

Lab Assignment 6

1. Write program codes to evaluate integrals using
(i) midpoint rule (ii) trapezoidal rule (iii) Simpson 1/3 rule
Then apply them to evaluate

(a) $\int_0^{\pi/2} (1 + 2 \cos x) dx$

(b) $\int_0^3 (1 - e^{-x}) dx$

(c) $\int_0^1 (x^2 \sinh x + \tan^{-1} x) dx$

(d) $\int_1^2 (x + 1/x)^2 dx$

Compare the results with the analytic ones, then estimate the number of segments n such that the error becomes less than 10^{-6} for each method.

2. Determine the RMS value of the following current:

(a) $i(t) = 10 \sin 2\pi t$

(b) $i(t) = 10 e^{-0.1t} \sin 2\pi t$

(c) $i(t) = \begin{cases} 5 \sin 10\pi t & 0 \leq t \leq T/2 \\ 0 & T/2 \leq t \leq T \end{cases}$

(d) $i(t) = \begin{cases} 5 e^{-0.5t} \sin 10\pi t & 0 \leq t \leq T/2 \\ 0 & T/2 \leq t \leq T \end{cases}$