#flo #ref #hw

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1 | def of a vector space

- **Props of addition and scalar multiplication in F^N**
  - +: comutative, associative, identiy
    - every element has an additive inverse
  - *: associative, identity
  - addition and scalar multiplication, connected by distributive props
- let *V* be a set with an addition and scalar multiplication that satisfy the props,

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**addition, scalar multiplication**
- addition: assigns an element u+v in V to each pair of elements u, v in V
- scalar multiplication: lv with l in f and v in V

**vector space**
is V with addition and SCMUL with:

- commutativitity
- associativity
- additive idenitity
- additive inverse
- multiplicative identity
- distibutive properties
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- no multiplicative inverse?
  - is this how you solve the 0 issue?
- vec, point
  - elements of vec space are called vecs or points
- simplest vec space: $\{0\}$
- f^{infin} is the set of all seqencues of elements of F
  - additive identity: seqnece of all zeros
- vector space can include a set of functions? not quite..
  - let S be a set, and F^S be the set of functions from S to F
  - what?? #review
- let S be the interval [0,1] and F=R
  - R^[\0, \1] is the set of real valued function on the interval [0,1]
  - ??

- F^N -> $F^{1,2,\ldots,n}$
- F^{infin} -> $F^{1,2,\ldots}$
- vector spaces need unique additive inverse
  - 0'=0'+0=0+0'=0
    - nicer than my proof
- unique additive inverse
  - w=w+0=w+(v+w')=(w+v)=(w+v)+w'=0+w'=w'

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V denotes a vector space over F

1. no multiplicative inverse required?
2. what does the set of functions from S to F mean?
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1.1 | **exercises**

1. prove that -(-v) = v
   (a) -(-v) = -1(-1v) = (-1*(-1))v = 1v = v
2. ab = 0, prove that a or b = 0
   (a) a=0/v = 0, v=0/a = 0
3. empty set is not a vector space, it fails to satisfy only of the reqs. which one?
   (a) no additive idenity
      i. "there exists an element 0 in v" no there doesn't.

homework: KBxSolvingSystems