Exercises

Q1: Use both of Trapezoidal and composite Simpson formulas to derive a new composite formula, with n=5.

a. What is the truncation error's form of this new formula?
b. What should be the degree of f to guarantee that there is no absolute error.
c. Use the new formula to find the approximate value of the following integral, and find the absolute error.

$$\int_0^1 e^{2x} dx$$

Q2: Use **Trapezoidal** method, with **n=1**, and **n=3** to find the approximate value of the following integral, and find the absolute error in each case.

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

Q3: Write a Matlab program which can be used to find the approximate value to the integral in the last example by using Gauss-Legendre 2-points method.

Q4: - Prove that Gauss-Legendre 2-points method gives the exact results for the following integral

$$\int_0^1 (x^3 + 1) dx$$

Q5: Derive a newton cotes formula with $n = 3$.