MAS 3105 Oct 25, 2006
Quiz 4 Prof. S. Hudson

1) [40 points] Set $B = \{\mathbf{v_1}, \mathbf{v_2}, \mathbf{v_3}, \mathbf{v_4}\} = \{(1,0,0)^T, (1,0,1)^T, (0,1,1)^T, (0,0,1)^T\}$. So, B is a set of 4 column vectors in R^3. Answer, and explain briefly:

a) Is B a spanning set of R^3?

b) Is B linearly independent?

c) Let $C = \{\mathbf{v_1}, \mathbf{v_2}, \mathbf{v_4}\}$. Is C a basis of R^3?

d) Let $D = \{\mathbf{v_1}, \mathbf{v_2}, \mathbf{v_3}\}$. Show that D is a basis of R^3.

e) Find the transition matrix from D to the standard basis of R^3.

2) [20 points] Choose ONE of these to prove (use the back).

a) Show that a nonempty subset of a linearly independent set of vectors $\{\mathbf{v_1}, \mathbf{v_2}, \ldots \mathbf{v_n}\}$ must also be linearly independent. [Use the definition of LI].

b) Show that if $\{\mathbf{v_1}, \mathbf{v_2}, \ldots \mathbf{v_n}\}$ is a basis of V, and $\mathbf{v} \in V$, then $\mathbf{v}$ can be written uniquely as a linear combination of $\{\mathbf{v_1}, \mathbf{v_2}, \ldots \mathbf{v_n}\}$. [Do NOT quote Thm 3.3.2 - you are proving part of it].

This Quiz was the same as my Spring 2003 Quiz 4 (see that Key for answers). The average in 2006 was 45/60 (The average in 2003 was 41/60, and I may use this info to improve the scale). For now, the scale is:
A's: 51-60, B's: 45-50, C's: 39-44, D's: 33-38

I estimated your semester average from your best 3 of 4 quiz grades, and wrote it on your Quiz 4 (upper right corner). This does not yet include HW or MHW. If you missed a quiz, and were excused, I have not yet adjusted for that, so your letter grade is probably not very accurate.