NSM

Gaurang Abinave

UNIT - III

- Gauss - Jordan Method

  - Row transformation

- Gauss - Seidal Method

  - Increasing order
  - get eq^n for x, y and z
  - Keep Solving.

- Numerical ~~differentiation~~ Integration Trapezoidal Rule

$$h = \frac{b-a}{n}$$

assume $n=6$ when not given

$$\frac{h}{2}\left(y_0 + y_n + 2(\text{remaining term addition})\right)$$

- Simpson's 1/3 Rule.

$$h = \frac{b-a}{n}$$

$$\frac{h}{3}\left(y_0 + y_n + 2(\text{even terms}) + 4(\text{odd terms})\right)$$

  - Repetation is not allowed.

Simpson's 3/8th Rule

$$h = \frac{b-a}{n}$$

$$\frac{3h}{8}\left(y_0 + y_n + 2(\text{multiple of } 3) + 3 \times (\text{remaining terms})\right)$$

- Without repetation.

Euler's Method.

$$x_{n+1} = x_n + h$$

$$y_{n+1} = y_n + h\, f(x_n, y_n)$$

where, h = step size (don't change once assumed)

Modified Euler's Method.

$$y^{0}_{(n+1)} = y_n + hf(x_n, y_n)$$

$$y'_{(n+1)} = y_n + \frac{h}{2}\left[f(x_n, y_n) + f(x_{n+1}), y^{\cdot}\right]$$

Range- Kutta Method

2nd order

$$k_1 = hf(x_n, y_n)$$

$$k_2 = hf(x_n + h, y_n + k_1)$$

$$y_{n+1} = y_n + \frac{1}{2}(k_1 + k_2)$$

4th order

$$k_1 = hf(x_n, y_n)$$

$$k_2 = hf(x_n + h/2, y_n + k_1/2)$$

$$k_3 = hf(x_n + h/2, y_n + k_2/2)$$

$$k_4 = hf(x_n + h, y_n + k_3)$$

$$y_{n+1} = y_n + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$$