Practice Problems 2

Linear Algebra, Dave Bayer, March 18, 2012

[1] Let V and W be the subspaces of $\mathbb{R}^2$ spanned by $(1,1)$ and $(1,2)$, respectively. Find vectors $v \in V$ and $w \in W$ so $v + w = (2,-1)$.

[2] Let V and W be the subspaces of $\mathbb{R}^2$ spanned by $(1,-1)$ and $(2,1)$, respectively. Find vectors $v \in V$ and $w \in W$ so $v + w = (1,1)$.

[3] Let V and W be the subspaces of $\mathbb{R}^2$ spanned by $(1,1)$ and $(1,4)$, respectively. Find vectors $v \in V$ and $w \in W$ so $v + w = (2,3)$.

[4] Let V be the subspace of $\mathbb{R}^3$ consisting of all solutions to the equation $x + y + z = 0$. Let W be the subspace of $\mathbb{R}^3$ spanned by $(1,1,0)$. Find vectors $v \in V$ and $w \in W$ so $v + w = (0,0,1)$.

[5] Let V be the subspace of $\mathbb{R}^3$ consisting of all solutions to the equation $x + y - z = 0$. Let W be the subspace of $\mathbb{R}^3$ spanned by $(1,0,4)$. Find vectors $v \in V$ and $w \in W$ so $v + w = (1,1,1)$.

[6] Let V be the subspace of $\mathbb{R}^3$ consisting of all solutions to the equation $x + 2y + z = 0$. Let W be the subspace of $\mathbb{R}^3$ spanned by $(1,1,1)$. Find vectors $v \in V$ and $w \in W$ so $v + w = (1,1,0)$.

[7] Let V be the subspace of $\mathbb{R}^4$ consisting of all solutions to the system of equations

$$\begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}.$$

Let W be the orthogonal complement of V. Find vectors $v \in V$ and $w \in W$ so $v + w = (1,0,1,0)$.

[8] Let V be the subspace of $\mathbb{R}^4$ consisting of all solutions to the system of equations

$$\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}.$$

Let W be the orthogonal complement of V. Find vectors $v \in V$ and $w \in W$ so $v + w = (0,0,1,1)$.

[9] Let V be the subspace of $\mathbb{R}^4$ consisting of all solutions to the system of equations

$$\begin{bmatrix} 0 & 1 & 2 & 3 \\ 3 & 2 & 1 & 0 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}.$$

Let W be the orthogonal complement of V. Find vectors $v \in V$ and $w \in W$ so $v + w = (1,0,0,0)$.