Matrix notation

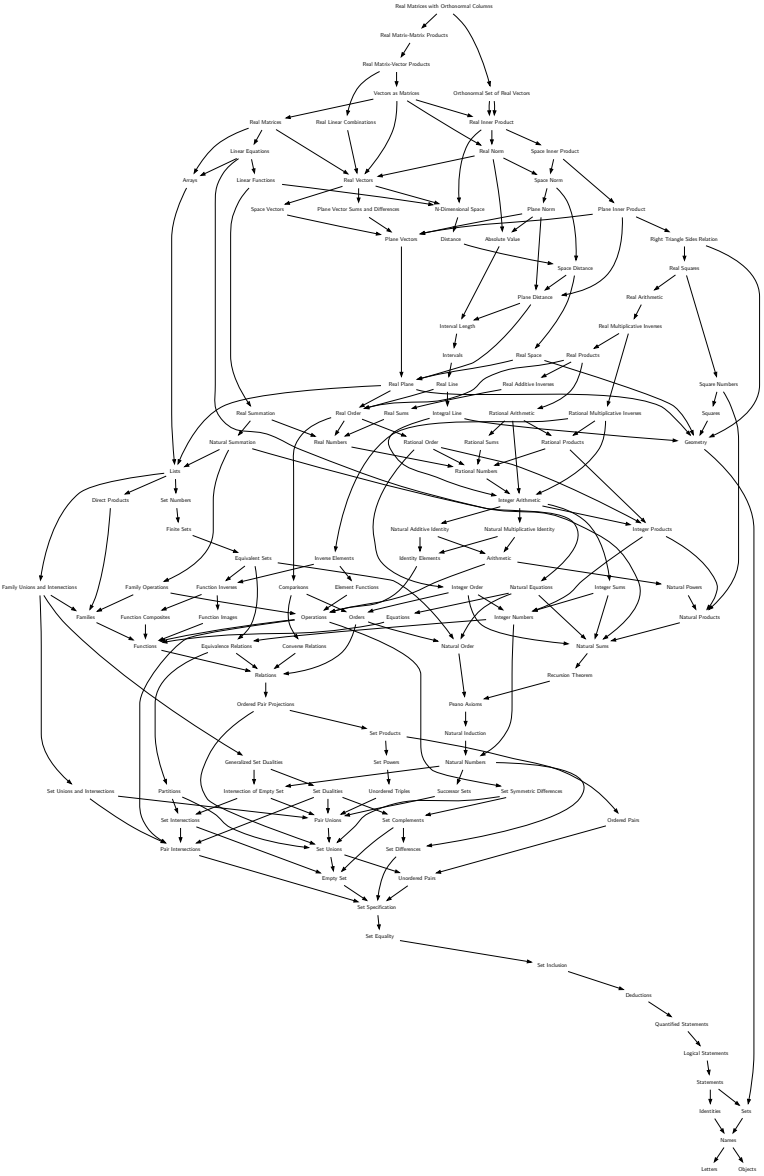
Let $u_1 \ldots, u_k \in \mathbf{R}^n$. Define $U \in \mathbf{R}^{n \times k}$ so that

$$U = \begin{bmatrix} u_1 & u_2 & \cdots & u_k \end{bmatrix}.$$

Then $\{u_1, \ldots, u_k\}$ is an orthonormal set mean

$$U^\top U = I_k$$

Notice that if $k < n$, $UU^\top \neq I$, since its rank is at most k.


Real Matrices with Orthonormal Columns
Real Matrix-Matrix Products
Real Matrix-Vector Products
Vectors as Matrices
Orthonormal Set of Real Vectors
Real Matrices
Real Linear Combinations
Real Inner Product
Linear Equations
Real Norm
Space Inner Product
Arrays
Linear Functions
Real Vectors
Space Norm
Space Vectors
Plane Vector Sums and Differences
N-Dimensional Space
Plane Norm
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Distance
Absolute Value
Right Triangle Sides Relation
Real Squares
Space Distance
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Real Arithmetic
Interval Length
Real Multiplicative Inverses
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Real Space
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Real Line
Real Additive Inverses
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Natural Multiplicative Identity
Equivalent Sets
Inverse Elements
Identity Elements
Arithmetic
Family Unions and Intersections
Family Operations
Function Inverses
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Element Functions
Integer Order
Natural Equations
Integer Sums
Natural Powers
Families
Function Composites
Function Images
Operations
Orders
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Functions
Equivalence Relations
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Recursion Theorem
Relations
Ordered Pair Projections
Peano Axioms
Set Products
Natural Induction
Generalized Set Dualities
Set Powers
Natural Numbers
Set Unions and Intersections
Partitions
Intersection of Empty Set
Set Dualities
Unordered Triples
Successor Sets
Set Symmetric Differences
Set Intersections
Pair Unions
Set Complements
Ordered Pairs
Pair Intersections
Set Unions
Set Differences
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects