Worksheet 6

Sections 306 and 310
MATH 54

September 11, 2018

Exercise 1. Solve the system using matrix inverses!

$$8x_1 + 5x_2 = -9$$

$$-7x_1 - 5x_2 = 11$$

Exercise 2. Suppose $(B - C)D = 0$, where B and C are $m \times n$ matrices and D is an invertible $n \times n$ matrix. show that $B = C$.

Exercise 3. Determine which of the matrices are invertible. Justify your answers, but try using as few calculations as possible :)

$$\begin{bmatrix} -4 & 6 \\ 6 & -9 \end{bmatrix} \qquad \begin{bmatrix} -7 & 0 & 4 \\ 3 & 0 & -1 \\ 2 & 0 & 9 \end{bmatrix} \qquad \begin{bmatrix} 1 & 3 & 7 & 4 \\ 0 & 5 & 9 & 6 \\ 0 & 0 & 2 & 8 \\ 0 & 0 & 0 & 10 \end{bmatrix}$$

Exercise 4. Is it possible for a 5×5 matrix to be invertible when its columns do not span $\mathbb{R}^5$? Why or why not?

Exercise 5. Compute the following determinant by cofactor expansion.

$$\begin{vmatrix} 3 & 0 & 0 & 0 \\ 2 & -2 & 0 & 0 \\ 2 & 6 & 0 & 3 \\ 3 & -8 & -3 & 4 \end{vmatrix}$$

Exercise 6. Let A, B be $n \times n$ matrices. Show that if AB is invertible, then so is A.