

MATH 101A: HOMEWORK

8. HOMEWORK 8

The following problems are due Thursday (Nov 15). I will post the answers after I grade it.

8.1. Take the complex matrix

$$A = \begin{pmatrix} 0 & 1 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}.$$

I.e.: $Ae_1 = 0, Ae_2 = Ae_3 = e_1$ and put it into Jordan canonical form: Find an invertible complex matrix B so that $B^{-1}AB$ is in Jordan canonical form. What is the corresponding decomposition of \mathbb{C}^3 as a module over $\mathbb{C}[T]$?

8.2. Over the real numbers there are irreducible polynomials of degree 2:

$$p(x) = x^2 + bx + c$$

So, $\mathbb{R}[T]/(p(T)^2)$ is a cyclic module over $\mathbb{R}[T]$. Find the corresponding 4×4 matrix.