

ENGR 326

Lab Assignment - Romberg Integration

Solve the following integration problem using Romberg integration by “by hand” (suggest using a spreadsheet as your computational tool). Use 1 trapezoid for the first iteration. Exit criteria for the algorithm include  $10^{-6}$  as the convergence tolerance and 5 for the maximum number of iterations (i.e., a maximum of 6 rows in the Romberg table). Be sure to compare the numerical result to the exact solution. Use the rate of change in the error in the trapezoid rule integration as the stepsize changes to directly estimate the error order of the trapezoid rule.

$$\int_1^5 (4e^x + 5 \ln(x^3)) dx$$