COMP 361: Elementary Numerical Methods
Assignment no.3

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Contents

NOTE:
The folder <program> attached in the same directory contains every program for the assignment. Consult the file README.md inside the folder for build guide and list of dependencies.
The programs were written in Python with Jupyter Notebook.

1 Question 3

1.1 Problem

Derive the local Three-point Gauss Quadrature Formula for integrating a function f(x) over the reference interval [1, 1]. (This formula uses the roots of the orthogonal polynomial $e_3(x)$.)
Use the corresponding composite formula to integrate the function $f(x) = \sin(\pi x)$ over the interval [0, 1], using N = 2, 4, 8, 16, ů ů ů , equally spaced subintervals in [0, 1]. List the observed errors (the difference between the numerical integral and the exact integral) in a Table.
How many function evaluations are needed for the error to be less than $10^(7)$?

1.2 Local Three-point Gauss Quadrature Formula