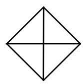


Why

We can generalize the real general linear groups to vector spaces over $\mathbf{C}$.

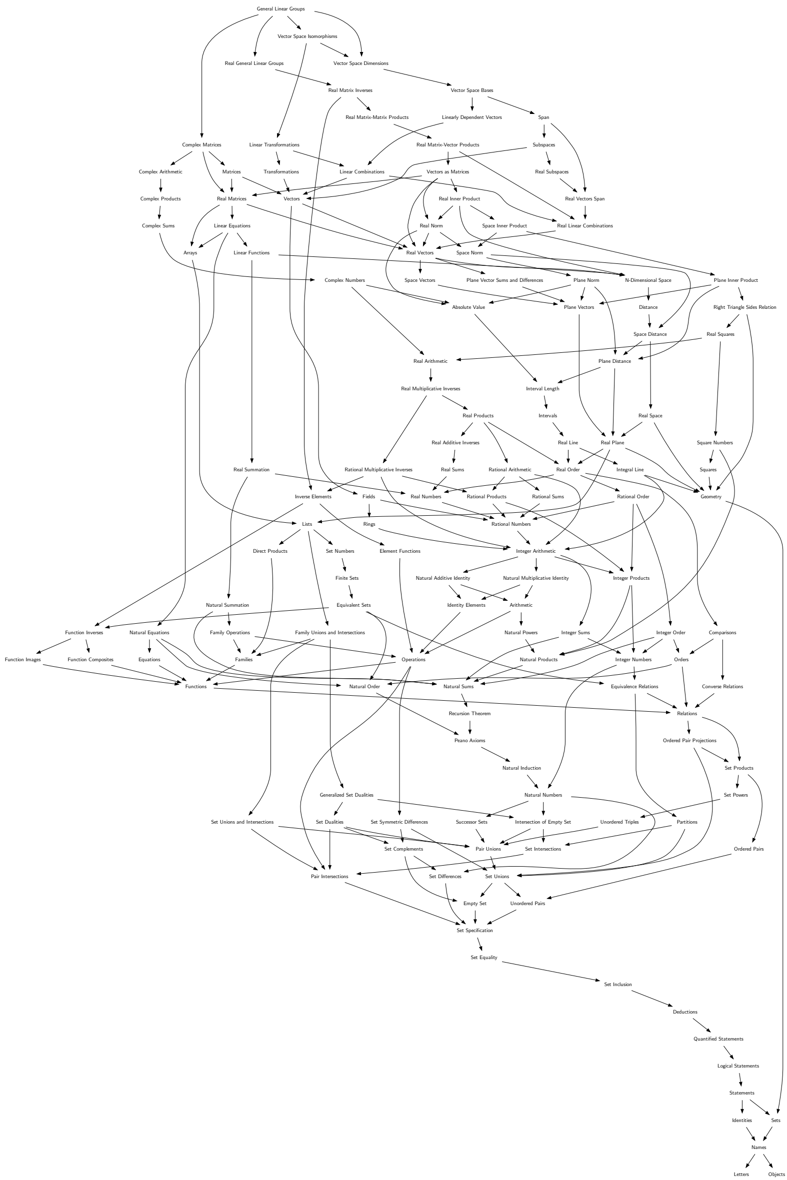
Definition

Suppose V is a vector space over the field $\mathbf{C}$ of complex numbers. The set of isomorphisms of V onto itself is a group, called the *general linear group*, under the operation of composition. If V has dimension n, then the general linear group can be identified with the invertible $n \times n$ complex matrices in the usual way.

Notation

We denote by $GL(V)$ the general linear group of isomorphisms of V onto itself. If $f \in GL(V)$, and V has a finite basis $e_1, \dots, e_n \in V$, then f has corresponding matrix representation $A \in \mathbf{C}^{n \times n}$ given by

$$A = \begin{bmatrix} f(e_1) & \cdots & f(e_n) \end{bmatrix}.$$


General Linear Groups
Vector Space Isomorphisms
Real General Linear Groups
Vector Space Dimensions
Real Matrix Inverses
Vector Space Bases
Real Matrix-Matrix Products
Linearly Dependent Vectors
Span
Complex Matrices
Linear Transformations
Real Matrix-Vector Products
Subspaces
Complex Arithmetic
Matrices
Transformations
Linear Combinations
Vectors as Matrices
Real Subspaces
Complex Products
Real Matrices
Vectors
Real Inner Product
Real Vectors Span
Complex Sums
Linear Equations
Real Norm
Space Inner Product
Real Linear Combinations
Arrays
Linear Functions
Real Vectors
Space Norm
Complex Numbers
Space Vectors
Plane Vector Sums and Differences
Plane Norm
N-Dimensional Space
Plane Inner Product
Absolute Value
Plane Vectors
Distance
Right Triangle Sides Relation
Space Distance
Real Squares
Real Arithmetic
Plane Distance
Real Multiplicative Inverses
Interval Length
Real Products
Intervals
Real Space
Real Additive Inverses
Real Line
Real Plane
Square Numbers
Real Summation
Rational Multiplicative Inverses
Real Sums
Rational Arithmetic
Real Order
Integral Line
Squares
Inverse Elements
Fields
Real Numbers
Rational Products
Rational Sums
Rational Order
Geometry
Lists
Rings
Rational Numbers
Direct Products
Set Numbers
Element Functions
Integer Arithmetic
Finite Sets
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Natural Summation
Equivalent Sets
Identity Elements
Arithmetic
Function Inverses
Natural Equations
Family Operations
Family Unions and Intersections
Natural Powers
Integer Sums
Integer Order
Comparisons
Function Images
Function Composites
Equations
Families
Operations
Natural Products
Integer Numbers
Orders
Functions
Natural Order
Natural Sums
Equivalence Relations
Converse Relations
Recursion Theorem
Relations
Peano Axioms
Ordered Pair Projections
Natural Induction
Set Products
Generalized Set Dualities
Natural Numbers
Set Powers
Set Unions and Intersections
Set Dualities
Set Symmetric Differences
Successor Sets
Intersection of Empty Set
Unordered Triples
Partitions
Set Complements
Pair Unions
Set Intersections
Ordered Pairs
Pair Intersections
Set Differences
Set Unions
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects