UNIT- II – Solution of simultaneous algebraic equations & Numerical differentiation and Integration

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1. Solve the following system of linear equation by using Gauss sidle method.

a. x + 2y +3z = 8 2x + 4y + 9x = 8 4x + 3y + 2z = 2

b. x + y + z = 6 2x –y +3z = 4 4x + 5y -10z = 13

2. Solve the following by using Gauss Jordan method.

a. 2x + y + z = 10 ; 3x + 2y + 3z = 18 ; x + 4y + 9z = 16

b. 10x -7 y + 3z = 6 ; 5x -9y -2z = 7 ; -6x + 8y -z = 5

3. Evaluate $\int_0^6 \frac{dx}{(1+2x)^2}$ taking 6 equal sub intervals by Simpson's $\frac{1}{3}$rd rule

4. Using Simpson's $(1/3)^{rd}$ rule to evaluate : $\int_0^1 \frac{dx}{1+x^3}$ take h = 0.25.

5. Using Simpson $(3/8)^{th}$ rule evaluate : $\int_0^6 \sqrt{1-\ 8x^3}\ dx$ take n = 6.

6. Using Simpson $(3/8)^{th}$ rule evaluate $\int_{0.2}^{0.7}(\cos(x) - \log(x))dx$, take h = 0.1

7. Calculate by trapezoidal rule an approximate value of $\int_0^1 e^x dx$ in step of size 0.2.

8. Find the value of $\int_3^7 (x\log(x) + 1\ )dx\ \ by$ taking 4 strips using Trapezoidal rule

9. Using Euler's modified method find $y(0.1), y(0.2)\ \ if \frac{dy}{dx} = y - \frac{2x}{y}, y(0) = 1\ and\ h = 0.1$

10. Using Euler's modified method find $y(1.4), y(1.6)$

$if \frac{dy}{dx} = 2 + \sqrt{xy}, y(1.2) = 1.64\ and\ h = 0.2$

11. Using Runge Kutta method of fourth order find :

$y\ (0.1) if \frac{dy}{dx} = \frac{xy}{1+x^2}\ with\ initial\ condition\ x_0 = 0,\ y_0 = 1\ taking\ h = 0.1$

12. Using Runge Kutta method of fourth order find $y(1.2)\ if\ \frac{dy}{dx} = x^3 + y, y(1) = 2\ take\ h = 0.2$

13. Using Euler's method find $y\ (0.2) and\ y(0.4) if\ \frac{dy}{dx} = x^2 + y, y(0) = 1, h = 0.2$

14. Using Euler's method find $y\ (0.5) if \frac{dy}{dx} = \frac{1}{x+y}, y(0) = 1\ and\ h = 0.5$

15. Given that y(x) is solution to $dy/dx = y^3 + 2$, y(0)=3, find the value of y(0.2) from a second order Taylor series polynomial around x=0.

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