

## HOMEWORK 7, MATH 114, SPRING 2003

DUE TUESDAY, JUNE 3

- (1) Let  $A$  be an  $n \times n$  real matrix, and let  $x \in \mathbb{R}^n$ . Show that the set of polynomials  $\{p : p(A)x = 0\}$  is an ideal. The *annihilator* of  $x$  is the generator of this ideal. Show that there are only finitely many polynomials which are annihilators of elements of  $\mathbb{R}^n$  (even though there are an uncountably infinite number of elements of  $\mathbb{R}^n$ ).
- (2) Lax, p.64, exercise 1
- (3) Lax, p.70, exercise 3, parts 1 and 2.
- (4) Lax, p.70. Prove theorem 9.
- (5) Lax, p.70, exercise 4.
- (6) Lax, p.73, exercise 7.