110.201 Linear Algebra
1st Quiz

February 10, 2005

Problem 1 Given the following system of equations:

$$x - 3y + z = 1$$
$$x + y + 2z = 14$$

find all solutions using Gauss-Jordan elimination procedure. Is this an example of consistent system? Why?

Problem 2 Find the rank of the following matrix

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

Problem 3 Show that the following linear system:

$$\begin{cases} x_1 & - & x_2 & & & & & & = & b_1 \\ & & x_2 & - & x_3 & & & & = & b_2 \\ & & & & x_3 & - & x_4 & & = & b_3 \\ & & & & & & x_4 & - & x_5 & = & b_4 \\ -x_1 & & & & & & & + & x_5 & = & b_5 \end{cases}$$

has solution if and only if $\displaystyle\sum_{i=1}^{5} b_i = 0$