

- Zip all your files and label the zip file as **[Roll number in lower case]_hw5.zip**
- The scripts will be executed and compared against the submitted PDF file.
- Submit a single zip file containing .tex, .m, .pdf and image files only.
- Generic instructions from previous homeworks stand.
- **This assignment is to be done entirely in Octave**

All tasks are performed on the following integral

$$I = \int_0^{\pi/2} \sin(x) dx$$

and evaluation of errors is possible as the exact value of I is known. The four methods for quadrature as pertinent to this assignment are: 1. Left endpoint (LE), 2. Right endpoint (RE), 3. Mid point (MP), and 4. Trapezoidal (TZ).

Answer the following (state your inferences for each),

1. Plot absolute error vs Δx for all four schemes on linear axis. Repeat the same on a log-log scale.
2. Fit an appropriate curve using linear regression and comment on the regression model.
3. If for any of the cases, the linear regression resulted in a straight line, what does the slope indicate? Would you want a scheme with a higher or lower slope? Why?
4. Plot I_{LE} and I_{RE} as function of Δx . What happens as the number of segments tend to infinity?
5. Present a plot that shows the computational cost of each of these methods. State your inferences.