

Exercises on transposes, permutations, spaces

Problem 5.1: (2.7 #13. *Introduction to Linear Algebra: Strang*)

- a) Find a 3 by 3 permutation matrix with $P^3 = I$ (but not $P = I$).
- b) Find a 4 by 4 permutation \hat{P} with $\hat{P}^4 \neq I$.

Problem 5.2: Suppose A is a four by four matrix. How many entries of A can be chosen independently if:

- a) A is symmetric?
- b) A is skew-symmetric? ($A^T = -A$)

Problem 5.3: (3.1 #18.) True or false (check addition or give a counterexample):

- a) The symmetric matrices in M (with $A^T = A$) form a subspace.
- b) The skew-symmetric matrices in M (with $A^T = -A$) form a subspace.
- c) The unsymmetric matrices in M (with $A^T \neq A$) form a subspace.

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18.06SC Linear Algebra
Fall 2011

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