

#flo #hw

# 1 | Finite-Dimensional Vector Spaces

title: Review

F denotes  $\mathbb{R}$  or  $\mathbb{C}$ V denotes a [\[\[file:KBe20math530refVectorSpace.org\] \[KBe20math530refVectorSpace\]\]](https://kbermath530refVectorSpace.org) over F

- lin alg does not focus on arbitrary vector spaces
- it focuses on finite-dimensional vector spaces!

title: learning objectives for the chapter

- span
- linear independence
- bases
- dimension

- notation:

- lists of vectors:
  - \*  $(2,1,4), (3,2,5)$ 
    - list len 2 of vectors in  $\mathbb{R}^3$
  - \* n-tuples without surrounding parens

- *linear combination*

- a linear combination of  $x$  and  $y$  would be any expression of the form  $ax + by$ , where  $a$  and  $b$  are constants ~wiki
- multiply each element in a list of vectors by an element in F
- and then add them up!
- any relation between the element scalar and what's being multiplied? can the scalars repeat? #question

- *span*

- the set of all linear combos of a list of vectors
  - \* denoted:  $\text{span}(v_1, \dots, v_m)$
- span of empty list is  $\{0\}$
- aka. linear span

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

``ad-question

but don't you get out a single vector at the end..? because you add them? #question no! because it's the

- *finite-dimensional vector space*
  - a vector space is called finite-dimensional if some list of vectors in it spans the space