Linear Algebra MATH 325: Assignment 5

(Due in class, March 8)

Problem 1: Find the Jordan normal form of the following 3×3-matrix

$$A = \begin{pmatrix} -3 & 1 & 2 \\ -1 & -1 & 1 \\ -2 & 1 & 1 \end{pmatrix},$$

and find a Jordan basis for A. (Hint: -1 is an eigenvalue of A.)

Problem 2: Find the Jordan normal form of the following 3×3-matrix

$$B = \begin{pmatrix} 4 & 1 & 1 \\ 2 & 3 & 1 \\ -6 & -3 & -1 \end{pmatrix},$$

and find a Jordan basis for B. (Hint: 2 is an eigenvalue of B.)

Problem 3: Let A be a complex 4×4-matrix, such that $A^4 = 0$. What are the possible Jordan normal forms of A?