

AMCS 602  
Problem set 5 due October 4, 2016  
Dr. Epstein

**Reading:** Page numbers below refer to *Numerical Linear Algebra* by Trefethen and Bau.

**Standard problems:** The following problems should be done, but do not have to be handed in.

1. Page 101, problem 13.1.
2. Page 101, problem 13.2.
3. Page 107, problem 14.1 (a–e).

**Homework assignment:** The solutions to the following problems should be carefully written up and handed in.

1. Page 101, problem 13.3.
2. Page 101, problem 13.4. (MATLAB, via MuPAD can now do exact arithmetic)
3. Page 107, problem 14.1 (f), (g).
4. Page 107, problem 14.2.
5. Suppose that  $\{\epsilon_1, \dots, \epsilon_m\}$  are numbers that all satisfy  $|\epsilon_i| \leq |\eta|$ . Show that, given  $1 < C$ , we have that

$$\prod_{j=1}^m (1 + \epsilon_j) = 1 + \epsilon, \quad (1)$$

where  $|\epsilon| \leq Cm|\eta|$ , provided that  $|\eta| \leq \min \left\{ \frac{\ln C}{m-1}, 1 \right\}$ . For double precision arithmetic how large can we take  $m$  if  $C = 2$ ?

6. Page 112, problem 15.1 (a), (b), (d), (e), (g).
7. Page 113, problem 15.2.