

# Chapter 4(Root Finding)

[will be added]

# Chapter 5(Linear System)

$$12x_1 + 10x_2 - 7x_3 = 15$$

$$6x_1 + 5x_2 + 3x_3 = 14$$

$$24x_1 - x_2 + 5x_3 = 28$$

## Q1) Using the above equations

- i) Construct the A, x and b matrix from the above linear equation set
- ii) Using the above equation, use **Gaussian Elimination** to find the solution of the system.

## Q2) Using the above equations

- i) By calculating the row multipliers, m, find  $A^{(2)}$
- ii) Find  $F^{(2)}$  and  $A^{(3)}$
- iii) Find L and U
- iv) Find the solution of the system.

# Chapter 7(Integration)

**Q1) For the following equations with interval [-1,4], find:**

- a)  $e^{5x} + 5x$
- b)  $6x - e^{-2x}$
- c)  $5x^2 + e^{-1x}$
- d)  $\sin(2x+3)$
- e)  $\cos(5x)$

- i) Actual integral value
- ii) Evaluate  $n=1$  (nodes =2) with closed Newton Cotes formulae (Trapezium Rule). Also find absolute and relative error.
- iii) Evaluate  $n = 2$  (nodes = 3) with closed Newton Cotes formulae (Simpson Rule). Also find absolute and relative error.
- iv) Find approximate integral using Composite Newton Cotes formulae using  $C_{1,3}$  ,  $C_{1,4}$  ,  $C_{1,5}$  ,  $C_{1,5}$  . Also find absolute and relative error for each case.

# Chapter 6(Integration)

**Q1) Consider a system where  $f(2)=5$  ,  $f(1)=9$ ,  $f(7)=2$ ,  $f(4)=0$ . Using this, find the best fit linear polynomial.**

- i) Show the values in equation format
- ii) Find A, x and b
- iii) Using the Gram-Schmidt process, find the orthonormal columns  $q_1$  and  $q_2$ .
- iv) Construct Q.
- v) Find matrix R
- vi) Find matrix x
- vii) Find the best fit linear polynomial

**Q2) Consider a system where  $f(2)=5$  ,  $f(1)=9$ ,  $f(7)=2$ ,  $f(4)=0$ . Using this, find the best fit quadratic polynomial (degree = 2).**

- i) Show the values in equation format
- ii) Find A, x and b
- iii) Using the Gram-Schmidt process, find the orthonormal columns  $q_1$  and  $q_2$ .
- iv) Construct Q.
- v) Find matrix R
- vi) Find matrix x
- vii) Find the best fit linear polynomial