Why

[1]

Definition

Let$A \in \mathbf{R}^{n \times n}$ be symmetric. A is *positive definite* if, for all $x \in \mathbf{R}^d$, $x \neq 0$, $x^\top A x > 0$. A is *positive semidefinite* (or *nonnegative definite*) if, for all $x \in \mathbf{R}^d$, $x^\top A x \geq 0$.

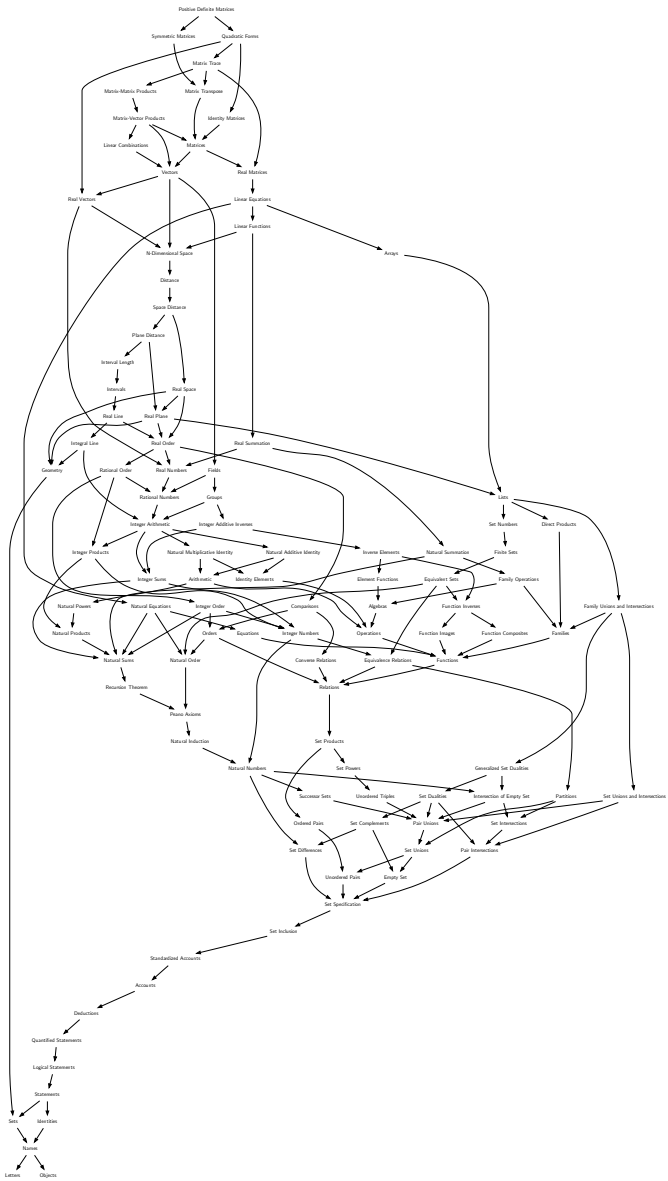
Notation

We denote the set of real-valued positive definite d by d matrices by $\mathbf{S}^d_{++}$. We denote the set of real-valued positive semidefinite d by d matrices by $\mathbf{S}^d_{+}$.

Characterizations

Proposition 1. *Let $A \in \mathbf{S}^d$ and denote the smallest*

[1] Future editions will elaborate.


Positive Definite Matrices
Symmetric Matrices
Quadratic Forms
Matrix Trace
Matrix-Matrix Products
Matrix Transpose
Matrix-Vector Products
Identity Matrices
Linear Combinations
Matrices
Vectors
Real Matrices
Real Vectors
Linear Equations
Linear Functions
Arrays
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Space
Real Line
Real Plane
Real Order
Integral Line
Real Summation
Geometry
Rational Order
Real Numbers
Fields
Rational Numbers
Groups
Lists
Integer Arithmetic
Integer Additive Inverses
Set Numbers
Direct Products
Integer Products
Natural Multiplication Identity
Natural Additive Identity
Inverse Elements
Natural Summation
Finite Sets
Integer Sums
Arithmetic
Identity Elements
Element Functions
Equivalent Sets
Family Operations
Natural Powers
Natural Equations
Integer Order
Comparison
Algebras
Function Inverses
Family Unions and Intersections
Natural Products
Order
Equations
Integer Numbers
Operations
Function Image
Function Composition
Families
Natural Sums
Natural Order
Converse Relations
Equivalence Relations
Functions
Recursion Theorem
Relations
Peano Axioms
Natural Induction
Set Products
Natural Numbers
Set Powers
Generalized Set Doubles
Successor Sets
Unordered Triples
Set Doubles
Intersection of Empty Set
Partitions
Set Unions and Intersections
Ordered Pairs
Set Complements
Pair Unions
Set Intersections
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Name
Letters
Objects