Numerical Analysis Assignment 5 — Curve Fitting and Interpolation

Question #1

Consider the following set of data points:

x	y
0.1	0.03
0.3	0.06
0.8	0.07
1.1	0.1

Fit the curve $y = C_1 + C_2\sqrt{x} + C_3 x$ through the latter data with C_1, C_2, and C_3 some constants determined through the method of least squares.

Question #2

Consider the following set of data points:

x	y
0.1	0.2
0.3	0.7
0.7	0.6

Find an expression $y(x)$ that fits through every data point using

(a) a Vandermonde polynomial

(b) a Lagrange polynomial

(c) a Newton polynomial

Question #3

You obtain a polynomial of degree 3 that yields y as a function of x from 4 data points (x_1, y_1), (x_2, y_2), (x_3, y_3), (x_4, y_4). *Knowing the polynomial coefficients,* determine the *minimum* number of arithmetic operations (additions, subtractions, multiplications, and divisions) necessary to calculate y as a function of x from $x = 0$ to $x = 1$ using a step $\Delta x = 0.01$ for

(a) A Vandermonde polynomial.

(b) A Lagrange polynomial.

(c) A Newton polynomial.

Answers

1.

2.

3. 808, 1943 or 1741, 1111.

Due on Monday 19th November at 16:30. Do all problems.