Why

[1]

Definition

The *square* of a square matrix is the product of the matrix with itself. A *square root* (or *matrix square root*) of a given matrix is a matrix whose square is the given matrix. A matrix is *idempotent* if it is equal to its square.

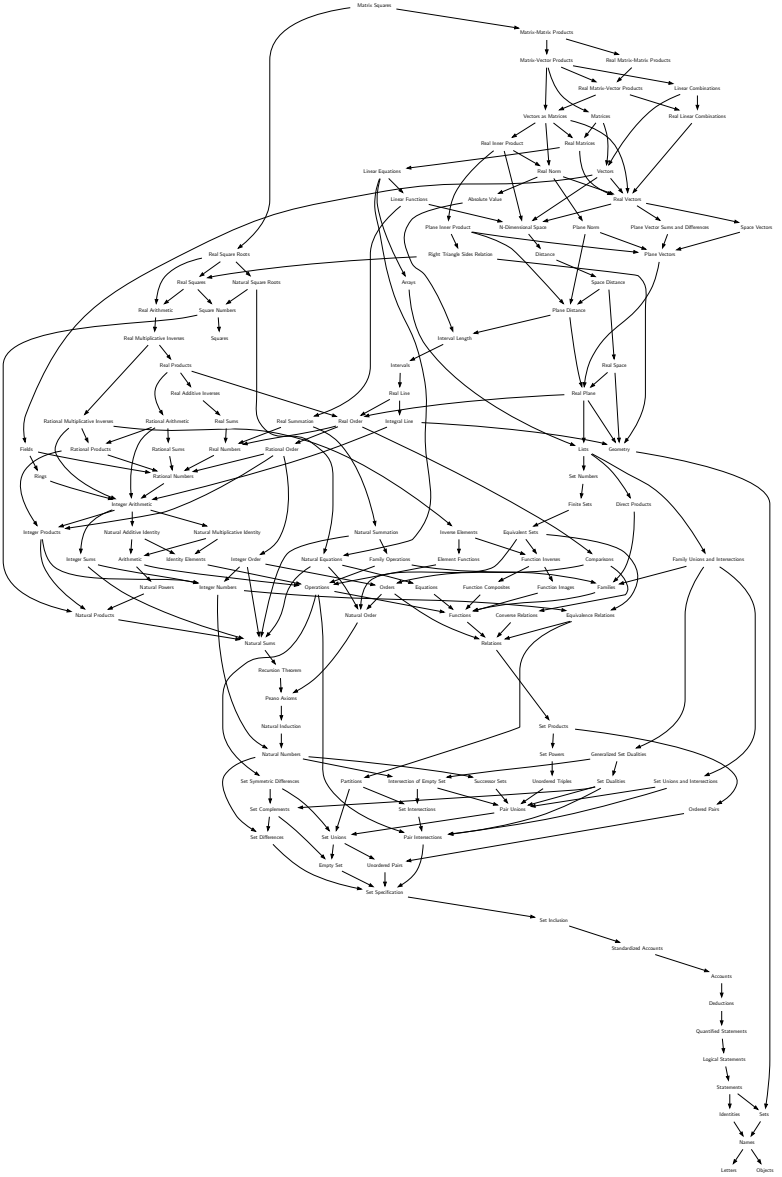
Notation

Let $A \in \mathbf{R}^{n \times n}$. Then the square of A is AA. We denote the square of A by A^2. A is idempotent if $A^2 = A$. $B \in \mathbf{R}^{n \times n}$ is a square root of A if $A = B^2$.

Existence and uniqueness

Clearly a matrix can have a square root. Take for example the matrix in $\mathbf{R}^{1 \times 1}$ $\begin{bmatrix} 1 \end{bmatrix}$. A square root of this matrix is $\begin{pmatrix} 1 \end{pmatrix}$, but also $\begin{pmatrix} -1 \end{pmatrix}$. So matrix square roots do exist, but are not unique.

[1] Future editions will include an account.


Matrix Squares
Matrix-Matrix Products
Matrix-Vector Products
Real Matrix-Matrix Products
Real Matrix-Vector Products
Linear Combinations
Vectors as Matrices
Matrices
Real Linear Combinations
Real Inner Product
Real Matrices
Linear Equations
Real Norm
Vectors
Linear Functions
Absolute Value
Real Vectors
Plane Inner Product
N-Dimensional Space
Plane Norm
Plane Vector Sums and Differences
Space Vectors
Real Square Roots
Right Triangle Sides Relation
Distance
Plane Vectors
Real Squares
Natural Square Roots
Arrays
Space Distance
Real Arithmetic
Square Numbers
Plane Distance
Real Multiplicative Inverses
Squares
Interval Length
Real Products
Intervals
Real Space
Real Additive Inverses
Real Line
Real Plane
Rational Multiplicative Inverses
Rational Arithmetic
Real Sums
Real Summation
Real Order
Integral Line
Fields
Rational Products
Rational Sums
Real Numbers
Rational Order
Lists
Geometry
Rings
Rational Numbers
Set Numbers
Integer Arithmetic
Finite Sets
Direct Products
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Natural Summation
Inverse Elements
Equivalent Sets
Integer Sums
Arithmetic
Identity Elements
Integer Order
Natural Equations
Family Operations
Element Functions
Function Inverses
Comparisons
Family Unions and Intersections
Natural Powers
Integer Numbers
Operations
Orders
Equations
Function Composites
Function Images
Families
Natural Products
Natural Order
Functions
Converse Relations
Equivalence Relations
Natural Sums
Relations
Recursion Theorem
Peano Axioms
Natural Induction
Set Products
Natural Numbers
Set Powers
Generalized Set Dualities
Set Symmetric Differences
Partitions
Intersection of Empty Set
Successor Sets
Unordered Triples
Set Dualities
Set Unions and Intersections
Set Complements
Set Intersections
Pair Unions
Ordered Pairs
Set Differences
Set Unions
Pair Intersections
Empty Set
Unordered Pairs
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Uses
Names
Letters
Objects