Numerical Computing :: Project Eleven

Implement the following numerical methods for approximating integrals: (i) trapezoidal rule, (ii) Simpson's rule, and (iii) Clenshaw-Curtis rule. (Code for generating the points and weights of the Clenshaw-Curtis rule is available on Canvas.)

Using calculus, compute the definite integral of $f(x) = \cos(3\pi x)$ on the interval $[-1, 1]$. Run a convergence study on the three numerical methods and identify the asymptotic regime and the rate of convergence for each method. **FOR FUN:** Change the integration interval to $[-\pi, \pi]$ and repeat the study. What changes?