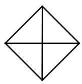


Motivating result

Proposition 1. *Suppose $T : V \to W$ is linear and T^{-1} exists. Then T^{-1} is linear.*

Proof. We show that T^{-1} is additive and homogenous. Let $w_1, w_2 \in W$ and define v_1 and v_2 so that

$$v_1 = T^{-1}(w_1) \quad \text{and} \quad v_2 = T^{-1}(w_2)$$

In other words,

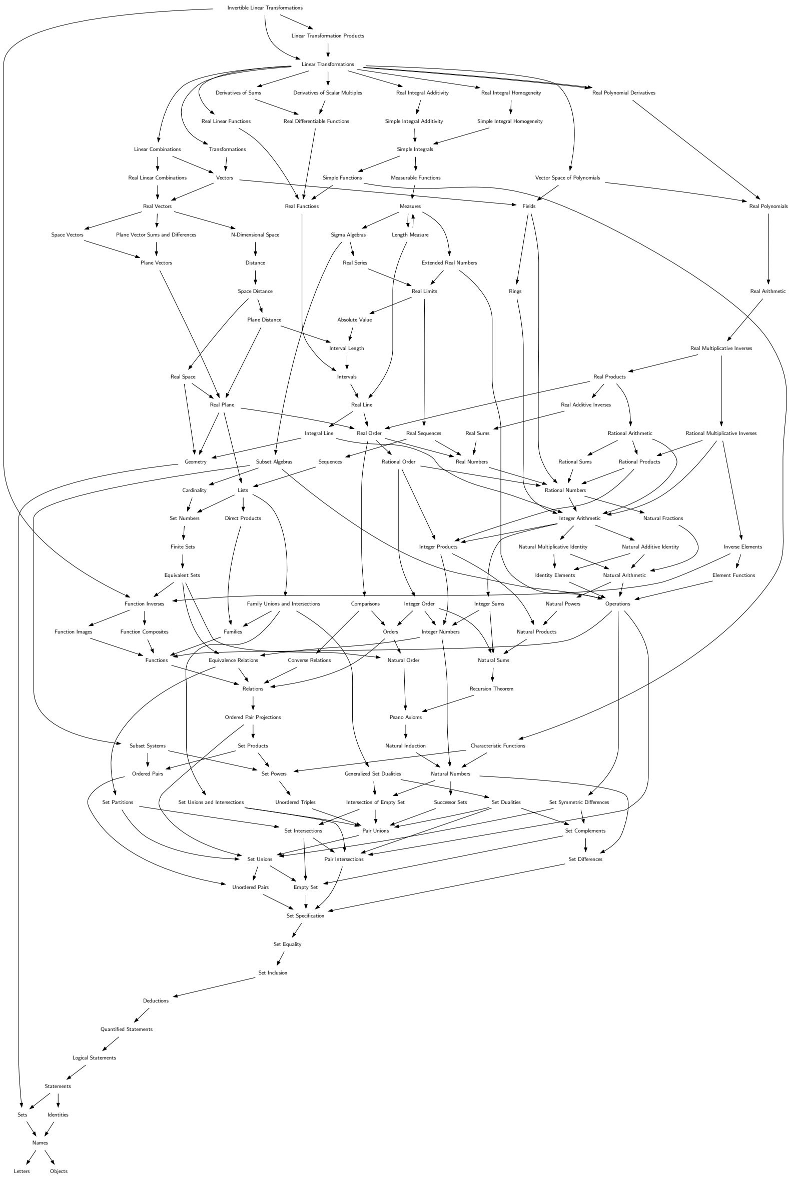
$$Tv_1 = w_1 \quad \text{and} \quad Tv_2 = w_2$$

and so by the linearity of T, □

Recall that we can use the terminology *the* inverse because inverses are unique (if they exist; see Function Inverses).

Definition

A linear map $T \in \mathcal{L}(V, W)$ is *invertible* if there is a linear map $S \in \mathcal{L}(W, v)$ so that ST


Invertible Linear Transformations
Linear Transformation Products
Linear Transformations
Derivatives of Sums
Derivatives of Scalar Multiples
Real Integral Additivity
Real Integral Homogeneity
Real Polynomial Derivatives
Real Linear Functions
Real Differentiable Functions
Simple Integral Additivity
Simple Integral Homogeneity
Linear Combinations
Transformations
Simple Integrals
Real Linear Combinations
Vectors
Simple Functions
Measurable Functions
Vector Space of Polynomials
Real Vectors
Real Functions
Measures
Fields
Real Polynomials
Space Vectors
Plane Vector Sums and Differences
N-Dimensional Space
Sigma Algebras
Length Measure
Plane Vectors
Distance
Real Series
Extended Real Numbers
Space Distance
Real Limits
Rings
Real Arithmetic
Plane Distance
Absolute Value
Interval Length
Real Multiplicative Inverses
Real Space
Intervals
Real Products
Real Plane
Real Line
Real Additive Inverses
Integral Line
Real Order
Real Sequences
Real Sums
Rational Arithmetic
Rational Multiplicative Inverses
Geometry
Subset Algebras
Sequences
Rational Order
Real Numbers
Rational Sums
Rational Products
Cardinality
Lists
Rational Numbers
Set Numbers
Direct Products
Integer Arithmetic
Natural Fractions
Finite Sets
Integer Products
Natural Multiplicative Identity
Natural Additive Identity
Inverse Elements
Equivalent Sets
Identity Elements
Natural Arithmetic
Element Functions
Function Inverses
Family Unions and Intersections
Comparisons
Integer Order
Integer Sums
Natural Powers
Operations
Function Images
Function Composites
Families
Orders
Integer Numbers
Natural Products
Functions
Equivalence Relations
Converse Relations
Natural Order
Natural Sums
Relations
Recursion Theorem
Ordered Pair Projections
Peano Axioms
Subset Systems
Set Products
Natural Induction
Characteristic Functions
Ordered Pairs
Set Powers
Generalized Set Dualities
Natural Numbers
Set Partitions
Set Unions and Intersections
Unordered Triples
Intersection of Empty Set
Successor Sets
Set Dualities
Set Symmetric Differences
Set Intersections
Pair Unions
Set Complements
Set Unions
Pair Intersections
Set Differences
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects