Why

What does it mean for two random variables to be independent? What are the events associated with a random variable? TODO

Definition

A family of random variables are *independent* if the sigma algebras generated by the random variables are independent.

Notation

Let $(X, \mathcal{A}, \mu)$ be a probability space and $(Y, \mathcal{B})$ be a measurable space. Let $f_1, f_2 : X \to Y$ be a random variables. If the random variables are independent we write $f_1 \perp f_2$.

Results

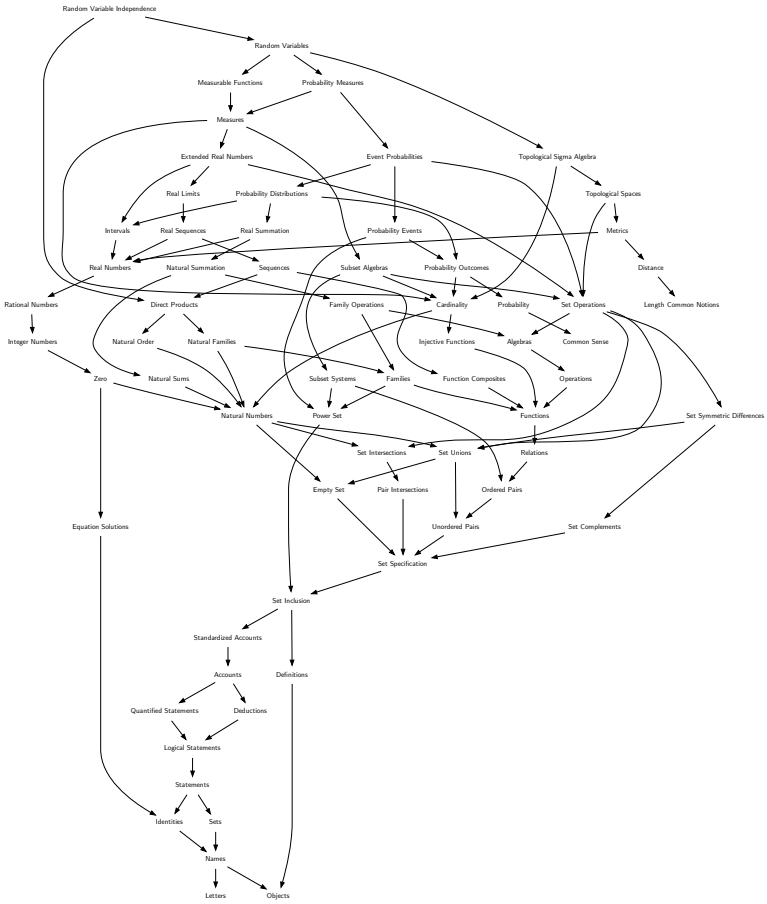
Proposition **1.** *Let $f_1, \ldots, f_n$ be independent real-valued random variables defined on a probability space $(X, \mathcal{A}, \mu)$.*

Let $B_1, \ldots, B_n$ be Borel sets of real numbers and let $A_i = f_i^{-1}(B_i)$. Let $A = \cap_{i=1}^n f_i^{-1}(B_i)$. Then

$$\mu(A) = \prod_{i=1}^{n} \mu(A_i)$$

Proof. Since f_i are independent, so are the sigma algebras they generate. A_i are in each of these sigma algebras, so by defi-

nition of independence the measure of the intersection is the product of the measures. □


Random Variable Independence
Random Variables
Measurable Functions
Probability Measures
Measures
Extended Real Numbers
Event Probabilities
Topological Sigma Algebra
Real Limits
Probability Distributions
Topological Spaces
Intervals
Real Sequences
Real Summation
Probability Events
Metrics
Real Numbers
Natural Summation
Sequences
Subset Algebras
Probability Outcomes
Distance
Rational Numbers
Direct Products
Family Operations
Cardinality
Probability
Set Operations
Length Common Notions
Integer Numbers
Natural Order
Natural Families
Injective Functions
Algebras
Common Sense
Zero
Natural Sums
Subset Systems
Families
Function Composites
Operations
Natural Numbers
Power Set
Functions
Set Symmetric Differences
Set Intersections
Set Unions
Relations
Empty Set
Pair Intersections
Ordered Pairs
Equation Solutions
Unordered Pairs
Set Complements
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Definitions
Quantified Statements
Deductions
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects