

115a/4 - Homework 1*

Due 27 September 2010

1. Compute the row reduced form of the matrix

$$\begin{pmatrix} 1 & 3 & 1 & 2 \\ 2 & 6 & 6 & 5 \\ 1 & 3 & -3 & 1 \\ 1 & 3 & 5 & 6 \end{pmatrix}.$$

2. Is the matrix

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

invertible? Explain why.

3. Find a basis for the null space and the range of the matrix

$$A = \begin{pmatrix} 4 & 2 & 4 \\ 0 & 0 & 2 \\ 6 & 3 & -4 \end{pmatrix}.$$

What is the nullity of A ? What is the rank of A ? What is the orthogonal projection of the vector

$$\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$$

onto the null space of A ?

4. Compute the inverse and transpose of

$$A = \begin{pmatrix} 1 & 6 \\ 1 & 4 \end{pmatrix}.$$

*Numbers in parentheses like (1.2.11) refer to the 11th problem in the second section of the first chapter of Friedberg *et. al.*

5. Let

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

Find the eigenvalues and eigenvectors of A . Find bases for the row and column spaces of A .