Result

Every symmetric matrix $A \in \mathbf{R}^{n \times n}$ has real eigenvalues. Moreover, there exists a set of orthonormal eigenvectors corresponding to these eigenvalues.

Symmetric Real Matrix Eigenvalues

Eigenvalues and Eigenvectors

Symmetric Real Matrices — Matrix Determinants — Monic Polynomials

Vector as Matrices — Names

Real Matrix Determinants

Real Inner Product — Functionals — Real Matrices — Real Linear Equations

Space Inner Product — Real Norm — Vectors — Arrays

Space Norm — Real Vectors — Linear Function

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

Right Triangle Sides Relation — Absolute Value — Plane Vectors — Distance — Fields — Groups — Polynomials

Real Squares — Space Distance — Rings — Real Polynomials

Plane Distance — Real Arithmetic

Interval Length — Real Multiplication Inverse

Real Space — Intervals — Real Products

Square Numbers — Real Plane — Real Line — Real Addition Inverse — Real Summation

Integral Line — Real Order — Real Sums — Rational Arithmetic — Rational Multiplicative Inverse — Natural Summation

Squares — Geometry — Rational Order — Real Numbers — Rational Sums — Rational Products — Set Numbers — Lists

Natural Fractions — Integer Arithmetic — Finite Sets — Direct Products

Integer Products — Natural Multiplicative Identity — Natural Addition Identity — Inverse Elements — Equivalent Sets

Comparisons — Integer Order — Integer Sums — Natural Arithmetic — Identity Elements — Element Functions — Natural Equation — Function Inverses — Family Operations

Orders — Integer Numbers — Natural Powers — Operations — Equations — Function Image — Function Composites — Families — Family Unions and Intersections

Natural Products — Converse Relations — Natural Order — Equivalence Relations — Functions

Natural Sums — Relations

Recursion Theorem

Peano Axioms — Ordered Pair Projection

Natural Induction — Set Products — Generalized Set Dualities

Natural Numbers — Set Powers — Unordered Triples — Set Dualities — Intersection of Empty Set — Partitions — Set Unions and Intersections

Set Symmetric Differences — Successor Sets — Pair Union — Set Complements — Set Intersections

Ordered Pairs — Set Differences — Set Unions — Pair Intersection

Unordered Pairs — Empty Set

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Sets — Identities

Names

Letters — Objects