Why

Matrices that have reflected values across their diagonals arise often.[1]

Definition

A square matrix is *symmetric* (we call it a *symmetric matrix*) if its values do not depend on the order of the indices. In other words, a matrix is symmetric if the value above and below the diagonal are a mirror image.

Notation

Let S be a nonempty set and $A \in S^{n \times n}$. Then A is symmetric if $A_{ij} = A_{ji}$. We denote the set of real-valued n by n symmetric matrices by $\mathbf{S}^n$. A symmetric matrix is the same as its tranpose. In other words, if A is symmetric, $A = A^\top$.

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[1]Future editions will clarify.

Symmetric Matrices

Matrix Transpose Symmetric Real Matrices

Vectors as Matrices

Real Matrices Real Inner Product

Linear Equations Space Inner Product Real Norm

Arrays Linear Functions Real Vectors Space Norm

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

Plane Vectors Distance Right Triangle Sides Relation Absolute Value

Space Distance Real Squares

Plane Distance Real Arithmetic

Real Multiplicative Inverse Interval Length

Real Space Real Products Intervals

Real Plane Real Additive Inverse Real Line Square Numbers

Real Summation Real Sums Real Order Rational Arithmetic Rational Multiplicative Inverse Integral Line Square

Real Numbers Rational Order Rational Sums Rational Products Geometry

Rational Numbers

Integer Arithmetic

Lists Integer Products Natural Additive Identity Natural Multiplicative Identity

Set Numbers Arithmetic Identity Elements

Direct Products Finite Sets Natural Power Inverse Elements

Natural Summation Equivalent Sets Natural Equations Integer Order Natural Products Integer Sums Function Inverses Element Functions

Family Unions and Intersections Family Operations Comparisons Equations Natural Sums Integer Numbers Function Composites Function Images Operations

Families Orders Natural Order Recursion Theorem Equivalence Relations Converse Relations Functions

Peano Axioms Relations

Set Products Natural Induction

Generalized Set Dualities Set Powers Natural Numbers

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

Ordered Pairs Pair Unions Set Complements

Set Intersections Pair Intersections Set Differences

Unordered Pairs Set Unions

Empty Set

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities Sets

Names

Letters Objects

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