

Source: [KBe20math530refVectorSpace](#)

## 1 | #definition span

The set of all linear combinations of a list of vectors  $v_1, \dots, v_m$  in  $V$  is called the span of  $v_1, \dots, v_m$ , denoted  $\text{span}(v_1, \dots, v_m)$ :

$$\text{span}(v_1, \dots, v_m) = \{a_1 v_1 + \dots + a_m v_m \mid a_1, \dots, a_m \in F\}$$

And the span of an empty list  $()$  is  $0$

## 2 | Properties

- The span is the smallest containing subspace
  - The span of a list of vectors in  $V$  is the smallest subspace of  $V$  containing all the vectors in the list.

### #definition spans

If  $\text{span}(v_1, \dots, v_m) = V$ , then  $v_1, \dots, v_m$  **spans**  $V$

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