

Date:

Statistical Computing and Numerical Analysis Using C Programming
(STS-A-CC-3-7-P)
Problem Set 4

- ✓ 1. Write a program in C to find the value of the function $y = f(x)$ for a given x and n pairs of values $(x_i, y_i), i = 1, 2, \dots, n$, using Lagrange's interpolation formula. Run the above program to find the value of (i) $f(1.25)$, (ii) $f(1.36)$ on the basis of the following data set.

[120_lagrange_interpolation_formula.c](#)

$x:$	1.0	1.1	1.3	1.5	1.6
$y = f(x):$	0.3639	0.3258	0.2612	0.2095	0.1876

(i) The value of $f(1.250000)$ is 0.276024 (ii) The value of $f(1.360000)$ is 0.244469

2. Write a program in C to compute the value of the following integral by Trapezoidal rule using 12 sub-intervals.

$$\int_{0.2}^{1.4} (\sin(x) - \ln(x) + e^x) dx$$

3. Write a program in C to compute the value of the following integral by Simpson's one third rule correct upto 8 significant figures.

$$\int_0^1 \frac{\log_e(1+x^2)}{(1+x^2)} dx.$$

4. Write a program in C to calculate the real root correct upto 5 places of decimal of the equation $10^x + x - 4 = 0$ by the Newton-Raphson method. Take the initial value as 0.5.

5. Write a program in C to calculate the real root correct upto 6 places of decimal of the following equation by the method of iteration. Take the initial value as 3.5.

$$2x - \log_{10} x - 7 = 0$$