Why

[1]

Definition

An *orthonormal* (or *orthogonal*) matrix is a matrix whose columns are an orthonormal family of vectors.

Some authors call these *real orthogonal* or *unitary* matrices.

Notation

Let $A \in \mathsf{F}^{m \times n}$. Something something

$$AA^\top = I.$$

Characterizations

Proposition 1. *A matrix is orthonormal if and only if its transpose product with the matrix is the identity.*

Proposition 2. *A matrix is orthonormal if and only if its transpose is orthonormal.*

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[1]Future editions will include.

Orthonormal Matrices

Orthonormal Vectors

Inner Product Norms — Norms — Inner Products — Matrices — Vectors as Matrices — Matrix Transpose

Functionals — Real Inner Product — Real Matrices

Vectors — Plane Inner Product — Real Norm — Linear Equations

Absolute Value — Real Vectors — Linear Functions

N-Dimensional Space — Plane Norm — Plane Vector Sums and Differences — Space Vectors

Distance — Plane Vectors — Arrays

Real Square Roots — Space Distance

Natural Square Roots — Real Squares — Plane Distance

Square Numbers — Real Arithmetic

Squares — Interval Length

Real Multiplication Inverse — Intervals — Real Space

Real Products — Real Line — Real Plane

Real Additive Inverse

Rational Arithmetic — Rational Multiplicative Inverse — Fields — Real Sums — Real Order — Irrational Line — Real Summation

Rational Sums — Rational Products — Groups — Real Numbers — Rational Order — Geometry — Lists

Rational Numbers — Integer Additive Inverse — Set Numbers — Direct Products

Natural Additive Identity — Natural Multiplicative Identity — Integer Arithmetic — Inverse Elements — Natural Summation — Finite Sets

Arithmetic — Identity Elements — Integer Products — Integer Sums — Element Functions — Integer Order — Comparisons — Family Operations — Equivalent Sets — Family Unions and Intersections

Natural Powers — Integer Numbers — Algebra — Natural Equations — Orders — Function Inverses — Families

Operations — Equations — Natural Order — Function Composites — Function Images

Natural Products — Equivalence Relations — Converse Relations — Functions

Natural Sums — Relations

Recursion Theorem

Peano Axioms

Natural Induction

Set Products

Natural Numbers — Set Powers — Generalized Set Dualities

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

Set Intersections — Pair Unions — Ordered Pairs — Set Complements — Pair Intersections

Set Differences — Unordered Pairs — Empty Set

Set Unions — Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities — Sets

Names

Letters — Objects

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