Why

[1]

Definition

The *quadratic form* of a square matrix A with a vector x is the value $x^\top Ax$.

Notation

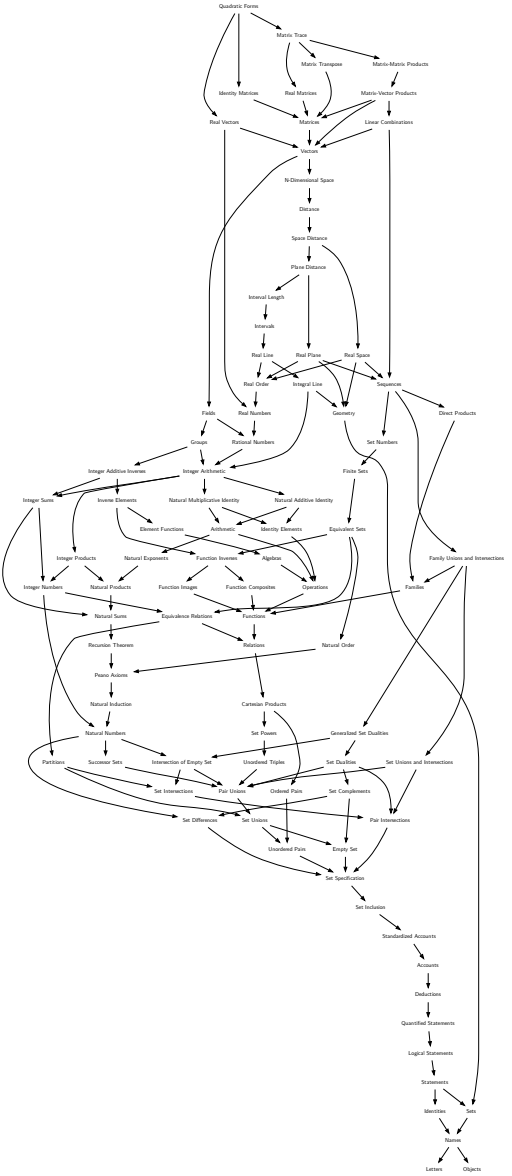
Let $\mathbf{F}$ be a field and $A \in \mathbf{F}^{m\times m}$. For a vector $x \in \mathbf{R}^d$, A quadratic for in A Let $x \in \mathbf{R}^d$. Then $x^T Ax$ is a quadratic form.

$$x^\top Ax = \sum_{i,j} A_{ij} x_i x_j$$

Under trace

Observe that $\mathbf{tr}\, x^\top Ax = \mathbf{tr}\, Axx^\top = \mathbf{tr}\, xx^\top A$.

[1] Future editions will include.


Quadratic Forms
Matrix Trace
Matrix Transpose
Matrix-Matrix Products
Identity Matrices
Real Matrices
Matrix-Vector Products
Real Vectors
Matrices
Linear Combinations
Vectors
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Line
Real Plane
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Real Order
Integral Line
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Direct Products
Groups
Rational Numbers
Set Numbers
Integer Additive Inverses
Integer Arithmetic
Finite Sets
Integer Sums
Inverse Elements
Natural Multiplicative Identity
Natural Additive Identity
Element Functions
Arithmetic
Identity Elements
Equivalent Sets
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Set Powers
Generalized Set Dualities
Partitions
Successor Sets
Intersection of Empty Set
Unordered Triples
Set Dualities
Set Unions and Intersections
Set Intersections
Pair Unions
Ordered Pairs
Set Complements
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
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