

Numerical Analysis Semester 081 Problem Set 8

Reference: Chapter 05.03 Lagrange Polynomial Interpolation

For these problems show all work by hand

1a) Construct the Lagrange Coefficients for the following tabulated data points:

k	x_k	$f(x_k)$
0	1.0	3.60
1	3.0	1.80
2	5.0	1.20
3	7.0	0.90

b) Write down the Lagrange Polynomial of degree three interpolating these points. Leave in "unexpanded" form.

2. Consider the function $f(x) = 2 \sin\left(\frac{\pi x}{6}\right)$.

a) Calculate the 2nd degree Lagrange interpolating polynomial using data points $x= 0,1$, and 3.

b) Use the above polynomial to approximate $f(2)$, $f(2.4)$ and $f(4)$ -- Compare to true values of $f(x)$.

c) Calculate the 3rd degree Lagrange interpolating polynomial using data points $x= 0, 1, 3$ and 5

d) Use the above polynomial to approximate $f(2)$, $f(2.4)$ and $f(4)$ -- Compare to true values of $f(x)$