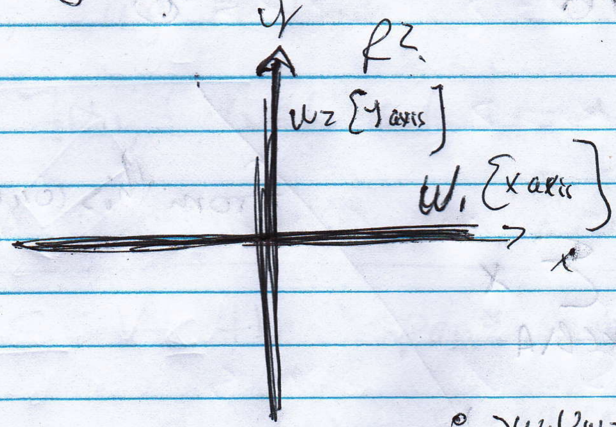
but $W_1 \cup W_2 = \{w : (w \in W_1) \vee (w \in W_2)\}$ is in general not a subspace of V. (Although some times they can be)



($w_1 \cup w_2$ is the cross)

for example take $\begin{pmatrix}3\\0\end{pmatrix} \in w_1 \therefore \in w_1 \cup w_2$ & take $\begin{pmatrix}0\\2\end{pmatrix} \in w_2 \therefore \in w_1 \cup w_2$, so the sum $\begin{pmatrix}3\\2\end{pmatrix}$ does not belong to the union $(w_1 \cup w_2)$

another example

$W_1 = \{A : A^t = A\}$

$W_2 = \{A : trA = 0\}$.

$A = \begin{pmatrix}1 & 0\\0 & 0\end{pmatrix} \in W_1 \therefore \in W_1 \cup W_2$

$B = \begin{pmatrix}0 & 1\\0 & 0\end{pmatrix} \in W_2 \therefore \in W_1 \cup W_2$

$A + B = \begin{pmatrix}1 & 1\\0 & 0\end{pmatrix} \notin W_1$ & $\notin W_2 \therefore \notin W_1 \cup W_2$

$A \subseteq \mathbb{R}$ $\quad A = \{1,2,3,4\}$ $\quad A = \{\ \}$

$$\sum_{x \in A} x \qquad = 10 \qquad\qquad = 0$$

from this convention

$A \subseteq B$

$$\left(\sum_{x \in B} x\right) - \left(\sum_{x \in A}\right) = \sum_{x \in B \setminus A} x$$

$A = B$

$$0 \quad \sum_{B} - \sum_{B} = 0 = \sum_{x \in \emptyset} x$$

$A = \{1,2,3,4\}$ $\qquad A = \{\ \}$

$$\prod_{x \in A} x \qquad 24 \qquad\qquad 1$$

(convention)

(ie $0! = 1$)

$$\prod_{x \in B} x \div \left(\frac{\prod x}{x \in A}\right) = \sum_{x \in B \setminus A} x$$

$A = B$

$$1 = \sum_{B} \div \sum_{B} = \sum_{x \in \emptyset} x = 1$$

[The point of these conventions is to avoid having to write exceptions.]