#ref #hw #study

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1 | Prep. Time.

1.1 | Quiz review

- wrong list:
  - def of span (verb)
  - def of a field
  - def of a direct sum
  - sum of subspaces
  - cross product
  - connection between linear independence and systems of equations
  - geometric interpretation of dot product
  - U1 + U2 is a direct sum iff U1 intersect U2 = {0}
  - def vector space
  - elementary matrix
  - solving matrix equations
  - finding inverse
  - find the plane containing
  - prove that a set of vectors is linearly dependent if and only if you can write on of the vectors as a linear combination of the others
  - prove or give a counterexample: v1, v2, v3, v4, basis of V, and U is subspace of V.. del v3 v4 is it a basis?
- solutions
  - def of span (verb)
    - if the span of a list of vectors equals V, then the list of vecs spans V
      - ie. if it contains all the nessasarry info, then it spans.
  - def of a field
    - a set containing at least two distinct elements 0 and 1, along with the operations + and * as defined on the reals/complexs.
      - commutativity
      - associativity
      - additive identity
      - multiplicative identity
      - additive inverse
      - multiplicative inverse
      - distributive property
  - def direct sum
    - sum of subspaces where each element in the resultant subspace can be written uniquely as a sum of the elements in the original subspaces

- sum of subspaces
  - subspaces containing the set of all possible linear combinations from the union of the original subspaces
- cross product #TODO!
  - the determinant thingy, or
  - $|A||B| \sin \theta n$
    - n is the unit vector orthogonal to vectors A and B
- connect between linear independence and systems of equations -"if we take the coefficients of a system of equations as vectors, then the vectors are linearly independent if the system has one solution, and linearly dependent if the system has either zero or infinite solutions"
- geometric interpretation of dot product
  - %%projection of one vector onto the other times the magnitude of the vector %%
  - magnitude of projection of a vector onto another vector times the magnitude of the other vector
    - $|A||B| \cos \theta$
- def vector space
  - set V with addition and scalar multiplication such that there is
    - additive identity
    - additive inverse (no multiplicative inverse!)
    - commutativity
    - assosiativty
    - distibutive property
- elementary matrix
  - identity matrix with one row operation applied

1.2 | Content and knowledge review

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1.2.1 | Definitions!

- Vector space
- Subspace
- Sums
- Direct sums
- linear independence / dependence
- groups
- fields
- spans
- basis
- dimension

- linear combination
- commutativity
- associativity
- distributivity
- elementary matrices
- nonsingular matrices