

Mathematics 1350H – Linear algebra I: Matrix algebra

TRENT UNIVERSITY, Summer 2013

ASSIGNMENT #3

Due on Wednesday, 5 June, 2013.

Complex relationships

Let \mathbf{I}_n denote the $n \times n$ identity matrix.

1. Find a 2×2 matrix \mathbf{T} such that $\mathbf{T}^2 = -\mathbf{I}_2$. [4]
2. Find 4×4 matrices U , V , and W such that $\mathbf{U}^2 = \mathbf{V}^2 = \mathbf{W}^2 = -\mathbf{I}_4$, $\mathbf{UV} = \mathbf{W}$, $\mathbf{VW} = \mathbf{U}$, $\mathbf{WU} = \mathbf{V}$, $\mathbf{VU} = -\mathbf{W}$, $\mathbf{WV} = -\mathbf{U}$, and $\mathbf{UW} = -\mathbf{V}$. [6]

HINT: You can use the matrix \mathbf{T} from your solution to problem 1 as a submatrix of at least one of the matrices you need to build for problem 2.