t) | |  | |  | |

on the interval 0 £ t £ 2p.

a) Use the MATLAB routine plot to sketch the graph of the parametric equations. Label the x- and y-axes and place an appropriate title on your graph. Obtain a printout of your result.

b) Try the MATLAB routine comet for a cool ride on the curve.

**Solution F:**

t = [0:0.01:2\*pi];

x = cos(5\*t). \*(3-2\*sin(7\*t));

y = sin(5\*t). \*(3-2\*sin(7\*t));

plot (x, y);

title ('Graph for parametric equations');

xlabel ('x=cos(5\*t) \*(3-2\*sin(7\*t))');

ylabel('y=sin(5\*t) \*(3-2\*sin(7\*t))');

print -dpng figure.png