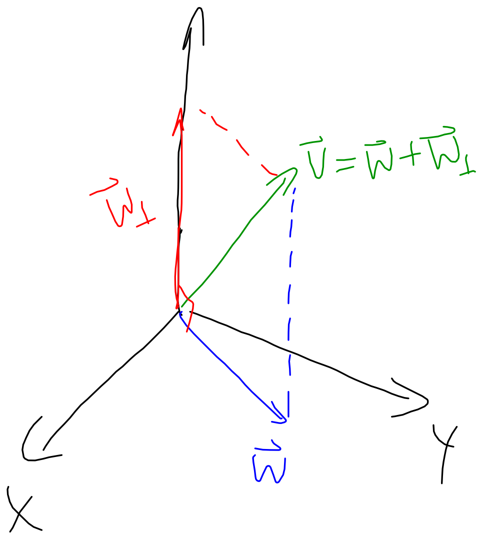
$W = \text{span}\left(\begin{bmatrix}1\\0\\0\end{bmatrix}, \begin{bmatrix}1\\1\\0\end{bmatrix}\right)$ is a subspace of $\mathbb{R}^3$.

What is it, geometrically? Give another vector in $\mathbb{R}^3$ whose span is a subspace $W^\perp$ for which every $\vec{v} \in W^\perp$ is orthogonal to every $\vec{u} \in W$.



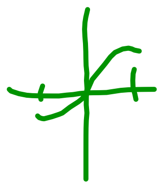
$$\begin{bmatrix} 5 \\ 3 \\ 0 \end{bmatrix} \begin{bmatrix} -2 \\ 8 \\ 0 \end{bmatrix},$$

$$\begin{bmatrix} 9 \\ 6 \\ 0 \end{bmatrix}$$

$$W^\perp = \operatorname{span}\left(\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}\right)$$

$C[-1,1]$ $\quad \langle f,g\rangle = \int_{-1}^{1} f(x)g(x)\,dx$

$W = \mathcal{E}$ is even functions in here



$W^{\perp}$ = odd funcions in $C[-1,1]$?

$\vec{v}, W, W^{\perp}$

$\vec{v} = \vec{w} + \vec{w}_{\perp} = \text{proj}_W \vec{v} + \text{perp}_W \vec{v}$

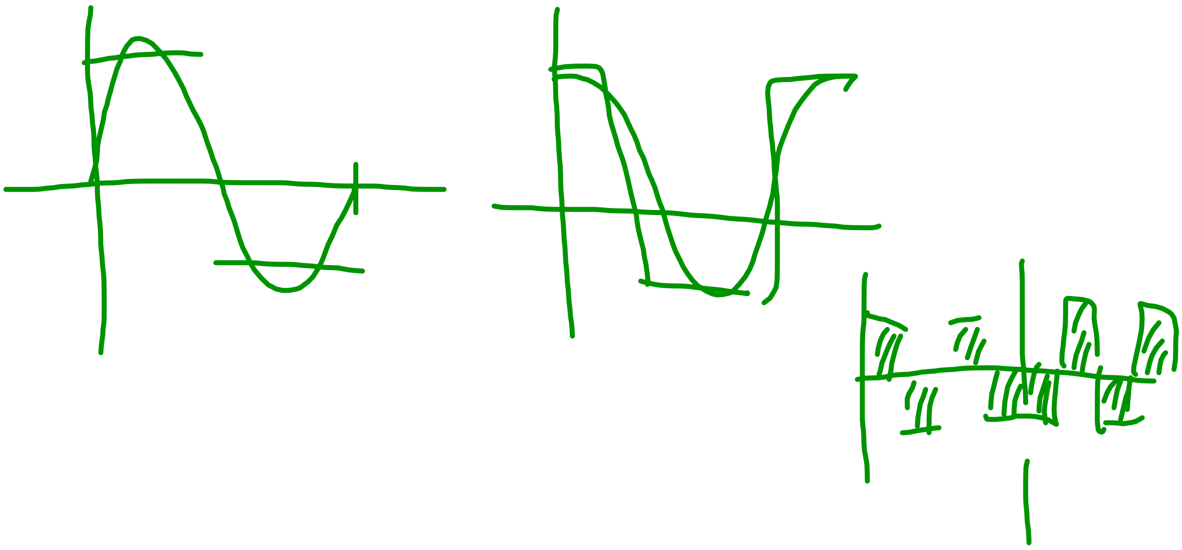
$(\vec{v} - \text{proj}_W \vec{v})$

$\mathbb{R}^5$ has basis $\left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \ldots \right\}$

$\vec{e}_1, \vec{e}_2$

$W = \text{span}(\vec{e}_1, \vec{e}_2)$

$W^\perp = \text{span}(\vec{e}_3, \vec{e}_4, \vec{e}_5)$



Due Monday:

Signal Processing 1: 4-9

3.3: 1,5