Why

[1]

Definition

The *matrix-vector product* (or *matrix vector product*) between an $m \times n$-matrix and an n-vector is the result of the linear combination of the columns of the matrix with the sequence of scalars in the vector. So the matrix-vector product is an m-vector.

Notation

Let C be a nonempty set. Let $A \in C^{m \times n}$ and let $x \in C^n$. We denote the matrix-vector product of A with x by Ax, read "A x".

If we denote Ax by b, then

$$b_i = \sum_{j=1}^{n} a_{ij} x_j$$

for $i \in \{1, 2, \ldots, m\}$. Let

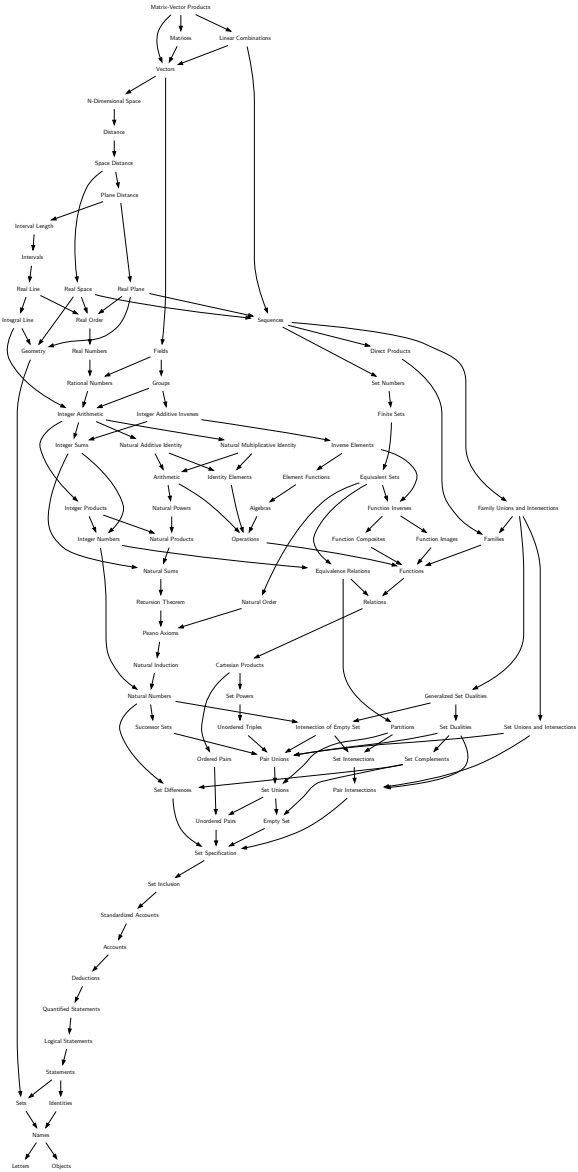
$$A = \begin{bmatrix} a_1^T \\ a_2^T \\ \vdots \\ a_m^T \end{bmatrix}$$

[1] Future editions will include.

Or, if a_i^T is the ith row of A, then

$$b_i = a_i^T x$$

for $i \in \{1, 2, \ldots, m\}$.


Matric-Vector Products
Matrices
Linear Combinations
Vectors
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Line
Real Space
Real Plane
Integral Line
Real Order
Geometry
Real Numbers
Fields
Rational Numbers
Groups
Integer Arithmetic
Integer Additive Inverses
Integer Sums
Natural Additive Identity
Natural Multiplicative Identity
Inverse Elements
Arithmetic
Identity Elements
Integer Products
Natural Powers
Algebras
Integer Numbers
Natural Products
Operations
Natural Sums
Recursion Theorem
Natural Order
Peano Axioms
Natural Induction
Natural Numbers
Successor Sets
Sequences
Direct Products
Set Numbers
Finite Sets
Element Functions
Equivalent Sets
Function Inverses
Function Composites
Function Images
Families
Family Unions and Intersections
Equivalence Relations
Functions
Relations
Cartesian Products
Set Powers
Unordered Triples
Ordered Pairs
Intersection of Empty Set
Partitions
Set Dualities
Set Unions and Intersections
Pair Unions
Set Intersections
Set Complements
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Generalized Set Dualities
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects