MCKV Institute of Engineering

243, G.T. Road (N), Liluah, Howrah

Numerical Methods Laboratory (BS-M494)

CSE 4th Semester, Year 2023-24

Assignment 1:

Write a program in C to calculate $sin32°$ by Newton's Forward Interpolation formula using the following data:

x	30	35	40	45	50	55
$\sin x$	0.5000	0.5736	0.6428	0.7071	0.7660	0.8192

Answer: 0.530

Assignment 2:

Write a program in C to calculate $\boldsymbol{y(6.5)}$by Newton's Backward Interpolation formula using the following data:

x	2	4	6	8
y	12	10	9	14

Answer: 9.492

Assignment 3:

Write a program in C to find $f(x)$ for x=6 by Lagrange's Interpolation formula using the following data:

x	1	2	3	4	7
y	2	4	8	6	128

Answer: 33.333

Assignment 4:

Write a program in C by applying 1) Trapezoidal Rule and 2) Simpson's 1/3 Rule to find the value of the following definite integral:

$\int_0^1 (\boldsymbol{xsinx + x^3})\boldsymbol{dx}$, taking n=24 and correct the result up to 3 decimal places.

Answer: (1) 0.552 (2) 0.551

Assignment 5:

Write a program in C by applying 1) Bisection method 2) Regula-Falsi method and 3) Newton-Raphson method to find the value of the following algebraic equation:

$x^3 - 3x - 5 = 0$, correct the result up to 3 decimal places.

Answer: (1)2.279 (2) 2.279 (3) 2.279

Assignment 6:

Write a program in C by applying 1) Euler's method and 2) R-K method of order 4 to find the solution of the following differential equation:

$\frac{dy}{dx} = \boldsymbol{3x + y^2}$, taking y=1 at x=0, find y at x=0.1, taking step length 0.01 and print the result correct up to 3 decimal places.

Answer: (1) 1.124 (2) 1.127

Assignment 7:

Write a program in C to fit a i) straight line ($y=a+bx$) and ii) exponential curve ($y=ae^{bx}$) using least square method from the given tables as follows:

x	0	1	2	3	4
y	1.1	1.9	2.7	3.5	4.3

X	2	4	6	8	10
Y	4	11	30	82	223

Answer: $y=1.1+0.8x$

$y=1.469\ e^{\wedge}0.503x$

Assignment 8:

Write a program in C to find the Mean, Median, Mode and Standard deviation for given set of grouped data.

marks	200 – 220	220 – 240	240 – 260	260 – 280	280 – 300	300 – 320	320 – 340
No. of students	7	15	20	6	6	4	2

Answer: 253, 248, 245.263, 30.512

Assignment 9:

Write a program in C using Gauss-Elimination method to solve the following system of linear equations:

$$3x+4y+5z=18, 2x-y+8z=13, 5x-2y+7z=20$$

Answer: $x=3, y=1, z=1$

Assignment 10:

Write a program in C using Gauss-Seidel iterative method to solve the following system of linear equations:

$$9x-2y+z=50, x+5y-3z=18, -2x+2y+7z=19$$

Answer: $x=6.154, y=4.314, z=3.24$

17/01/24 17/01/2024

(Signature of faculty In-charge)

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