Why

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Definition

The *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 $x \in C^n$. As usual, we denote the matrix-vector product of A with x by Ax, read "A x," and defined by

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

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

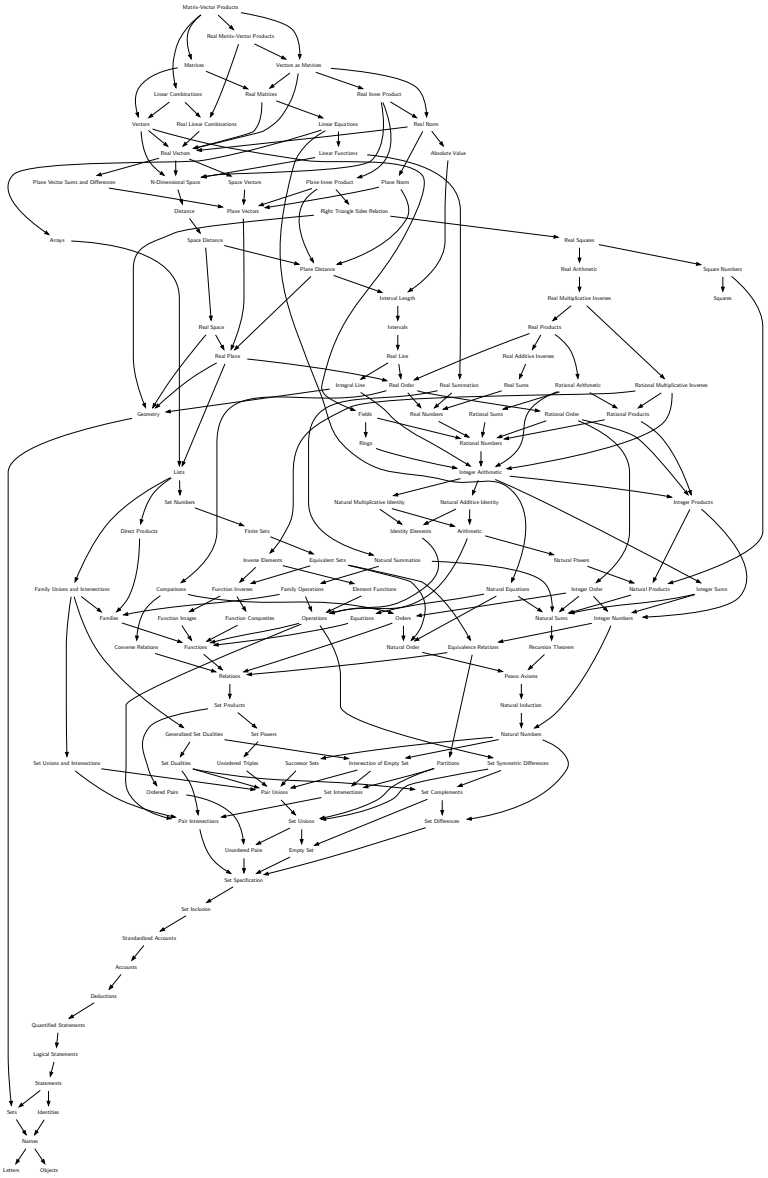
$$A = \begin{bmatrix} a_1^\top \\ a_2^\top \\ \vdots \\ a_m^\top \end{bmatrix}$$

Or, if $a_i^\top$ is the ith row of A, then

$$b_i = a_i^\top x$$

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

[1] Future editions will include.


Matrix-Vector Products
Real Matrix-Vector Products
Matrices
Vectors as Matrices
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Set Complements
Pair Intersections
Set Unions
Set Difference
Unordered Pairs
Empty Set
Set Specification
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Standardized Accounts
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Statements
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