Linear Algebra (Math 220)

Assignment due Thursday, February 28

1 Preparation

Expect a quiz.

Relevant Reading:

- Lay § 1.7 and § 4.3
- Hefferon § 2.II
- Matthews §§ 3.3 – 3.4

2 Exercises

1. Find the inverse of the matrix

$$\begin{pmatrix} 1 & 2 & -4 & 1 \\ -2 & 10 & -1 & 1 \\ 1 & 0 & 1 & 5 \\ 2 & -9 & 1 & 0 \end{pmatrix} .$$

2. Let f be the linear map from $\mathbf{R}^4$ to $\mathbf{R}^4$ that is given by the matrix

$$\begin{pmatrix} 1 & 2 & -4 & 7 \\ -2 & -1 & -1 & -8 \\ -1 & 4 & -14 & 5 \\ 5 & 7 & -11 & 29 \end{pmatrix} .$$

   In this example it will be found that the reduced row echelon form of the matrix M has only two non-zero rows. We shall come to understand that in this situation both the kernel of f and the image of f are 2-dimensional.

   (a) Obtain a parametric representation for the kernel of f.

   (b) Find a pair of equations in 4 variables that characterize the image of f.

   (c) List a pair of equations in 4 variables that characterize the kernel of f.

   (d) Give a parametric representation for the image of f.