Numerical Analysis Project

Readme

Submitted by:

Muhammad Asim Chattha (210970)

Class:

BSCS - 5   C

Dept. of Computer Science

Air University

Islamabad

Project

The selected code is a MATLAB function named Project (). This function provides a menu-driven program for interpolation using various methods: Gauss Forward Interpolation, Gauss Backward Interpolation, Bessel Interpolation, and Sterling Interpolation.

The function starts with a while loop that continues until the user inputs the number 5. The user is presented with a menu to select the interpolation method they want to use. Depending on the user's choice, the corresponding block of code is executed.

In each block, the user is prompted to input the values of x and y, and the point of interpolation. The length of the input table is calculated and a matrix for divided differences is initialized. The divided differences are then calculated using the appropriate formula for the selected interpolation method. The interpolated value is evaluated by initializing it with the first or last divided difference (depending on the method) and then adding the terms calculated using the interpolation formula.

In the Gauss Forward and Bessel Interpolation methods, the first divided difference is used to initialize the interpolated value, and the forward difference formula is used to calculate the divided differences. In the Gauss Backward Interpolation method, the last divided difference is used to initialize the interpolated value, and the backward difference formula is used to calculate the divided differences.

In the Sterling Interpolation method, the first divided difference is used to initialize the interpolated value, and the forward differences are calculated. Then, the Sterling coefficients are calculated using the forward differences and the product of (x - table_x(1:i-1)). The interpolated value is calculated by adding the Sterling coefficient multiplied by the term to the interpolated value.

If the user inputs the number 5, the program displays an exit message and ends. If the user inputs a number greater than 5 or less than 0, the program displays an error message.