CSE330: Numerical Methods
Assignment 3
Spring 2025

1. An interpolating polynomial, p(x) = 1.648(x − 1) is derived for the function f(x)=x ln x at the nodes (x0 = 1, x1 = 3) using the Lagrange method. Answer the following keeping up to 4 significant figures.

a. (2 marks) Explain what you need to do to obtain a degree 3 interpolating polynomial for the same function f(x) and for the same nodal points (x0 = 1, x1 = 3).

b. (6 marks) Calculate the bases of the degree 3 polynomial.

c. (2 marks) Find the hermite polynomial using the bases found in (b).

 2. a. (5 Marks) For f(x) = 1/(1+x2), where x epsilon [-5,5]. Find out the Chebychev's node for a degree 4 polynomial.

3. For f(x) = xln(x)

a. (5 marks) Find the numerical differentiation f'(x) using Forward Difference method at x=1, where h=0.1.

b. (5 Marks) Find the upper bound of truncation error for h=0.1 but for Backward Difference and Central Difference method