

## SUBSPACE SUMS

## Why

## **Definition**

The *sum* of two subspaces is the span of their union. So then the sum of two subspaces is also a subspace. If the intersection of two subspaces is the zero subspace, we call the sum a *direct sum*.

## Notation

Let U and V be subspaces of a vector space. We denote the sume of U and V by U + V. We can express

$$U + V = \mathsf{span}(U + V).$$

Let **0** denote the zero vector. If  $S_1 \cap S_2 = \{\mathbf{0}\}$ 

TODO: something about uniqueness of representation

