Assignment III

1. Find the first and second derivatives at x=1.1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | 1 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 |
| y | 7.989 | 8.403 | 8.781 | 9.129 | 9.451 | 9.75 | 10.031 |

1. Evaluate , using trapezoidal rule for four intervals. How Simpson's 1/3 rule differs from trapezoidal rule? Derive the formula for Simpson's 1/3 rule.
2. Using Simpson’s 1/3 rule evaluate the followings:
   1. with n=8

, with h=0.1

1. Evaluate , using Gaussian 3-point formula.
2. Why partial pivoting is used with Naive Gauss Elimination method? How Gauss Jordan method differs from Gauss elimination method?
3. Solve the following system of equations using Gauss Elimination method with partial pivoting?

x - y + 3z = 13

4x - 2y + z = 15

-3x - y + 4z = 8

1. Explain the Doolittle LU decomposition method for matrix factorization and its application with an example.
2. Write algorithms for Guass-Jacobi and Gauss Siedel methods and apply them to solve one example of system of linear equations.
3. What are eigen value and eigen vectors? Find the largest eigen value and corresponding eigen vector for the following matrix correct to two significant digits using power method.
4. Appropriate the solution of y' = 2x + y , y(0) = 1 using Euler’s method with step size 0.1. Approximate the value of y(0.4).
5. How do boundary value problems differ from initial value problems? Discuss shooting method for solving boundary value problem.