

Math 128a, Chorin, Spring 2013, computer homework 6 (last computer homework)

Try to use the equations derived in theoretical homework 9 to approximate the function  $f(x) = e^x$  on  $[0, 1]$  by a polynomial of degree  $n$  by minimizing  $\|f - (a_0 + a_1x + \dots + a_nx^n)\|_2^2$ , actually solving the linear equations for the coefficients via Gaussian elimination with partial pivoting, for  $n=5, 10, 15$ . You can calculate integrals of the form  $\int_0^1 e^x x^j$  by hand. (Gaussian elimination will be discussed in class. There are detailed instructions how to do Gaussian elimination in the book, pp. 133-137, 141-144.) Comment on what you see.