EE241 SPRING 2015: TUTORIAL #11

Friday, April 10, 2015

PROBLEM 1 (Complementary basis): Find a set S of vectors in $\mathbb{R}^4$ such that $W = S$ is a 3-dimensional subspace of $\mathbb{R}^4$ that does not include the vector $\vec{v}_0 = [1, 1, 1, 1]$. Then, find a basis for the vector space of all vectors orthogonal to $\vec{v}_0$

PROBLEM 2 (Change of basis): Write the vector $\vec{v} = [1, -2, 1]$ in the basis $S = \{[1, 1, 0], [1, 0, 1], [0, 1, 1]\}$

PROBLEM 3 (Checking linear independence with functions): Is the set $\left\{2, 4\sin^2(x), \cos^2(x)\right\}$ linearly dependent or independent?

PROBLEM 4 (Matrix bases): Find a basis for 2×2 symmetric matrices where each element in the set has determinant 1 or -1. Then, write the the following matrix as a linear combination of the elments of this basis

$$\begin{bmatrix} 1 & 2 \\ 2 & 0 \end{bmatrix}$$