Math 110, Summer 2012 : Jordan canonical form review notes

Polynomials, representations

Division algorithm for $\mathbb{C}[t]$ (computation), Euclidean algorithm for $\mathbb{C}[t]$ (statement), Fundamental Theorem of Algebra. Definition of a representation of the polynomial algebra $\mathbb{C}[t]$. Definition of the minimal polynomial μ_L/μ_A. The minimal polynomial divides every nonzero element in $\ker \rho$. Using the minimal polynomial to determine the allowed polynomial relations a matrix A can satisfy. Relatively prime polynomials; if $f_1, \ldots, f_p$ are relatively prime then there exists $g_1, \ldots, g_p$ such that $f_1 g_1 + \ldots + f_p g_p = 1$.

Canonical form of an endomorphism

Annihilating polynomials. Using annihilating polynomials to determine direct sum decomposition of V. Primary decomposition theorem. L diagonalisable if and only if the minimal polynomial is a product of *distinct* linear factors. The roots of the minimal poynomial μ_L are precisely the eigenavalues of L. Cayley-Hamilton theorem. Examples

Jordan canonical form

Using the above results to determine the Jordan canonical form of a matrix. Computing a Jordan basis of a given matrix. Examples (eg Short Homework 8, question 1).