

Department of CSE

Semester Final Examination, Spring 2020

Name: Rashik Rahman

Reg ID: 17201012

Year: 3rd

Semester: 2nd

Course Code: CSE 313

Course Title: Numerical Methods

Date: 28.10.2020

"During Examination and upload time I will not take any help from anyone. I will give my exam all by myself."

University of Asia Pacific

Admit Card

Final-Term Examination of Spring, 2020

Financial Clearance PAID

Registration No : 17201012 Student Name : Rashik Rahman

Program : Bachelor of Science in Computer Science and

Engineering

SI.NO.	COURSE CODE	COURSE TITLE	CR.HR.	EXAM. SCHEDULE
1	CSE 313	Numerical Methods	3.00	
2	CSE 314	Numerical Methods Lab	0.75	
3	CSE 315	Peripheral & Interfacing	3.00	
4	CSE 316	Peripheral & Interfacing Lab	1.50	
5	CSE 317	Computer Architecture	3.00	
6	CSE 319	Computer Networks	3.00	
7	CSE 320	Computer Networks Lab	1.50	
8	CSE 321	Software Engineering	3.00	
9	CSE 322	Software Engineering Lab	0.75	

Total Credit: 19.5

- 1. Examinees are not allowed to enter the examination hall after 30 minutes of commencement of examination for mild semester examinations and 60 minutes for semester final examinations.
- 2. No examinees shall be allowed to submit their answer scripts before 50% of the allocated time of examination has elapsed.
- 3. No examinees would be allowed to go to washroom within the first 60 minutes of final examinations.
- 4. No student will be allowed to carry any books, bags, extra paper or cellular phone or objectionable items/incriminating paper in the examination hall.
 Violators will be subjects to disciplinary action.

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Answer to the O.No.1 (a)

Given,

$$\begin{bmatrix} 2 & 8 & -11 \\ 1 & 6 & 4 \\ 16 & 1.2 & 3 \\ \end{bmatrix} \begin{bmatrix} \chi_1 \\ \chi_2 \\ \chi_3 \\ \end{bmatrix} \begin{bmatrix} 7 \\ -6 \\ 10 \end{bmatrix}$$

from the matrix are get

$$16x_1 + 1.2x_2 + 3x_3 = 7$$

$$K_1 + 6X_2 + 9X_3 = -6$$

$$91 = 10 - 1.2 \times 29 - 323$$

$$16$$

$$\chi_2 = \frac{-6 - 9\chi_3 - 2\ell_1}{6}$$

$$92 = \frac{221, +82-7}{11}$$

History:

$$\begin{bmatrix} 3c_1 \\ x_2 \\ 2c_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$$

putting this in (i) (i) (ii) we get,
$$\alpha_1 = \frac{10 - 1.2 \times 3 - 3 \times 5}{16} = -0.5375$$

$$x_2 = \frac{-6-4x5-1}{6} = -4.5$$

$$x_3 = \frac{2 \times 1 + 8 \times 3 - 7}{11} = 1.72727$$

$$\begin{bmatrix} x_{1} \\ x_{2} \\ x_{3} \end{bmatrix} = \begin{bmatrix} e-0.5375 \\ -4.5 \\ 1.72727 \end{bmatrix}$$

$$\begin{bmatrix} x_1 \\ 2t_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -6.5375 \\ -4.5 \\ 1.72727 \end{bmatrix}$$

$$p_{n+1} = \frac{1}{10-1.2(-4.5)-3\times1.72727} = 0.6386$$

$$\begin{bmatrix} \chi_1 \\ \chi_2 \\ \chi_3 \end{bmatrix} = \begin{bmatrix} 0.6386 \\ -2.06193 \\ -4.0068 \end{bmatrix}$$



itenation 3:

patting these value in (v), (v), (vi) we get

x= 10-1.2 × 0.6386 -3(-4.0068) = 1.32838

$$x_2 = \frac{-6 - 4(-4.0068) - 0.6386}{6} = 1.56477$$

$$x_3 = \frac{2 \times 0.6386 + 8(-2.006193) - 7}{11} = -1.9793$$

so aften and itenation x,x2, 23 is

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1.32838 \\ 1.56477 \\ -1.9793 \end{bmatrix}$$



Answer to the Q. NO. 1(6)

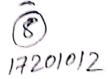
Obeniation! Anitiall the system given work converge but with piroting it will converges.

Pnoof:

121> 18/+ 1-11/; This isn't tome.

so the matrix is not drago nally dominant but with pivoting we can make it dominat.

After pivoting we get.



Here,

116/2 11.2/+/3/; This is true,

111/2 18/1/21; This is true.

As all the conditions are true, so the matrix is now diagonally dominant and now the system will converge.

Vendict: After pivoting the system will converge.

Answer to the Q. No. 100)

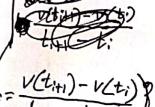
The ganss escillat method allows the usen to control nound off ennon. Elimination method like gamss edimination and the decomposition are prome to nound of ennon. If the physics of the problem is understood a close initial guess can be made, decreasing the number of iteration graded. Also using gauss-seided we method we can know that if the system will converge on not.

Answer to the Q. NO. 2 (a)

for quadratic we know,

Here,

Now to find bo, b, , be well use thee method



50,

from we get,

V(t) = 50+ 5, (t-to) + 52 (t-to)(t-t)

v(22) = 227.04 + 27.76989(22-8) + 0.41616(22-8)
x(22-36)

= 534.2511

So at t=225, velocity would be 5200

Answer to the Q. No. 205)

For limean interpolation

$$b_0 = V(t_0) = 227.07$$

$$b_1 = \frac{V(t_1) - V(t_0)}{t_1 - t_0} = \frac{1004.597 - 227.04}{3836 - 8}$$



and this is how I'll calculate it.

Answor to the O. No. 3(a)

Given,

Here,

$$0 = 2.4$$

 $5 = 0 + 2 = 4.4$

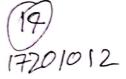
$$f(x_0) = f(1) = e^{1} = 2.718$$

$$f(x_0) = f(2)$$

$$f(x_0) = f(2.9) = e^{2.9} = 11.023$$

$$f(x_1) = f(32.911) = e^{3.9} = 29.96$$

$$f(x_2) = f$$



$$f(x_0) = f(2.4) = e^{2.4} = 41.023$$

$$f(x_1) = f(2.4+0.5) = e^{2.9} = 18.174$$

$$f(x_2) = f(2.9+0.5) = e^{3.4} = 29.964$$

$$f(x_3) = f(3.4+0.5) = e^{3.9} = 4.9.402$$

$$f(x_4) = f(3.9+0.5) = e^{4.9} = 81.451$$

$$form + segment simpson's V_3 nule we know,$$

$$x = \frac{5-a}{3\times n} \int f(x_0) + 4 \sum_{i=1}^{n-1} f(x_i) + 2 \sum_{i=2}^{n-2} f(x_i) + f(x_n)$$

$$= \frac{4.4-21}{3\times 9} \int f(2.9) + 4 \sum_{i=1}^{n-1} f(x_i) + f(x_3) + 2 \int_{10.2}^{10.2} f(x_i) + f(x_4)$$

$$= 0.167 \left[11.023 + 4 \left(18.174 + 49.402\right) + 2 \times 29.867 + 81.451\right]$$

$$= 0.167 \left(152.402 + 4 \left(67.576\right)\right)$$

$$= 0.167 \times 422.706 = 70.4524$$
So the value is 70.4524 .



Answer to the Q. NO. 3(b)

populative home ennon,

17201012

Answer to the a. No. 4(a) OR

A= 45in0 (1+ cosO) itenation 2:

a 2/ = 0

Xu=2.4 u=2.4-0=2.4

X1 = 82+0.618 x h = 0+0.618 x 2.4

= 1.9832

x, = 2.4 - 0.618x 00 2.4 = 0.9168

f(x2)=f(0.9168)=4 sin(0.9168)(1+cos(0.9168))

= 5.10597

f(z1) = f(1.4832) = 4 sin(1.4832)(1+(0s/1.4882)) = 4.3332

f(x2)>f(xi) So. now,

xu=1.4832

x, = 0-1168 +1832 0.9/68

20 x = 0; h = 1. 8832 - 0 @des = 0 5569

1.4832 -6.618x (+198) 20.55

N2=1.4832-0.618x 8=564=1+1393

0.56658

itenation ?!

$$E f(x_2) = f(H393) = 5-15295 3.9585$$

itenation 3:

f(x,)>f(x2)

Xl = 0.9168

x2=1.1331

xu=1.4832

21, = 0.9168+ 0.618(1.4832-0.9168)

= 1.2668.

After 3nd iteration

i. optimal point = 2 = 0.9168+1.2768

21.0718

For optimal point A would be,

A=\$ 4 sin(1.0718)(1+cos(1.0718))

= 5.193

A

Answer to the O.No. 4(b) or

For equal interval, with interval Ias)

in f

治(生))(学一号)

then the interval in which the waximum occurs is $[a+2-\frac{2}{2},b)$ else $[a,a+\frac{1}{2}+\frac{2}{2}]$ here $\{a,a+\frac{1}{2}+\frac{2}{2}\}$ here $\{$

time consuming. For the given seenance

8 in 4 (OF) we have to guess &, when to small it'll cause extrem were iteration

when too large will will cause loss of optimal value. So doing equal interval

for the given seenanio wort be

appropriede of even not possible in.