DEPARTMENT OF MATHEMATICS

BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI

IMM5002 Numerical Method Lab, Session: (MO-19)

Lab Assignment - 7

---

1. Compute π from an integral of the form $\int_0^1 \frac{dx}{1+x^2}$, by using Trapezoidal, Simpson's one-third and three-eighth rules. You must take the same number of intervals in all the three cases. Print the error in all the three cases. Now increase the number of intervals firstly 10 times and then 20 times and see the effect on the error.

2. Find the approximate values of the two integrals

$$\int_0^1 \frac{dx}{1+x^2} \qquad \text{and} \qquad \int_0^{\frac{1}{\sqrt{2}}} (\sqrt{1-x^2} - x)dx$$

by Simpson's one-third rule in such a way that the error ϵ is less than $\frac{1}{2}10^{-5}$. Your programme should be such that it starts with the smallest number of sub-intervals and then goes on increasing the number of sub-intervals till the desired accuracy is reached.
