<Header>

Date: Note

Subject: Numeral Analysis Chapter 6

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Q1:

$$\begin{bmatrix} 1, & 0.67, & 0.33, & 2 \\ 0.45, & 1, & 0.55, & 2 \\ 0.67, & 0.33, & 1.0, & 2 \end{bmatrix}$$

1 → mutiply first row by -0.45

2 → add -0.45 to second row

3 → multiply second row by 0.17022

4 → add to third row

$x_3 = 0.84724409$

$x_2 = 1$

$x_1 = 1$

Q2

④ -2+	0	1	2	3 :	0
③ -3+	3	0	1	2 :	1
② -3+	2	3	0	1 :	2
① -2+	1	2	3	0 :	3

swap ① ; add ⑥ and put as third row ; swap ⑤

add multiply second row by 6 then add it to 4th row and put it as 4th ⑦

⑧ add 3rd & 4th and put it as 4th row

$$\begin{bmatrix} 1 & 2 & 3 & 0 & 3 \\ 0 & 1 & 2 & 3 & 0 \\ 0 & 0 & -4 & 4 & -4 \\ 0 & 0 & 0 & 24 & 12 \end{bmatrix}$$

$x_4 = 0.5 * -1$

$x_3 = 0.5$

$x_2 = 0.5$

$x_1 = 0.5$

Q3

$$\begin{bmatrix} 1 & -1 & 1 & -4 \\ 5 & -4 & 3 & -12 \\ 2 & 1 & 1 & 11 \end{bmatrix}$$

① mutiply fist by -5 then add it to second and place it as second

② multiply fist by -2; then add it to third row; then place it as third row

③
$$\begin{bmatrix} 1 & -1 & +1 & -4 \\ 0 & 1 & -2 & +8 \\ 0 & 3 & -1 & +19 \end{bmatrix}$$

④ multiply the second row by -3 then add it to third and place it as third

Q3 resumption . . . . :

$z = -1$;
$x = 6$;
$x = 3$;

Q4

$$\begin{bmatrix} 2 & 6 & -1 & -12 \\ 5 & -1 & 2 & 29 \\ -3 & -4 & 1 & 5 \end{bmatrix}$$

1 Multiply first row by $-\frac{5}{2}$ and add it to second row; and replace second row by resaltant

2 multiply first row by $\frac{3}{2}$ then add it to third and place it as third

3 multiply second row in $\frac{5}{16}$; then add it to third row and place it as third row

$$\begin{bmatrix} 2 & 6 & -1 & -2 \\ 0 & 0 & +4.5 & 59 \\ 0 & 0 & [illegible] & 5.4375 \end{bmatrix}$$

0.9062

$z = 6$
$y = -2$
$x = 3$

Qs

$$\begin{bmatrix} 2+3i & 2-i & 2+i \\ 4+6i & 3-6i & -2-5i \end{bmatrix}$$

① mul the first row with -2 then add it to second row ; then place it as the second row

② $$\begin{bmatrix} 2+3i & 2-i & 2+i \\ 0 & -1-4i & -6-7i \end{bmatrix}$$

$y = 2+i$

$x = 1+i$

for 3rd Q:

$$\begin{bmatrix} 2 & 6 & -1 & -12 \\ 5 & -1 & 2 & 29 \\ -3 & -4 & 1 & 5 \end{bmatrix}$$

① $m[2] += (m[1] * -5/2)$

② $m[3] += m[1] * 3/2$

③
$$\begin{bmatrix} 2 & 6 & -1 & -12 \\ 0 & -16 & 9/2 & 59 \\ 0 & 0 & 29/32 & 87/16 \end{bmatrix}$$

④ $[2] /= -16$

$$\begin{bmatrix} 2 & 6 & -1 & -12 \\ 0 & 1 & -9/32 & -59/16 \\ 0 & 0 & 29/32 & 87/16 \end{bmatrix}$$

⑤ $m[3] /= -16$

⑥ $m[1] += -6 * m[2]$

⑦ $m[3] += = \frac{32}{29}$

⑧ $m[2] += m[3] * 9/32$

⑨ $m[1] += m[3] * -11/16$

$x_1, x_2, x_3 = 3, -2, 6$

for the 3rd Q:

$$\begin{bmatrix} 1 & -1 & 1 & -4 \\ 5 & 4 & 3 & -12 \\ 2 & 1 & 1 & 11 \end{bmatrix}$$

① matrix[2] = (matrix[1] * −5) + matrix[2]

② matrix[3] = (matrix[1] * −2) + matrix[2]

③
$$\begin{bmatrix} 1 & -1 & 1 & -4 \\ 0 & 1 & -2 & 8 \\ 0 & 3 & -1 & 19 \end{bmatrix}$$

④ matrix[1] = matrix[2] + matrix[1]

⑤ matrix[3] += matrix[2] * −3

$$\begin{bmatrix} 1 & 0 & -1 & 4 \\ 0 & 1 & -2 & 8 \\ 0 & 0 & 5 & -5 \end{bmatrix}$$

⑤ $m[1] = m[3] * \frac{1}{5} + m[1]$

⑥ $m[3] = m[3] * \frac{2}{5}$

$$\begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 6 \\ 0 & 0 & 5 & -5 \end{bmatrix}$$

→ $x_1 = 3$

$x_2 = 6$

$x_3 = -1$

(5) divide the third row by 0.84724 and assign it as third row

(6) mul third row by -0.4015 and add-assign it to second row

(7) mul third row by 0.0551181 and then add-assign it to first row

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0.6985 & 0 & 0.6985 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

$x=1; y=1; z=1$

for second Q2:

```
def maa(a, b, c):
    out = matrix[a]
    out *= c;
    out += matrix[b];
    matrix[b] = out;
```

(1) swap 1st and 4th

(2) maa(1, -3, 2-3)

(3) maa(1, 3, -2)

(4) swap 4th and second row

$$\begin{bmatrix} 1, 2, 3, 0, 3, \\ 0, 1, 2, 3, 0, \\ 0, -1, -6, 1, -4 \\ 0, -6, -8, 2, -8 \end{bmatrix}$$

(5) add 2nd to 3rd and assign as third

(6) maa(2, 4, +6)

(7) maa(2, 1, -2)

Q6

Q7

for first Q

$$\begin{bmatrix} 1 & 0.67 & 0.33 & 2 \\ 0.45 & 1 & 0.55 & 2 \\ 0.67 & 0.33 & 1 & 2 \end{bmatrix}$$

① mul the first row in -0.45 and assign-add to second row

② mul first row in -0.67 and assign-add to second order

③
$$\begin{bmatrix} 1 & 0.67 & 0.33 & 2 \\ 0 & 0.698 & 0.4015 & 1.1 \\ 0 & -0.118 & 0.7789 & 0.66 \end{bmatrix}$$

③ mul third row in 01689 then assign-add to third row

④ mul second row in 0.9598, then assign add to ~~third~~ first row

$$\begin{bmatrix} 1 & 0 & -0.05518 & 0.9448 \\ 0 & 0.6985 & 0.4015 & 11 \\ 0 & 0 & 0.84724 & 0.8472 \end{bmatrix}$$

for 5th question

$$\begin{bmatrix} 2+3i & 2-i & 2+i \\ 4+6i & 3-6i & -2-5i \end{bmatrix}$$

① m[2] += m[1] * −2

② m[1] += m[2] * $\frac{2+i}{-1-i}$

$y = 2-i$

$x = 1+i$

Q9

$$\begin{bmatrix} 10 & -7 & 0 \\ -3 & 2.099 & 6 \\ 5 & -1 & 5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 7 \\ 3.901 \\ 6 \end{bmatrix}$$

$$\begin{bmatrix} 10 & -7 & 0 & 7 \\ -3 & 3.099 & 6 & 3.901 \\ 5 & -1 & 5 & 6 \end{bmatrix}$$

① m[2] += m[1] * 0.3333

② m[3] += m[1] * $-\frac{1}{2}$

③

$$\begin{bmatrix} 10 & -7 & 0 & 7 \\ 0 & -0.001 & 6 & 6.001 \\ 0 & 2.5 & 5 & 2.5 \end{bmatrix}$$

(3) m[3] += 0.002.5

z = 1,05035

y = 301.100

x = 211.470

Q10

=

m[2] += m[1] * 0.333]

m[3] += m[1] * -1/2

$$\begin{bmatrix} 10 & -1 & 0 & 1 \\ 0 & -0.001 & 6 & 6.001 \\ 0 & 2.5 & 5 & 2.5 \end{bmatrix}$$

i have no idea >~<

Q11

$$\begin{bmatrix} 1 & 592 & 457 \\ 592 & 4308 & 2251 \end{bmatrix}$$

m[2] = m[2] * -592

y = 0.7409

x = -1.6128

$x^{(-)} = [0.9890,\ 2.0114,\ -1.0103,\ 1.0214]$

Q13

$m = 2.2721$

$x^{(1)} = [1.0483\ \ 1.7159\ \ -0.8052]$

$m = 0.9898$

$x^{(2)} = [1.047\ \ 1.715\ \ -0.80\ \ 0.88]$

$m = 0.3374$

$x^{(3)} = [0.9926\ \ 2.0533\ \ -1.049\ \ 1.1309]$

$m = 0.1571$

$x^{(4)} = [1.015\ \ 1.953\ \ -0.968\ \ 0.9738]$

$m = 0.0577$

$x^{(5)} = [0.9890\ \ 2.0114\ \ -1.0103\ \ 1.0214]$

$m = 0.0197$

$x^{(6)} = [1.0032,\ 1.9922,\ -0.9945\ \ 1.0016]$

$m = 0.0087$

$x^{(7)} = [0.9981,\ 2.0004\ \ 1.0013\ \ 1.0016]$

① swap 1st and second matrix

② $m[2] += m[1] * -\frac{1}{592}$

$$\begin{bmatrix} 592 & 4308 & 2251 \\ 0 & 584.72 & 433.197 \end{bmatrix}$$

$y = 0.740$

$x = -1.5892$

Q12

$$x_1 = \frac{1}{10} * (6 + x_2 - 2x_3)$$

$$x_2 = \frac{(x_1 + 25 + x_3 - 3x_4)}{11}$$

$$x_3 = \frac{(-11 + x_2 + x_3 - 2x_1)}{10}$$

$$x_4 = \frac{(15 + x_3 - 3x_2)}{8}$$

$x^{(1)} = [0.6, \ 2.727, \ -1.1 \ \ 1.875]$

$x^{(2)} = [1.0473 \ \ 1.7159 \ \ -0.8052 \ \ 0.8852]$

$x^{(3)} = [0.9326 \ \ 2.053 \ \ -1.0493 \ \ 1.130]$

$x^{(4)} = [1.0152 \ \ 1.9537 \ \ -0.9681, \ 0.9737]$

in resumption of Q13

$m^{(8)} = 0.002$

$x = [1.0003 \quad 1.9996 \quad -0.9995 \quad 0.9997]$

$m^{(9)} = 0.0005$

$x = [0.9999 \quad 2.0003 \quad -1.0001 \quad 1.0002]$

Q14

$$x_1 = \frac{(-2x_3 + 6 + x_2)}{10}; \quad x_2 = \frac{(25 + x_1 + x_3 - 3x_4)}{11}$$

$$x_3 = \frac{(-8 - 2x_1 + x_2 x_4)}{10}; \quad x_4 = \frac{(15 + x_3 - 3x_2)}{8}$$

$x^{(1)} = [0.6 \quad 2.3273 \quad -0.9873 \quad 0.8789]$

$x^{(2)} = [1.1032 \quad 1.9526 \quad -1.0029 \quad 1.0489]$

$x^{(3)} = [0.9998 \quad 1.9938 \quad -0.9991 \quad 1.0024]$

$x^{(4)} = [0.9992 \quad 1.9994 \quad -0.9997 \quad 1.0003]$

$x^{(5)} = [0.9999 \quad 1.9999 \quad -1.0000 \quad 1.0001]$

Q15

$x_1 = -\frac{(-1-x_2)}{2}$; $x_2 = -\frac{(-x_1-x_3)}{2}$

$x_3 = -\frac{(-x_2-x_4)}{2}$; $x_4 = \frac{-x_3}{2}$

$x_1 = [0.5 \quad 0.25 \quad 0.125 \quad 0.0625]$

$x_2 = [0.625 \quad 0.375 \quad 0.2188 \quad 0.1094]$

$x_3 = [0.6875 \quad 0.453 \quad 0.2813 \quad 0.1407]$

$x_4 = [0.7266 \quad 0.5040 \quad 0.3224 \quad 0.1612]$

$x_5 = [0.752 \quad 0.5371 \quad 0.3492 \quad 0.1746]$

$x_6 = [0.7686 \quad 0.5589 \quad 0.3667 \quad 0.1834]$

$x_7 = [0.7795 \quad 0.5732 \quad 0.3783 \quad 0.1892]$

$x_8 = [0.7866 \quad 0.5825 \quad 0.3859 \quad 0.1929]$