Linear Algebra (Math 220)
Assignment due Tuesday, March 4

1 Preparation

Expect a quiz.

Relevant Reading:

- Lay § 1.7 and § 4.3

- Hefferon § 3.II − 3.III

- Matthews §§ 3.3 − 3.4

2 Exercises

1. Which sets of column indices correspond to maximal linearly independent sets of columns in the following matrices?

   (a)
   $$\begin{pmatrix} 18 & -42 \\ -15 & 35 \end{pmatrix}$$

   (b)
   $$\begin{pmatrix} 3 & -2 & 4 \\ -1 & 5 & 2 \\ 5 & -12 & 0 \end{pmatrix}$$

   (c)
   $$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

2. Which sets of row indices correspond to maximal linearly independent sets of rows in the following matrices?

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

   (b)
   $$\begin{pmatrix} 1 & 2 & -4 & 7 \\ -2 & -1 & -1 & -8 \\ -3 & -6 & 12 & -21 \\ 5 & 7 & -11 & 29 \end{pmatrix}$$

3. In the vector space of all differentiable functions of the real variable t find a maximal linearly independent subset in the subspace spanned by the 4 functions $\cos t$, $\sin t$, $\cos^2 t$, and $\sin^2 t$.