Why

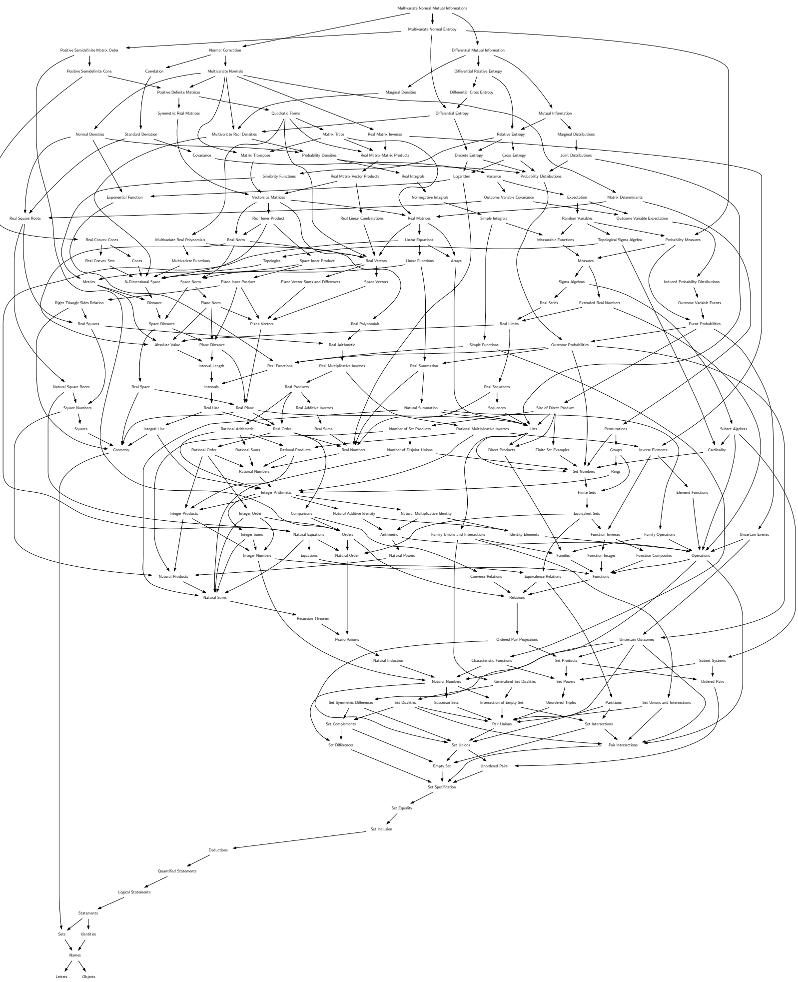
What is the differential mutual information between two components of a multivariate normal?

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