Rajshahi University of Engineering & Technology

CSE 2104: Sessional Based on CSE 2103

Lab Report 05

Dated: 24.03.18

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Problem#01: Determining a functional value using Lagrange’s interpolation method

**THEORY:** Lagrange interpolation method is thoroughly dependent upon a formula called Lagrange’s interpolation formula. For the dataset containing three entities, the formula stands –

For more entities, the formula is changed considering it’s merit.

#include <iostream>

using namespace std;

int main()

{

double a[10], b[10];

int n,i,j;

double x, X, Y, mul;

double Value = 0.0;

cout << "Enter number of data: ";

cin >> n;

cout << "Enter the values of x & y";

cout << "\nX\tY\n";

for(i = 0; i < n; i++)

{

cin >> a[i] >> b[i];

}

cout << "Desired X : ";

cin >> x;

for(i=0; i < n; i++)

{

X=1;

Y=1;

for(j = 0; j < n; j++)

{

if(j != i)

{

X = X\*(x-a[j]);

Y = Y\*(a[i]-a[j]);

}

}

mul = (X/Y) \* b[i];

Value += mul;

}

cout<< "Desired Output: " << Value <<endl;

return 0;

}

OUTPUT:

Enter number of data: 4

Enter the values of x & y

X Y

300 2.4771

304 2.4829

305 2.4843

307 2.4871

Desired X : 301

Desired Output: 2.4786

Enter number of data: 4

Enter the values of x & y

X Y

300 2.4771

304 2.4829

305 2.4843

307 2.4871

Desired X : 309

Desired Output: 2.48996

**DISCUSSION**:Though the complexity of the program is O(n­­2), the method is way faster than Newton’s and Gauss’s interpolation method and gives better result than other two.