**i) Polynomial Interpolation Methods**

1. **Lagrange Polynomial Interpolation:**

**Python Code:**

python

Copy code

def lagrange\_interpolation(x, y):

n = len(x)

L = np.zeros((n, n))

for i in range(n):

Li = np.ones(n)

for j in range(n):

if i != j:

Li \*= (x - x[j]) / (x[i] - x[j])

L[i, :] = Li

coefficients = np.sum(y \* L, axis=0)

return coefficients

**2. Newton's Divided Difference Method:**

**Python Code:**

python

Copy code

def divided\_diff(x, y):

n = len(y)

coef = np.zeros([n, n])

coef[:, 0] = y

for j in range(1, n):

for i in range(n - j):

coef[i][j] = (coef[i + 1][j - 1] - coef[i][j - 1]) / (x[i + j] - x[i])

return coef[0, :]