Why

A n-dimensional generalization of an ellipse.[1]

Definition

An *ellipsoid* (or *hyperellipse* or *hyperellipsoid*) is a set $E \subset \mathbf{R}^n$ for which there exists $A \in \mathbf{R}^{n \times n}$ positive definite satisfying

$$E = \left\{ x \mid x^\top A x \le 1 \right\}.$$

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[1] Future editions will expand.

Ellipsoid

Positive Definite Matrices

Quadratic Forms · Symmetric Matrices

Matrix Trace · Identity Matrices

Matrix-Matrix Products · Matrix Transpose

Real Matrix-Matrix Products · Matrix-Vector Products

Real Matrix-Vector Products · Matrices

Vectors as Matrices

Real Matrices · Real Inner Product · Linear Combination

Linear Equation · Real Linear Combinations · Real Norm · Vectors

Linear Functions · Real Vectors

Space Vectors · Plane Vector Sums and Differences · Plane Norm · Plane Inner Product · N-Dimensional Space

Plane Vectors

Distance · Right Triangle Sides Relation

Absolute Value · Space Distance · Real Squares

Plane Distance · Real Arithmetic · Square Numbers

Interval Length · Real Multiplication Inverse · Real Space · Squares

Intervals · Real Products

Real Plane · Real Line · Real Additive Inverse

Real Summation · Real Order · Real Sums · Rational Multiplicative Inverse · Rational Arithmetic · Integral List

Real Numbers · Rational Products · Rational Sums · Fields · Rational Order · Geometry

Rational Numbers · Rings

Integer Arithmetic

Arrays · Natural Multiplication Identity · Natural Additive Identity · Integer Products

Lists · Identity Elements · Arithmetic · Natural Powers

Set Number · Fields Sets · Natural Summation · Integer Order · Natural Products · Integer Sums

Direct Products · Inverse Elements · Equivalent Sets · Natural Equation · Integer Numbers

Comparisons · Function Inverse · Element Functions · Family Operation · Natural Sums

Family Unions and Intersection · Families · Function Composite · Function Images · Operations · Equations · Orders · Natural Order · Equivalence Relation · Recursion Theorem

Converse Relation · Functions · Peano Axiom

Relation · Natural Induction

Set Products · Natural Numbers

Set Powers · Generalized Set Dualities

Set Unions and Intersection · Unordered Triples · Set Dualities · Intersection of Empty Sets · Successor Sets · Partitions · Set Symmetric Differences

Ordered Pairs · Pair Unions · Set Intersection · Set Complements

Unordered Pairs · Set Unions · Set Differences

Empty Set

Pair Intersection · Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities · Sets

Names

Letters · Objects