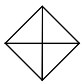


Why

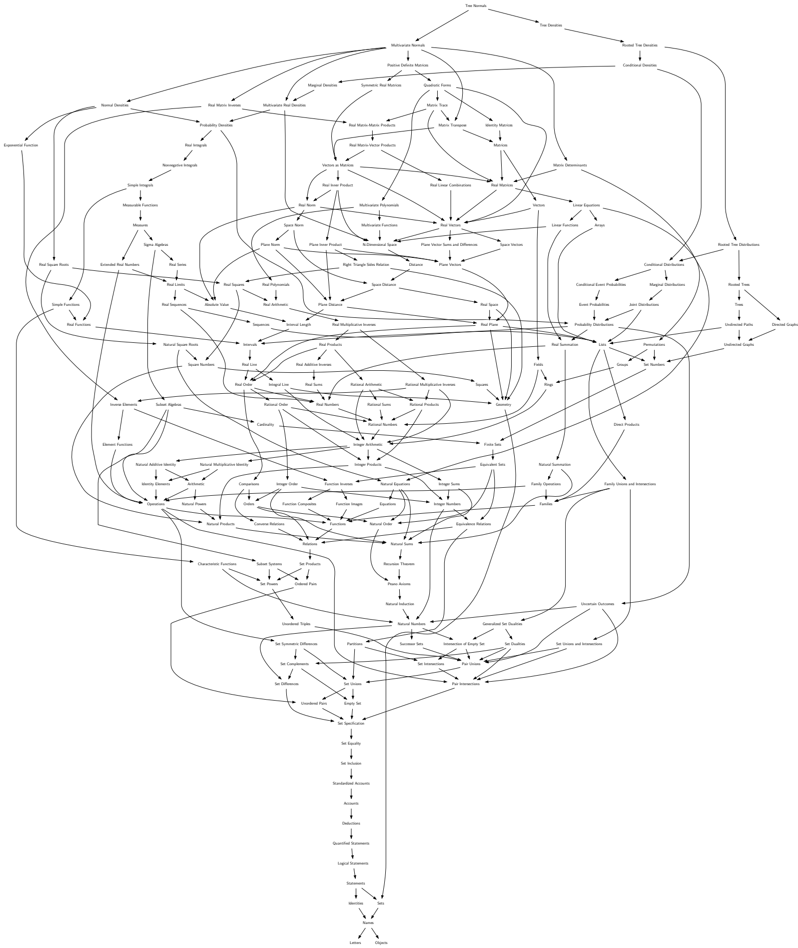
We name multivariate normal densities which factor according to a tree. These densities require tabulating fewer numbers.

Definition

A *tree multivariate normal* (or *tree normal*, *tree gaussian*) density is a multivariate normal density which factors according to a tree.

Fewer numbers

A multivariate normal on $\mathbf{R}^n$ requires tabulating n numbers for the mean and $n(n+1)/2$ numbers for the covariance matrix. If it factors according to a tree, we need only n numbers to specify the covariance (one for the one-variable marginal, and $n-1$ for the covariance of the two-variable conditionals).


Tree Normals
Tree Densities
Multivariate Normals
Rooted Tree Densities
Positive Definite Matrices
Conditional Densities
Marginal Densities
Symmetric Real Matrices
Quadratic Forms
Normal Densities
Real Matrix Inverses
Multivariate Real Densities
Matrix Trace
Probability Densities
Real Matrix-Matrix Products
Matrix Transpose
Identity Matrices
Exponential Function
Real Integrals
Real Matrix-Vector Products
Matrices
Nonnegative Integrals
Vectors as Matrices
Matrix Determinants
Simple Integrals
Real Inner Product
Real Linear Combinations
Real Matrices
Measurable Functions
Real Norm
Multivariate Polynomials
Vectors
Linear Equations
Measures
Space Norm
Multivariate Functions
Real Vectors
Linear Functions
Arrays
Sigma Algebras
Plane Norm
Plane Inner Product
N-Dimensional Space
Plane Vector Sums and Differences
Space Vectors
Rooted Tree Distributions
Real Square Roots
Extended Real Numbers
Real Series
Right Triangle Sides Relation
Distance
Plane Vectors
Conditional Distributions
Real Limits
Real Squares
Real Polynomials
Space Distance
Conditional Event Probabilities
Marginal Distributions
Rooted Trees
Simple Functions
Real Sequences
Absolute Value
Real Arithmetic
Plane Distance
Real Space
Event Probabilities
Joint Distributions
Trees
Real Functions
Sequences
Interval Length
Real Multiplicative Inverses
Real Plane
Probability Distributions
Undirected Paths
Directed Graphs
Natural Square Roots
Intervals
Real Products
Real Summation
Lists
Permutations
Undirected Graphs
Square Numbers
Real Line
Real Additive Inverses
Fields
Groups
Set Numbers
Real Order
Integral Line
Real Sums
Rational Arithmetic
Rational Multiplicative Inverses
Squares
Rings
Inverse Elements
Subset Algebras
Rational Order
Real Numbers
Rational Sums
Rational Products
Geometry
Cardinality
Rational Numbers
Direct Products
Element Functions
Integer Arithmetic
Finite Sets
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Equivalent Sets
Natural Summation
Identity Elements
Arithmetic
Comparisons
Integer Order
Function Inverses
Natural Equations
Integer Sums
Family Operations
Family Unions and Intersections
Operations
Natural Powers
Orders
Function Composites
Function Images
Equations
Integer Numbers
Families
Natural Products
Converse Relations
Functions
Natural Order
Equivalence Relations
Relations
Natural Sums
Characteristic Functions
Subset Systems
Set Products
Recursion Theorem
Set Powers
Ordered Pairs
Peano Axioms
Natural Induction
Uncertain Outcomes
Unordered Triples
Natural Numbers
Generalized Set Dualities
Set Symmetric Differences
Partitions
Successor Sets
Intersection of Empty Set
Set Dualities
Set Unions and Intersections
Set Complements
Set Intersections
Pair Unions
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects