Why

TODO

Definition

For a nonzero $b \in \mathbf{R}^n$ and $\beta \in \mathbf{R}$ the sets

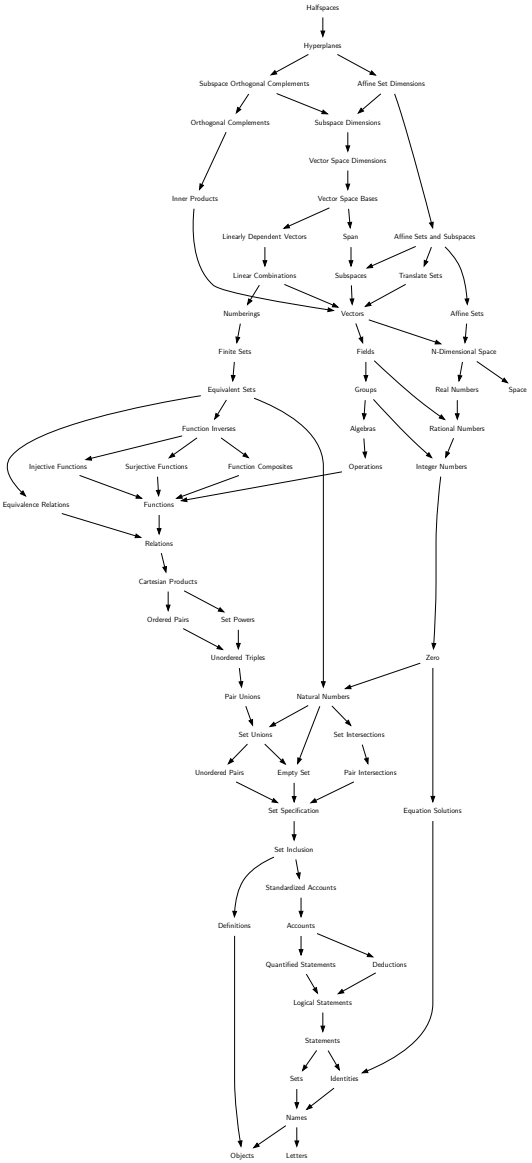
$$\{x \in \mathbf{R}^n \mid \langle x, b\rangle \leq \beta\}, \quad \{x \in \mathbf{R}^n \mid \langle x, b\rangle \geq \beta\},$$

are *closed halfspaces* and the sets

$$\{x \in \mathbf{R}^n \mid \langle x, b\rangle \leq \beta\}, \quad \{x \in \mathbf{R}^n \mid \langle x, b\rangle \geq \beta\},$$

are *open halfspaces.*

Each of these is nonempty and convex. As with hyperplanes, the same four sets appear if one uses $\lambda\beta$ and λb above, so the halfspaces depend only on the hyperplane $H = \{x \mid \langle x, b\rangle = \beta\}$.


Halfspaces
Hyperplanes
Subspace Orthogonal Complements
Affine Set Dimensions
Orthogonal Complements
Subspace Dimensions
Vector Space Dimensions
Inner Products
Vector Space Bases
Linearly Dependent Vectors
Span
Affine Sets and Subspaces
Linear Combinations
Subspaces
Translate Sets
Numberings
Vectors
Affine Sets
Finite Sets
Fields
N-Dimensional Space
Equivalent Sets
Groups
Real Numbers
Space
Function Inverses
Algebras
Rational Numbers
Injective Functions
Surjective Functions
Function Composites
Operations
Integer Numbers
Equivalence Relations
Functions
Relations
Cartesian Products
Ordered Pairs
Set Powers
Unordered Triples
Zero
Pair Unions
Natural Numbers
Set Unions
Set Intersections
Unordered Pairs
Empty Set
Pair Intersections
Set Specification
Equation Solutions
Set Inclusion
Standardized Accounts
Definitions
Accounts
Quantified Statements
Deductions
Logical Statements
Statements
Sets
Identities
Names
Objects
Letters