Math 310 Numerical Analysis (Bueler)

December 4, 2009

Assignment #9

DUE Friday 11 December, 2009 at 5pm

Problems 7.2, exercise 21.

Problems 7.2, exercise 22.

Problems 7.4, exercise 6a. (Please do this by hand. And compare to the exact integral.)

Problems 7.4, exercise 8.

Problems 8.1, exercise 4ab.

Problems 8.1, exercise 5ab.

Exercise 1. Use the online program romberg.m for Romberg integration, which uses trap.m, to approximate these integrals:

(a)

 $\int_{0}^{2} e^{-x^{2}} dx \qquad (\text{and look up the answer in a table or reference})$ $\int_{0}^{7} \sin x \, dx \qquad (\text{and compare to event})$

(b)

 $\int_{2}^{7} \sin x \, dx \qquad (\text{and compare to exact})$

Also do the same integrals using n = 32 subintervals for trapezoid and Simpson's rule. Comment on the relative accuracy of the three approximations.

(Extra Credit) Can you find an integral for which you know the exact answer, and for which Simpson's is more accurate than Romberg?