The Elements of Linear Algebra
Volume One: Livre des Lignes Droites

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- sketching lines in R2
- lengths, angles, and the dot product in R2
- normal vector to a line in R2
- equation of a line, three methods: elimination, from two pts via similar triangles, from geometry of dot product
- families of parallel lines
- sketching a line from an equation
- the big theorem with duality

The Equations of a Line in Space

Outline

- points, vectors in space
- R3
- vector algebra
- planes in R3 parametrically: through the origin, not
- dot product in R3
- normal vector to a plane
- the equation of a plane: by elimination, by dot product
- families of parallel planes
- sketching from an equation
- big theorem with duality for planes
- LINES in R3 as intersection of two planes

Systems of Lines in the Plane

Outline

- note about how we understand one line in the plane, what about two?
- idea of three possible outcomes
- translations into matrix algebra equation: matrix-vector multiplication
- idea of a solution to a system
- questions: how can we characterize the three options in terms of the matrix
- use normals to answer, linear independence...
- characterization of column space bit??
- write "solution" as parametric form of the line, or as just point
- algorithmic solution stuff

Systems of Planes in Space

Outline

– to-do

The Algebra of Square Matrices

Approximate Solutions to Unsolvable Systems

Matrices as Transformations