

Linear Algebra

Exercises for Lecture Eight: Solving $Ax = 0$: Row Reduced Form R

Due Friday, October 11, 2013

1. (This problem is essentially Problem 1 from Chapter 3.4.)

$$A = \begin{pmatrix} 2 & 4 & 6 & 4 \\ 2 & 5 & 7 & 6 \\ 2 & 3 & 5 & 2 \end{pmatrix} \quad (1)$$

- (a) Describe $C(A)$.
- (b) Describe $N(A)$.
- (c) Determine $\text{rref}(A)$.
- (d) What is the rank of A ?
- (e) What are the conditions, if any, on b such that $Ax = b$ has a solution?

$$b = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix} \quad (2)$$

- (f) Now suppose that b is:

$$b = \begin{pmatrix} 4 \\ 3 \\ 5 \end{pmatrix} \quad (3)$$

- (g) Determine a particular solution to $Ax = b$.
 - (h) Write down the complete solution to $Ax = b$.
 - (i) Find the special solutions to the equation $Ax = 0$.
2. Chapter 2.3, problem 3
3. Chapter 3.4, problem 16
4. Chapter 3.4, problem 17
5. Chapter 3.4, problem 24