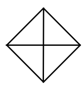


Why

In ordinary reduction, we obtain a sequence of row reducers.

Definition

Let $(A \in \mathbf{R}^{m \times m}, b \in \mathbf{R}^m)$ be an ordinarily reducible linear system. The *ordinary reducer sequence* (or *ordinary row reducer sequence*) is a sequence of reducer matrices $L_1, \dots L_{m-1}$ with $A_1 = L_1 A$ and $A_i = L_i A_{i-1}$ for $2 \leq i \leq m-1$. In other words, $U \in \mathbf{R}^{m \times m}$ defined by

$$U = L_{m-1} \cdots L_2 L_1 A$$

is the ordinary row reduction of A. U is upper triangular.

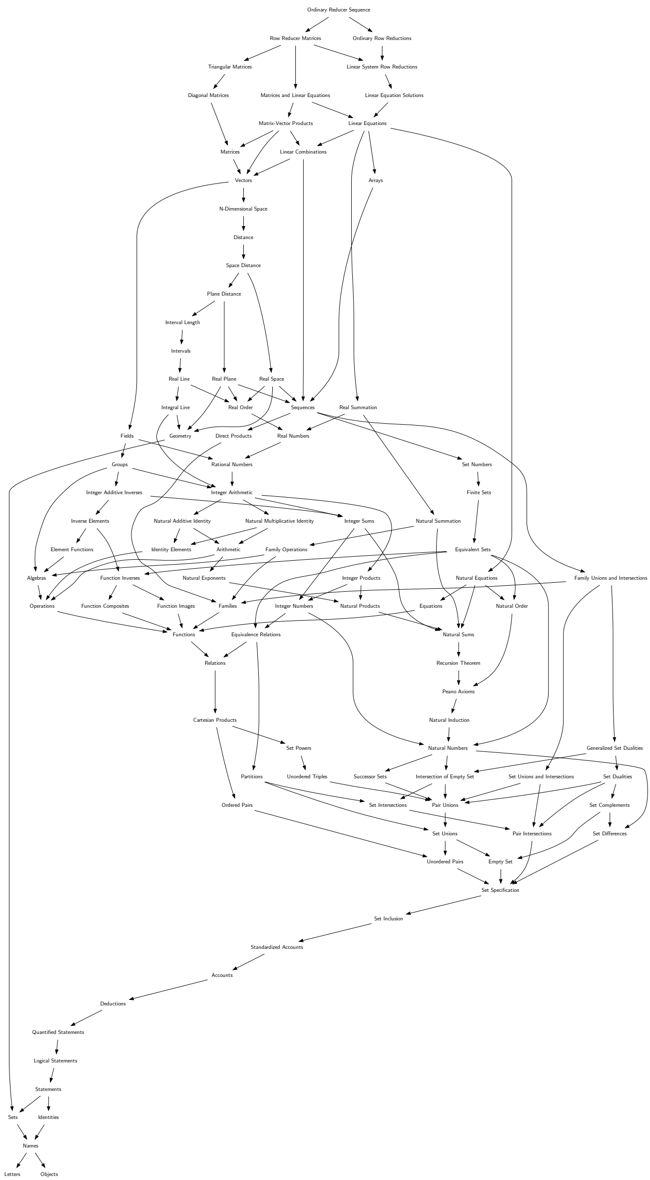
Let x_1 be the first column of A and let x_k be the kth column of A_{k-1} for $k = 2, \dots, m-1$. We chose L_k so that

$$x_k = \begin{bmatrix} x_{1k} \\ \vdots \\ x_{kk} \\ x_{k+1,k} \\ \vdots \\ x_{mk} \end{bmatrix} \quad \xrightarrow{L_k} \quad L_k x_k = \begin{bmatrix} x_{1k} \\ \vdots \\ x_{kk} \\ 0 \\ \vdots \\ 0 \end{bmatrix}.$$

we subtract $\ell_{jk} = {}^{x_{jk}}/_{x_{kk}}$ for $k \leq j \leq m$ times row k from row

j. We call l_{jk} the *row multiplier*. The matrix L_k has the form

$$L_k = \begin{bmatrix} 1 & & & & & \\ & \ddots & & & & \\ & & 1 & & & \\ & & -\ell_{k+1,k} & 1 & & \\ & & \vdots & & \ddots & \\ & & -\ell_{mk} & & & 1 \end{bmatrix}$$


Ordinary Reducer Sequence
Row Reducer Matrices
Ordinary Row Reductions
Triangular Matrices
Linear System Row Reductions
Diagonal Matrices
Matrices and Linear Equations
Linear Equation Solutions
Matrix-Vector Products
Linear Equations
Matrices
Linear Combinations
Vectors
Arrays
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Line
Real Plane
Real Space
Integral Line
Real Order
Sequences
Real Summation
Fields
Geometry
Direct Products
Real Numbers
Groups
Rational Numbers
Set Numbers
Integer Additive Inverses
Integer Arithmetic
Finite Sets
Inverse Elements
Natural Additive Identity
Natural Multiplicative Identity
Integer Sums
Natural Summation
Element Functions
Identity Elements
Arithmetic
Family Operations
Equivalent Sets
Algebras
Function Inverses
Natural Exponents
Integer Products
Natural Equations
Family Unions and Intersections
Operations
Function Composites
Function Images
Families
Integer Numbers
Natural Products
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Equivalence Relations
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Relations
Recursion Theorem
Peano Axioms
Cartesian Products
Natural Induction
Set Powers
Natural Numbers
Generalized Set Dualities
Partitions
Unordered Triples
Successor Sets
Intersection of Empty Set
Set Unions and Intersections
Set Dualities
Ordered Pairs
Set Intersections
Pair Unions
Set Complements
Set Unions
Pair Intersections
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Statements
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Objects