

Homework #10

Math 527, UNH spring 2015

Due Thursday, April 23 in recitation.

Problems 1-3: Write the system of equations as an $A\mathbf{x} = \mathbf{b}$ problem, and then find the solution \mathbf{x} by Gaussian elimination.

1. $x + y - 2z = 14$

$2x - y + z = 0$

$6x + 3y + 4z = 1$

2. $5x - 2y + 4z = 10$

$x + y + z = 9$

$4x - 3y + 3z = 1$

3. $5x + 4y - 16z = -10$

$y + z = -5$

$x - y - 5z = 7$

Problems 4-6: For the given matrix A , find all solutions \mathbf{x} to the equation $A\mathbf{x} = \mathbf{0}$. First calculate $\det A$. If $\det A = 0$, then there are infinitely many solutions \mathbf{x} . If $\det A \neq 0$, then the only solution is $\mathbf{x} = \mathbf{0}$.

4. $A = \begin{pmatrix} 4 & 2 & 3 \\ 2 & 1 & 0 \\ -1 & -2 & 0 \end{pmatrix}$

5. $A = \begin{pmatrix} 2 & 4 & -2 \\ 4 & 2 & -2 \\ 8 & 10 & -6 \end{pmatrix}$

6. $A = \begin{pmatrix} -1 & 3 & 0 \\ 1 & -2 & 1 \\ 0 & 1 & 2 \end{pmatrix}$

Problems 7-11: Find the eigenvalues and eigenvectors of the given matrix.

7. $A = \begin{pmatrix} -1 & 2 \\ -7 & -8 \end{pmatrix}$

8. $A = \begin{pmatrix} -8 & -1 \\ 16 & 0 \end{pmatrix}$

9. $A = \begin{pmatrix} -1 & 2 \\ -5 & 1 \end{pmatrix}$

10. $A = \begin{pmatrix} -1 & 2 \\ -5 & 1 \end{pmatrix}$

11. $A = \begin{pmatrix} 2 & -1 & 0 \\ 5 & 2 & 4 \\ 0 & 1 & 2 \end{pmatrix}$

Most problems adapted from Appendix II of Zill's "First Course in Differential Equations," 9th edition.