Why

[1]

Definition

Suppose we want to find the shortest path on a weighted graph from a given starting vertex to a given terminal vertex.

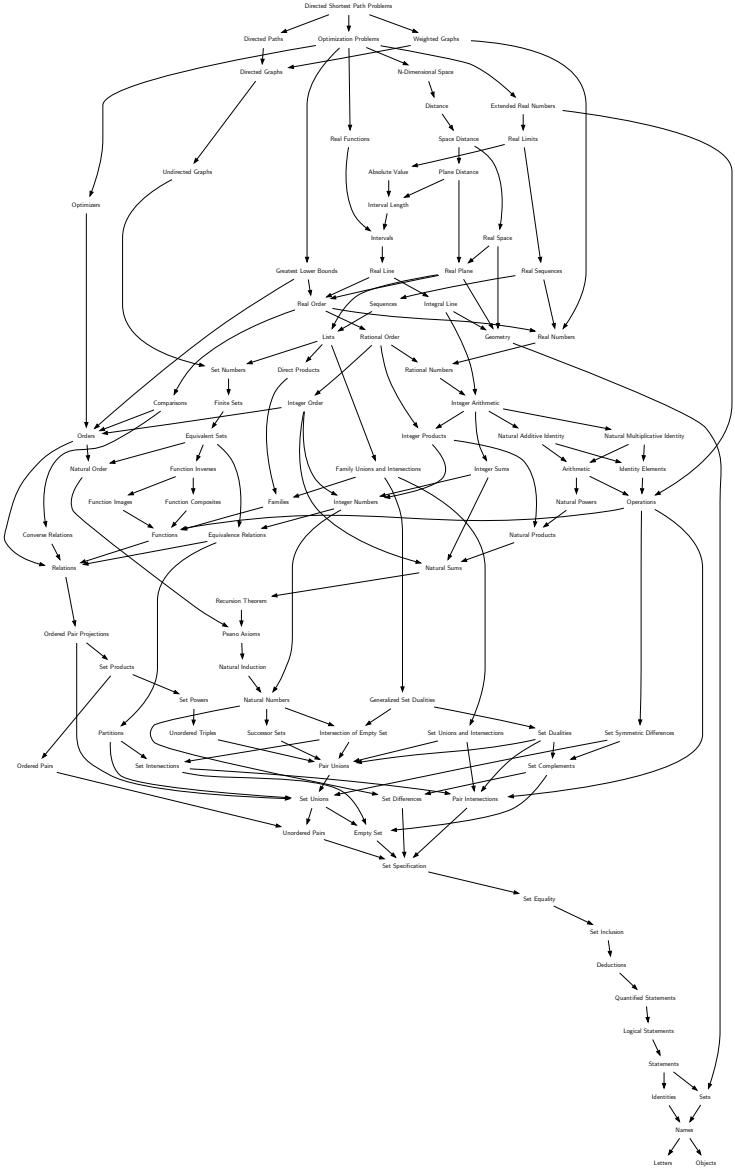
Let $((V, E), w : E \to \mathbf{R})$ be a weighted directed graph. Let v be a source and w be a sink. Let $\mathcal{X}$ denote the set of (directed) paths from v to w. Let $f : \mathcal{X} \to \mathbf{R}$ be so that if $x \in X$ is a path from v to w, then $f(x)$ is the weight of the path. In other words, $f(x)$ is the sum of weights on the edges. Then we call the problem $(\mathcal{X}, f)$ a *directed shortest path problem*.

Examples

[2]

[1] Future editions will include. For now this is an example of a discrete optimization problem.

[2] Future editions will include the numerous examples.


Directed Shortest Path Problems
Directed Paths
Optimization Problems
Weighted Graphs
Directed Graphs
N-Dimensional Space
Distance
Extended Real Numbers
Real Functions
Space Distance
Real Limits
Undirected Graphs
Absolute Value
Plane Distance
Optimizers
Interval Length
Intervals
Real Space
Greatest Lower Bounds
Real Line
Real Plane
Real Sequences
Real Order
Sequences
Integral Line
Lists
Rational Order
Geometry
Real Numbers
Set Numbers
Direct Products
Rational Numbers
Comparisons
Finite Sets
Integer Order
Integer Arithmetic
Orders
Equivalent Sets
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Natural Order
Function Inverses
Family Unions and Intersections
Integer Sums
Arithmetic
Identity Elements
Function Images
Function Composites
Families
Integer Numbers
Natural Powers
Operations
Converse Relations
Functions
Equivalence Relations
Natural Products
Relations
Natural Sums
Recursion Theorem
Ordered Pair Projections
Peano Axioms
Set Products
Natural Induction
Set Powers
Natural Numbers
Generalized Set Dualities
Partitions
Unordered Triples
Successor Sets
Intersection of Empty Set
Set Unions and Intersections
Set Dualities
Set Symmetric Differences
Ordered Pairs
Set Intersections
Pair Unions
Set Complements
Set Unions
Set Differences
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects