

AMCS 602
Problem set 7 due November 1, 2016
Dr. Epstein

Reading: We are covering the material in Chapters 22, 33, and 35 on this problem set. 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 171, problem 22.2.
2. Page 255, problem 33.1.
3. Page 275, problem 35.5.

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

1. Page 171, problem 22.1.
2. Page 171, problem 22.4.
3. Page 177, problem 23.1.
4. Page 255, problem 33.2.
5. Page 255, problem 33.3.
6. Page 274, problem 35.1.
7. Page 274, problem 35.2. Show that if S is a closed curve (or contains a closed curve) that bounds a region containing zero, then for any n , and $p_n \in P_n$, it is impossible for $\|p_n\|_S < 1$. How will GMRES behave for a matrix A whose spectrum “includes” S ? Of course the spectrum of a finite rank matrix cannot contain a continuum; here one should imagine that m is very large and the matrix A is a finite rank approximation to an operator in an infinite dimensional space, whose spectrum includes S .
8. Page 274, problem 35.3.
9. Page 275, problem 35.4.