

Simulation Lab(MC503)

Assignment 3

Try to solve all the problems

1. Find the value of the integral $\int_0^{10} 2^x dx$ using Trapezoidal rule by dividing the range into ten equal parts.
2. For $n=4$, evaluate $\int_{1.2}^{1.6} (x + 1/x) dx$ using the Simpson's 1/3rd rule and Trapezoidal rule respectively. Correct upto 2 significant digits.
3. Solve the integral $\int_{-1}^1 \frac{1}{2+\cos(x)} dx$ using the Simpson's 1/3rd rule. Round your answer to 3 decimal place.
4. Compute $I = \int_8^{30} \left\{ 2000 \ln \left(\frac{14000}{14000-2100t} \right) - 9.8t \right\} dt$, using Simpson 1/3rd rule (with $n_1=4$), and Simpson 3/8 rule (with $n_2 = 3$).
5. By considering some suitable no. of points, find the integral of $\int_0^1 f(x) dx$ by using Trapezoidal and Simpson 1/3rd rule where $f(x)$ is defined as below:

$$f(x) = \begin{cases} abx^{a-1}(1-x^a)^{b-1}; & 0 < x < 1; a, b > 0 \\ 0; & \text{elsewhere} \end{cases}$$

Here, you may take $a=2$ and $b=1$. Also compare the results obtained by two different method by find their relative error.

6. Find the integral of $\int_0^{0.4} f(x) dx$ by suing Simpson's 3/8 rule where $f(x)$ is defined as below:

x	0	0.1	0.2	0.3	.4
f(x)	1	0.9975	0.99	0.9776	0.8604

..... end