Gallaver Spring 16

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Spring 16, Math 33A, Lecture 1, Quiz 1 (Week 1): 10 minutes

Nam
UCL

Day \ T.A.	David	Casey	Adam
Tuesday	1A	1C	1E
Thursday	(1B)	1D	1F

10

Problem 1. Decide whether the following system of linear equations is consistent or inconsistent.

$$\begin{vmatrix} x - y + 2z = 0 \\ -x - y + 3z = 1 \\ -2x \quad + \quad z = 3 \end{vmatrix}$$

Problem 2. Perform row-reduction (also known as Gauss-Jordan elimination) on the matrix

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

① $\begin{bmatrix} 1 & -1 & 2 & 0 \\ -1 & -1 & 3 & 1 \\ -2 & 0 & 1 & 3 \end{bmatrix} \overset{+(I)}{\overset{+2(I)}{\rightarrow}} \begin{bmatrix} 1 & -1 & 2 & 0 \\ 0 & -2 & 5 & 1 \\ 0 & -2 & 5 & 6 \end{bmatrix} \div 2 \rightarrow \begin{bmatrix} 1 & -1 & 2 & 0 \\ 0 & 1 & -2.5 & -.5 \\ 0 & -2 & 5 & 6 \end{bmatrix} \overset{+(II)}{\overset{+2(II)}{\rightarrow}} \begin{bmatrix} 1 & 0 & -.5 & -.5 \\ 0 & 1 & -2.5 & -.5 \\ 0 & 0 & 0 & 5 \end{bmatrix}$

$0 \neq 5$

inconsistent ✓

$\begin{bmatrix} -1 & -2 & -1 \\ 1 & 2 & 5 \\ 0 & 2 & 4 \end{bmatrix} \div -1 \rightarrow \begin{bmatrix} 1 & 2 & 1 \\ 1 & 2 & 5 \\ 0 & 2 & 4 \end{bmatrix} -(I)$

② $\begin{bmatrix} -1 & -2 & -1 \\ 1 & 2 & 5 \\ 0 & 2 & 4 \end{bmatrix} \overset{+(I)}{\rightarrow} \begin{bmatrix} +1 & +2 & +1 \\ 0 & 0 & 4 \\ 0 & 2 & 4 \end{bmatrix} \leftrightarrow \rightarrow \begin{bmatrix} +1 & +2 & +1 \\ 0 & 2 & 4 \\ 0 & 0 & 4 \end{bmatrix} \div 2 \rightarrow \begin{bmatrix} +1 & +2 & +1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix} -2(II)$

$\begin{bmatrix} +1 & 0 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix} \div 4 \rightarrow \begin{bmatrix} 1 & 0 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix} \overset{+3(III)}{\overset{-2(III)}{\rightarrow}} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ ✓