
EE474/ECG695: Linear Systems

Spring 2008, 3 credits: Test 2

Dr. Pushkin Kachroo

<http://www.ece.vt.edu/pushkin>

pushkin@vt.edu

PROBLEM 1 : (6 points) Using elementary matrix operations derive the inverse of

$$\begin{pmatrix} 0 & 1 \\ -1 & 1 \end{pmatrix}$$

PROBLEM 2 : (6 points) Using Laplace's expansion of the determinant of an $n \times n$ matrix derive Cramer's rule for an inverse of a matrix.

PROBLEM 3 : (8 points)

1. What is the definition for *dimension* of a finite-dimensional vector space?
2. When is a finite set of vectors in a vector space linearly independent?
3. If an $m \times n$ matrix has r linearly independent columns, then what is the dimension of the nullspace of the matrix?
4. What is the exterior product of vectors $(2 \ 1)^T$ and $(1 \ -1)^T$?