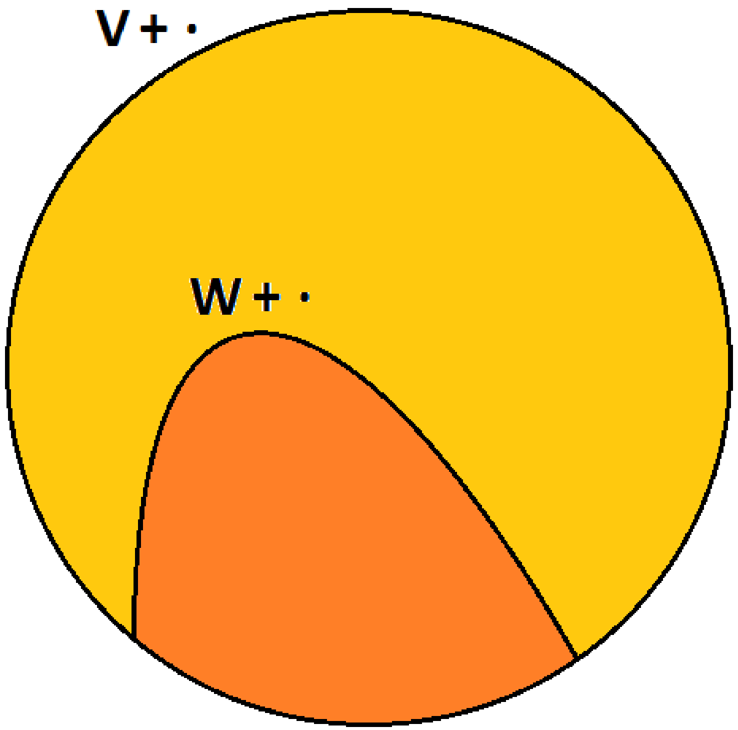
SUBSPACES

Section 4.3

DEFINITION

A subset W of a vector space V is called a **subspace** of V if W is itself a vector space under the operations defined in V.



RESULT
(TEST FOR A SUBSPACE)

Assume W is a subset of V. Then W is a **subspace** of V if and only if

1. $\mathbf{0} \in W$ (the zero vector)
2. For $\mathbf{u}, \mathbf{v} \in W$, $\mathbf{u} + \mathbf{v} \in W$ (closure)
3. For $\mathbf{u} \in W$, $c\mathbf{u} \in W$ (closure)

EXAMPLE

Show that the set

$$W = \left\{ \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \middle| \; x_1, \; x_2 \geq 0 \right\},$$

with the standard operations,

is **not** a subspace of R^2.