Math 544 Feb 15, 2001
Linear Algebra
Spring 2001, USC

MIDTERM 1

Time: 75min

1. Row reduce to reduced Echelon form: $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 6 & 7 & 8 & 4 \end{bmatrix}$.

2. Decide if $\begin{bmatrix} 0 \\ -6 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 4 \\ -2 \end{bmatrix}$, and $\begin{bmatrix} -8 \\ -4 \\ 3 \end{bmatrix}$ are linearly independent.

3. Set up (but do not solve) the system of linear equations which we need in order to find an interpolating polynomial of degree 2 for the data $(1, 5)$, $(2, 3)$, and $(3, 4)$.

4. Describe the solution set in $\mathbf{R}^3$ of $x_1 + 3x_2 - 8x_3 = 0$.

5. Find the matrix of the linear transformation which rotates points clockwise by $45°$.

6. True or False: Justify your answers.

(a) If a set of vectors is linearly independent, then each vector is a linear combination of others.

(b) If a system $A\mathbf{x} = \mathbf{b}$ has more than one solution, then so does the system $A\mathbf{x} = \mathbf{0}$.

(c) If a matrix A has more columns than rows, then the homogenous system $A\mathbf{x} = \mathbf{0}$ has a nontrivial solution.

Problems 1 *to* 5 *are worth* 15 *points each, and* 6 *is worth* 30 *points.*

LaTeX ..... $\mathcal{MG}$