EXAMEN FINAL

[Cod: CM334 Curso: Análisis Numérico I]

[Prof.: L. Paredes]

**Alumno: Lazaro Camasca Edson**

**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**

