

MATLAB – FUNCIONES BÁSICAS.

Ángel Arturo Ramírez Suárez

Grupo 01284, Ingeniería Mecatrónica.

Universidad Politécnica de Victoria.

INSTRUCCIONES.

Utilizar las funciones indicadas en el documento “MIT6_094IAP10_assn01” utilizando Matlab, y colocar los resultados en un PDF e imprimir.

DESARROLLO.

Primera parte – Elaboración de aplicación para prueba de funciones básicas.

1. Se elaboró un archivo script llamado shirtProblems.m y se utilizó el siguiente código:

```
clc
clear

%Scalar variables / Variables escalares.
a = 10
b = 2.5*10^23
c = 2 + 3*i
d = exp((j*2*pi)/3)

%Vector variables / Variables vector.
aVec = [3.14 15 9 26]
aVec'
bVec = [2.71; 8; 28; 182]
cVec = [5:-0.2:-5]
X1 = 0;
X2 = 1;
N = 100;
dVec = logspace(X1,X2,N)
eVec = 'Hello'

%Matrix variables / Variables matriz.
aMat = ones(9,9) * 2
bMat = zeros(9,9)
v = [1 2 3 4 5 4 3 2 1];
bMat = diag(v)
cMat = [1:100];
cMat2 = reshape(cMat,10,10)
dMat = ones(3,4) * nan()
eMat = [13 -1 5; -22 10 -87]
fMat = ceil(-3 + 6 .* rand(3,5))

%Scalar equations / Ecuaciones escalares.
x = 1/(1+exp(-(a-15)/6))
y = (sqrt(a)+b^(1/21))^pi
```

```

y2 = (sqrt(a)+nthroot(b,21))^pi
z = (log(real((c+d)*(c-d))*sin((a*pi)/3)))/(c*conj(c))

%Vector equations / Ecuaciones de vectores.
xVec = (1/sqrt(2*pi*2.5^2))*exp(-cVec.^2 ./ (2*2.5^2))
yVec = sqrt((aVec).^2+bVec.^2)
zVec = log10(1 ./ dVec)

%Matriz equations / Ecuaciones de matrices.
xMat = (aVec * bVec) * aMat.^2
yMat = (bVec * aVec)
zMat = det(cMat2).*(aMat .* bMat) '

%Common functions and indexing / Funciones comunes e indexado.
cSum = sum(cMat2)
eMean = mean(eMat)
eMat
eMat(1,:) = 1
cSub = cMat2(2:9,2:9)
lin = 1:20
linverse = lin(2:20)*-1
lin(2:20) = lininverse
r = rand(1,5)
index = find(r<0.5)
r(index) = 0

```

2. Se generaron los siguientes resultados:

a =

10

b =

2.5000e+23

c =

2.0000 + 3.0000i

d =

$$-0.5000 + 0.8660i$$

aVec =

3.1400 15.0000 9.0000 26.0000

ans =

3.1400
15.0000
9.0000
26.0000

bVec =

2.7100
8.0000
28.0000
182.0000

cVec =

Columns 1 through 8

5.0000 4.8000 4.6000 4.4000 4.2000 4.0000 3.8000 3.6000

Columns 9 through 16

3.4000 3.2000 3.0000 2.8000 2.6000 2.4000 2.2000 2.0000

Columns 17 through 24

1.8000 1.6000 1.4000 1.2000 1.0000 0.8000 0.6000 0.4000

Columns 25 through 32

0.2000 0 -0.2000 -0.4000 -0.6000 -0.8000 -1.0000 -1.2000

Columns 33 through 40

-1.4000 -1.6000 -1.8000 -2.0000 -2.2000 -2.4000 -2.6000 -2.8000

Columns 41 through 48

-3.0000 -3.2000 -3.4000 -3.6000 -3.8000 -4.0000 -4.2000 -4.4000

Columns 49 through 51

-4.6000 -4.8000 -5.0000

dVec =

Columns 1 through 8

1.0000 1.0235 1.0476 1.0723 1.0975 1.1233 1.1498 1.1768

Columns 9 through 16

1.2045 1.2328 1.2619 1.2915 1.3219 1.3530 1.3849 1.4175

Columns 17 through 24

1.4508 1.4850 1.5199 1.5557 1.5923 1.6298 1.6681 1.7074

Columns 25 through 32

1.7475 1.7886 1.8307 1.8738 1.9179 1.9630 2.0092 2.0565

Columns 33 through 40

2.1049 2.1544 2.2051 2.2570 2.3101 2.3645 2.4201 2.4771

Columns 41 through 48

2.5354 2.5950 2.6561 2.7186 2.7826 2.8480 2.9151 2.9836

Columns 49 through 56

3.0539 3.1257 3.1993 3.2745 3.3516 3.4305 3.5112 3.5938

Columns 57 through 64

3.6784 3.7649 3.8535 3.9442 4.0370 4.1320 4.2292 4.3288

Columns 65 through 72

4.4306 4.5349 4.6416 4.7508 4.8626 4.9770 5.0941 5.2140

Columns 73 through 80

5.3367 5.4623 5.5908 5.7224 5.8570 5.9948 6.1359 6.2803

Columns 81 through 88

6.4281 6.5793 6.7342 6.8926 7.0548 7.2208 7.3907 7.5646

Columns 89 through 96

7.7426 7.9248 8.1113 8.3022 8.4975 8.6975 8.9022 9.1116

Columns 97 through 100

9.3260 9.5455 9.7701 10.0000

eVec =

Hello

aMat =

```
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2
```

bMat =

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

bMat =

```
1 0 0 0 0 0 0 0 0
```

```
0 2 0 0 0 0 0 0 0
0 0 3 0 0 0 0 0 0
0 0 0 4 0 0 0 0 0
0 0 0 0 5 0 0 0 0
0 0 0 0 0 4 0 0 0
0 0 0 0 0 0 3 0 0
0 0 0 0 0 0 0 2 0
0 0 0 0 0 0 0 0 1
```

cMat2 =

```
1 11 21 31 41 51 61 71 81 91
2 12 22 32 42 52 62 72 82 92
3 13 23 33 43 53 63 73 83 93
4 14 24 34 44 54 64 74 84 94
5 15 25 35 45 55 65 75 85 95
6 16 26 36 46 56 66 76 86 96
7 17 27 37 47 57 67 77 87 97
8 18 28 38 48 58 68 78 88 98
9 19 29 39 49 59 69 79 89 99
10 20 30 40 50 60 70 80 90 100
```

dMat =

```
NaN NaN NaN NaN
NaN NaN NaN NaN
NaN NaN NaN NaN
```

eMat =

```
13 -1 5
-22 10 -87
```

fMat =

```
-1  1  -1  0  2
 0  0  3  3  2
-2 -1  2 -2  1
```

x =

0.3029

y =

6.2696e+03

y2 =

6.2696e+03

z =

0.1046

xVec =

Columns 1 through 8

0.0216 0.0253 0.0294 0.0339 0.0389 0.0444 0.0503 0.0566

Columns 9 through 16

0.0633 0.0703 0.0777 0.0852 0.0929 0.1007 0.1083 0.1159

Columns 17 through 24

0.1231 0.1300 0.1364 0.1422 0.1473 0.1516 0.1550 0.1575

Columns 25 through 32

0.1591 0.1596 0.1591 0.1575 0.1550 0.1516 0.1473 0.1422

Columns 33 through 40

0.1364 0.1300 0.1231 0.1159 0.1083 0.1007 0.0929 0.0852

Columns 41 through 48

0.0777 0.0703 0.0633 0.0566 0.0503 0.0444 0.0389 0.0339

Columns 49 through 51

0.0294 0.0253 0.0216

yVec =

4.1477
17.0000
29.4109
183.8478

zVec =

Columns 1 through 8

0 -0.0101 -0.0202 -0.0303 -0.0404 -0.0505 -0.0606 -0.0707

Columns 9 through 16

-0.0808 -0.0909 -0.1010 -0.1111 -0.1212 -0.1313 -0.1414 -0.1515

Columns 17 through 24

-0.1616 -0.1717 -0.1818 -0.1919 -0.2020 -0.2121 -0.2222 -0.2323

Columns 25 through 32

-0.2424 -0.2525 -0.2626 -0.2727 -0.2828 -0.2929 -0.3030 -0.3131

Columns 33 through 40

-0.3232 -0.3333 -0.3434 -0.3535 -0.3636 -0.3737 -0.3838 -0.3939

Columns 41 through 48

-0.4040 -0.4141 -0.4242 -0.4343 -0.4444 -0.4545 -0.4646 -0.4747

Columns 49 through 56

-0.4848 -0.4949 -0.5051 -0.5152 -0.5253 -0.5354 -0.5455 -0.5556

Columns 57 through 64

-0.5657 -0.5758 -0.5859 -0.5960 -0.6061 -0.6162 -0.6263 -0.6364

Columns 65 through 72

-0.6465 -0.6566 -0.6667 -0.6768 -0.6869 -0.6970 -0.7071 -0.7172

Columns 73 through 80

-0.7273 -0.7374 -0.7475 -0.7576 -0.7677 -0.7778 -0.7879 -0.7980

Columns 81 through 88

-0.8081 -0.8182 -0.8283 -0.8384 -0.8485 -0.8586 -0.8687 -0.8788

Columns 89 through 96

-0.8889 -0.8990 -0.9091 -0.9192 -0.9293 -0.9394 -0.9495 -0.9596

Columns 97 through 100

-0.9697 -0.9798 -0.9899 -1.0000

xMat =

1.0e+04 *

Columns 1 through 8

2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450
2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450	2.0450

Column 9

2.0450
2.0450
2.0450
2.0450

2.0450
2.0450
2.0450
2.0450
2.0450

yMat =

1.0e+03 *

0.0085	0.0406	0.0244	0.0705
0.0251	0.1200	0.0720	0.2080
0.0879	0.4200	0.2520	0.7280
0.5715	2.7300	1.6380	4.7320

zMat =

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	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	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	0	0	0	0	0	0

cSum =

55 155 255 355 455 555 655 755 855 955

eMean =

-4.5000 4.5000 -41.0000

eMat =

13 -1 5
-22 10 -87

eMat =

1 1 1
-22 10 -87

cSub =

12 22 32 42 52 62 72 82
13 23 33 43 53 63 73 83
14 24 34 44 54 64 74 84
15 25 35 45 55 65 75 85
16 26 36 46 56 66 76 86
17 27 37 47 57 67 77 87
18 28 38 48 58 68 78 88
19 29 39 49 59 69 79 89

lin =

Columns 1 through 14

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Columns 15 through 20

15 16 17 18 19 20

linverse =

Columns 1 through 14

-2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15

Columns 15 through 19

-16 -17 -18 -19 -20

lin =

Columns 1 through 14

1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14

Columns 15 through 20

-15 -16 -17 -18 -19 -20

r =

0.1842 0.5972 0.2999 0.1341 0.2126

index =

1 3 4 5

r =

0 0.5972 0 0 0

>>

Segunda parte – Elaboración de funciones de graficación.

3. Se creó un script llamado twoLinePlot.m y se introdujo el siguiente código:

```
clear
clc
figure()
t = 0:2*pi
u = sin(t)
plot(t,u)
hold on
v = cos(t)
plot(t,v,'r')
xlabel('Time(s)')
ylabel('Function')
title('Tarea 1 - Parte II - Diseño Mecatrónico.')
legend('sine','cosine')
xlim([0 2*pi])
ylim([-1.4 1.4])
```

4. Se obtuvo la siguiente gráfica resultante:

