

MA 265 Lecture 37

Appendix B.2 Complex Numbers in Linear Algebra

Example 1. *Solve the following linear system*

$$\begin{aligned}(1 + i)x_1 + (2 + i)x_2 &= 5, \\ (2 - 2i)x_1 + ix_2 &= 1 + 2i.\end{aligned}$$

Example 2. *Find the determinant of the coefficient matrix in Example 1.*

Example 3. Find the eigenvalues and eigenvector of

$$A = \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$$

Example 4. Find the eigenvalues and eigenvector of

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & i \\ 0 & -i & 2 \end{bmatrix}$$

Remark: If A is a Hermitian matrix (i.e., $\overline{A^T} = A$), then