EE203001 Linear Algebra
Quiz #11 05/13/2003

Quiz Problems:

1. (15 pts). A square matrix A is said to be orthogonal if $AA^t = I$. Prove each of the following statements about $n \times n$ matrices, or exhibit a counter example.
   (a) If A and B are orthogonal, then $A + B$ is orthogonal.
   (b) If A and B are orthogonal, then AB is orthogonal.
   (c) If A and AB are orthogonal, then B is orthogonal.
2. (15pts). If $A = \begin{bmatrix} 1 & 2 \\ 5 & 4 \end{bmatrix}$, find a nonsingular matrix P such that $P^{-1}AP = \begin{bmatrix} 6 & 0 \\ 0 & -1 \end{bmatrix}$.
3. (10pts). If $A^2 = A$, prove that $(A + I)^k = I + (2^k - 1)A$.

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