COMPUTATIONAL AND NUMERICAL METHODS

Lab-4

Date: 22-08-2016

Q. 1).

I. Plot the curve e^x in [-1, 1].

II. Construct Lagrange interpolating polynomial P_4 (x) by taking 5 node points {-1,$\frac{-1}{2}$, 0, $\frac{1}{2}$, 1}. Plot the Lagrange interpolating polynomial and see the difference.

III. Plot the error function $e^x - P_4(X)$ in [-1, 1].

IV. Construct Taylor Polynomial $T_4(X)$ of degree 4 about $x_0 = 0$ in [-1, 1]. Plot the Taylor's polynomial $T_4(X)$ and error function $e^x - T_4(X)$ in [-1, 1].

V. Compare which one is more accurate$P_4(X)$ or$T_4(X)$.

Q.2).The following data are given for a standard normal distribution

$$y(X) = \int_{-\infty}^{x} \frac{1}{\sqrt{2\pi}} e^{\frac{-1\,x^2}{2}}\, dx$$

X_i	1.4	1.6	1.8	2.0
$y(X_i)$	0.9192	0.9452	0.9641	0.9772

Write a program to find all the Newton's divided differences for the above data.

Find the Newton's divided difference polynomial P(X). Hence find P(1.65).