EXAMEN FINAL

[Cod: CM334 Curso: Análisis Numérico I]

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Pregunta 1:

METODO HOUSE HOLDER

A :

[[1. 3. 9.]

 [1. 4. 16.]

 [1. 5. 25.]]

Eliminando la columna 1

v:

 [[1.   ]

 [0.3660254]

 [0.3660254]]

H_1:

[[-0.57735027 -0.57735027 -0.57735027]

 [-0.57735027 0.78867513 -0.21132487]

 [-0.57735027 -0.21132487 0.78867513]]

R_1:

[[-1.73205081e+00 -6.92820323e+00 -2.88675135e+01]

 [2.77555756e-17 3.66025404e-01 2.13952810e+00]

 [0.00000000e+00 1.36602540e+00 1.11395281e+01]]

Q_1:

[[-0.57735027 -0.57735027 -0.57735027]

 [-0.57735027 0.78867513 -0.21132487]

[-0.57735027 -0.21132487 0.78867513]]

Eliminando la columna 2

v:

[[1.   ]

[0.76732699]]

H_2:

[[1.   0.   0.   ]

[0.   -0.25881905 -0.96592583]

[0.   -0.96592583 0.25881905]]

R_2:

[[-1.73205081e+00 -6.92820323e+00 -2.88675135e+01]

[-7.18367158e-18 -1.41421356e+00 -1.13137085e+01]

[-2.68098273e-17 2.34919574e-16 8.16496581e-01]]

Q_2:

[[-5.77350269e-01 -5.77350269e-01 -5.77350269e-01]

[7.07106781e-01 -1.41152218e-18 -7.07106781e-01]

[4.08248290e-01 -8.16496581e-01 4.08248290e-01]]

Eliminando la columna 3

v:

[[1.]]

H_3:

[[1. 0. 0.]

[0. 1. 0.]

[0. 0. -1.]]

R_3:

[[-1.73205081e+00 -6.92820323e+00 -2.88675135e+01]

[-7.18367158e-18 -1.41421356e+00 -1.13137085e+01]

[2.68098273e-17 -2.34919574e-16 -8.16496581e-01]]

Q_3:

[[-5.77350269e-01 -5.77350269e-01 -5.77350269e-01]

[7.07106781e-01 -1.41152218e-18 -7.07106781e-01]

[-4.08248290e-01 8.16496581e-01 -4.08248290e-01]]

Q_final:

[[-5.77350269e-01 -5.77350269e-01 -5.77350269e-01]

[7.07106781e-01 -1.41152218e-18 -7.07106781e-01]

[-4.08248290e-01 8.16496581e-01 -4.08248290e-01]]

R_final

[[-1.73205081e+00 -6.92820323e+00 -2.88675135e+01]

[-7.18367158e-18 -1.41421356e+00 -1.13137085e+01]

[2.68098273e-17 -2.34919574e-16 -8.16496581e-01]]

c = Q * b:

[-4.04145188 -3.53553391 -0.40824829]

Resolviendo el sistema Triangular Superior: RX=c

Sistema de ecuaciones:

[-1.73205*x1 + -6.9282*x2 + -28.8675*x3] = [-4.04145]

[0*x1 + -1.41421*x2 + -11.3137*x3] = [-3.53553]

[0*x1 +   0*x2 + -0.816497*x3] = [-0.408248]

Solucion x : Coeficientes de la funcion

[-1.53271548e-14 -1.50000000e+00 5.00000000e-01]

Pregunta 2:

Método SOR

W = 1.2
Error Tolerancia = 1e-7

x_1: [[14.8 -2.36]]
x_2: [[6.70771892 -0.10349595]]
x_3: [[4.9183591 2.13434921]]
x_4: [[4.46141368 2.7388887]]
x_5: [[4.13787632 2.91824458]]
x_6: [[4.04534018 2.97471063]]
x_7: [[4.01364734 2.99267518]]
x_8: [[4.00386028 2.99798109]]
x_9: [[4.00104483 2.99946264]]
x_10: [[4.00027465 2.99986022]]
x_11: [[4.00007087 2.99996417]]
x_12: [[4.00001807 2.9999909]]
x_13: [[4.00000458 2.9999977]]
x_14: [[4.00000115 2.99999942]]
x_15: [[4.00000029 2.99999985]]
x_16: [[4.00000007 2.99999996]]

Converge en iter:16

Resultado:
[[4.00000007], [2.99999996]]

Pregunta 3:

```
========================================
      METODO DE POTENCIA
========================================

Matriz A:
 [[0.5   0.3   0.5]
 [0.25  0.4   0.25]
 [0.25  0.3   0.25]]

Data Frame - Método Potencia
```

	x1(k)	x2(k)	x3(k)	lambda
0	400.0	400.000000	300.000000	
1	1.0	0.712766	0.627660	470
2	1.0	0.673395	0.604037	1.02766
3	1.0	0.667672	0.600603	1.00404
4	1.0	0.666817	0.600090	1.0006
5	1.0	0.666689	0.600014	1.00009
6	1.0	0.666670	0.600002	1.00001
7	1.0	0.666667	0.600000	1
8	1.0	0.666667	0.600000	1
9	1.0	0.666667	0.600000	1
10	1.0	0.666667	0.600000	1
11	1.0	0.666667	0.600000	1
12	1.0	0.666667	.600000	1

```
----------------------------------------------------------------------------------------
El valor propio es: 1.0000000001544724
El vector propio es: [1.        0.66666667  0.6]
----------------------------------------------------------------------------------------
Comprobación:
 A*v=
 [1.        0.66666667  0.6]
 lamb*v =
 [1.        0.66666667  0.6]

Usando la librería np.linal.eig(A)
Valor propio: [1.00000000e+00]
Vector propio: [ 7.44437500e-01     7.84464541e-01    -7.07106781e-01]
```

Pregunta 4:

Mínimos Cuadrados

Matriz M:

```
[[ 1 176]
 [ 1 168]
 [ 1 202]
 [ 1 138]
 [ 1 213]
 [ 1 159]
 [ 1 193]
 [ 1 122]
 [ 1 185]
 [ 1 153]]
```

A = M.t * M :

```
[[    10   1709]
 [   1709 299465]]
```

b = M.t * y:

```
[   4932    889433]
```

Resolvemos Ax = b

x = Coeficientes: [-582.40096527 6.29374468]

C = -582.40096527 + 6.29374468 * I

C(240) = 928.0977571685438

Grafica

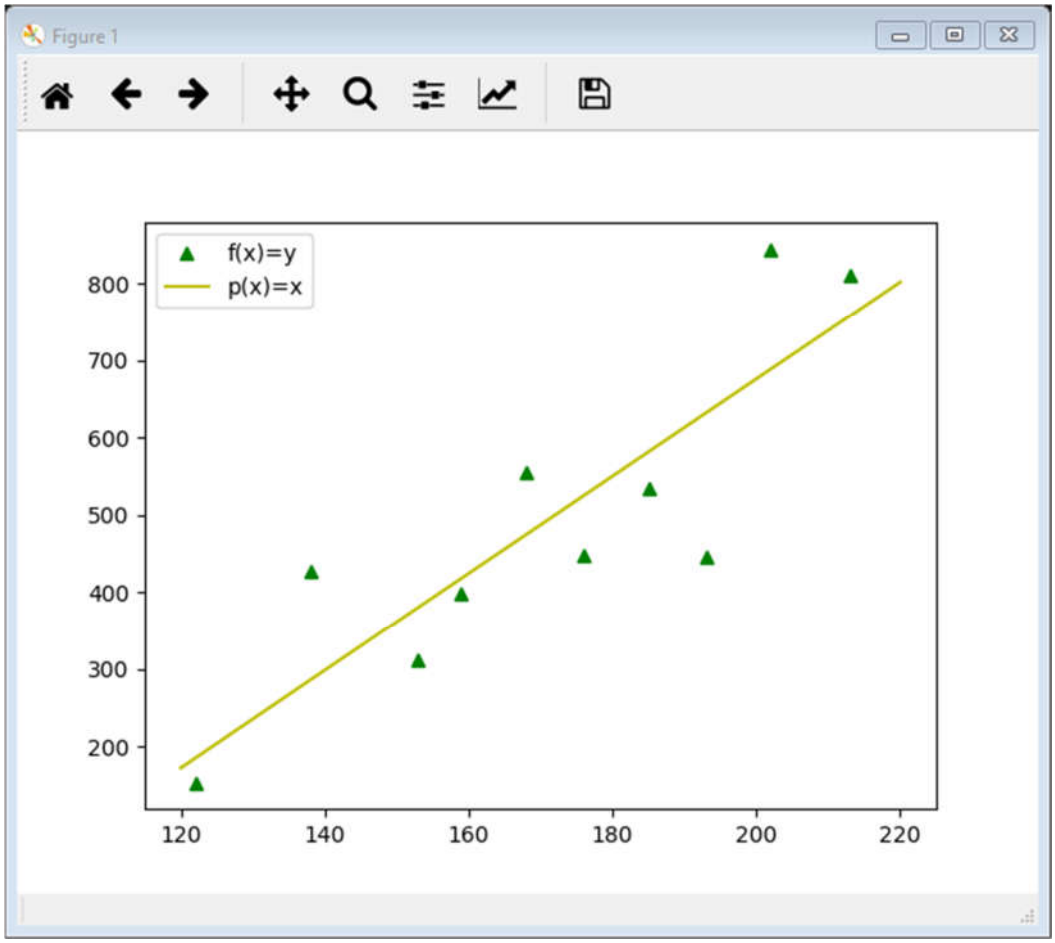
Figure 1
f(x)=y
p(x)=x
800
700
600
500
400
300
200
120
140
160
180
200
220