Assignment 5. Numerical Integration   Marks 10

Posted on 07.11.2022 and due on 15.11.2022 midnight

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1. Use Midpoint, Trapezoidal and Simpson numerical integration scheme to evaluate the integral

$$\int_1^4 \sqrt{1 + \frac{1}{x}}\, dx$$

   Take $N = 10$, 20 and 30 and compare the result in tabular format.   **[4]**

2. Use Monte Carlo integration to estimate the integral   **[3]**

$$\int_{-1}^1 \sin^2(x)\, dx$$

3. A 2 meter long beam has a linear mass density $\lambda(x) = x^2$, where x is measured from one its ends. Find the center of mass of the beam numerically.   **[3]**