Why

We want to talk about making a sequence of decisions.

Definition

Let S and A be finite sets. Let $T : S \times A \to (S \to [0, 1])$ so that for each $s \in S$ and $a \in A$, $T_{sa} : S \to [0, 1]$ is a probability distribution over S. We call the ordered triple (S, A, T) a *finite state-action process*.

A *trajectory* in the *state set* S and *action set* A is a sequence in $S \times A$. We interpret

Let $r : S \times A \times S \to \mathbf{R}$, $N \in \mathbf{N}$.

A *decision process* is a sequence $(S, A, T, r, \gamma,,$ consists of two sets, a function set, an action

Other terminology

Decision processes are commonly called *markov decision processes.*[1]

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[1]As usual, we avoid this terminology in connection with the projects guidelines against using particular names.

Decision Processes

Probability Distributions

Intervals

Real Line

Real Order

Real Summation

Real Numbers

Rational Numbers

Integral Line

Sequences

Set Numbers

Family Operations

Natural Additive Identity

Natural Multiplicative Identity

Integer Arithmetic

Natural Summation

Direct Products

Finite Sets

Algebras

Identity Elements

Arithmetic

Family Unions and Intersections

Equivalent Sets

Operations

Integer Products

Natural Exponents

Function Inverses

Natural Products

Integer Sums

Families

Function Composites

Function Images

Integer Numbers

Natural Sums

Functions

Equivalence Relations

Natural Order

Recursion Theorem

Relations

Peano Axioms

Cartesian Products

Uncertain Outcomes

Natural Induction

Generalized Set Dualities

Set Powers

Natural Numbers

Set Unions and Intersections

Partitions

Intersection of Empty Set

Set Dualities

Unordered Triples

Successor Sets

Set Intersections

Pair Unions

Set Complements

Ordered Pairs

Pair Intersections

Set Unions

Set Differences

Empty Set

Unordered Pairs

Set Specification

Geometry

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects