Why

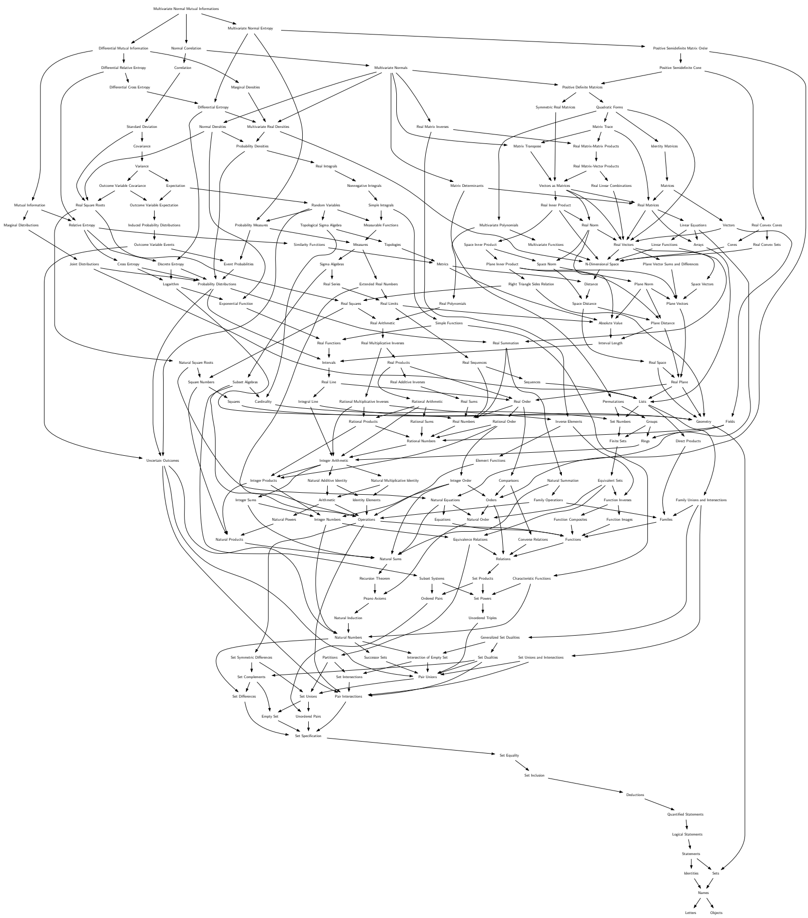
What is the differential mutual information between two components of a multivariate normal?

Result

Proposition 1. *Let $g \sim \mathcal{N}(\mu, \Sigma)$. Then the mutual information between component i and component j is*

$$-\frac{1}{2}\ln(1-\rho_{ij}^2)$$

where ρ_{ij} is the correlation between components i and j.


Multivariate Normal Mutual Informations
Multivariate Normal Entropy
Differential Mutual Information
Normal Correlation
Positive Semidefinite Matrix Order
Differential Relative Entropy
Correlation
Multivariate Normals
Positive Semidefinite Cone
Differential Cross Entropy
Marginal Densities
Positive Definite Matrices
Differential Entropy
Symmetric Real Matrices
Quadratic Forms
Standard Deviation
Normal Densities
Multivariate Real Densities
Real Matrix Inverses
Matrix Trace
Covariance
Probability Densities
Matrix Transpose
Real Matrix-Matrix Products
Identity Matrices
Variance
Real Integrals
Real Matrix-Vector Products
Outcome Variable Covariance
Expectation
Nonnegative Integrals
Matrix Determinants
Vectors as Matrices
Real Linear Combinations
Matrices
Mutual Information
Real Square Roots
Outcome Variable Expectation
Random Variables
Simple Integrals
Real Inner Product
Real Matrices
Marginal Distributions
Relative Entropy
Induced Probability Distributions
Probability Measures
Topological Sigma Algebra
Measurable Functions
Multivariate Polynomials
Real Norm
Linear Equations
Vectors
Real Convex Cones
Outcome Variable Events
Similarity Functions
Measures
Topologies
Space Inner Product
Multivariate Functions
Real Vectors
Linear Functions
Arrays
Cones
Real Convex Sets
Joint Distributions
Cross Entropy
Discrete Entropy
Event Probabilities
Sigma Algebras
Metrics
Plane Inner Product
Space Norm
N-Dimensional Space
Plane Vector Sums and Differences
Logarithm
Probability Distributions
Real Series
Extended Real Numbers
Right Triangle Sides Relation
Distance
Plane Norm
Space Vectors
Exponential Function
Real Squares
Real Limits
Real Polynomials
Space Distance
Plane Vectors
Real Arithmetic
Simple Functions
Absolute Value
Plane Distance
Real Functions
Real Multiplicative Inverses
Real Summation
Interval Length
Natural Square Roots
Intervals
Real Products
Real Sequences
Real Space
Square Numbers
Subset Algebras
Real Line
Real Additive Inverses
Sequences
Real Plane
Squares
Cardinality
Integral Line
Rational Multiplicative Inverses
Rational Arithmetic
Real Sums
Real Order
Permutations
Lists
Rational Products
Rational Sums
Real Numbers
Rational Order
Inverse Elements
Set Numbers
Groups
Geometry
Fields
Rational Numbers
Finite Sets
Rings
Direct Products
Uncertain Outcomes
Integer Arithmetic
Element Functions
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Integer Order
Comparisons
Natural Summation
Equivalent Sets
Integer Sums
Arithmetic
Identity Elements
Natural Equations
Orders
Family Operations
Function Inverses
Family Unions and Intersections
Natural Powers
Integer Numbers
Operations
Equations
Natural Order
Function Composites
Function Images
Families
Natural Products
Equivalence Relations
Converse Relations
Functions
Natural Sums
Relations
Recursion Theorem
Subset Systems
Set Products
Characteristic Functions
Peano Axioms
Ordered Pairs
Set Powers
Natural Induction
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
Empty Set
Unordered Pairs
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects