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.

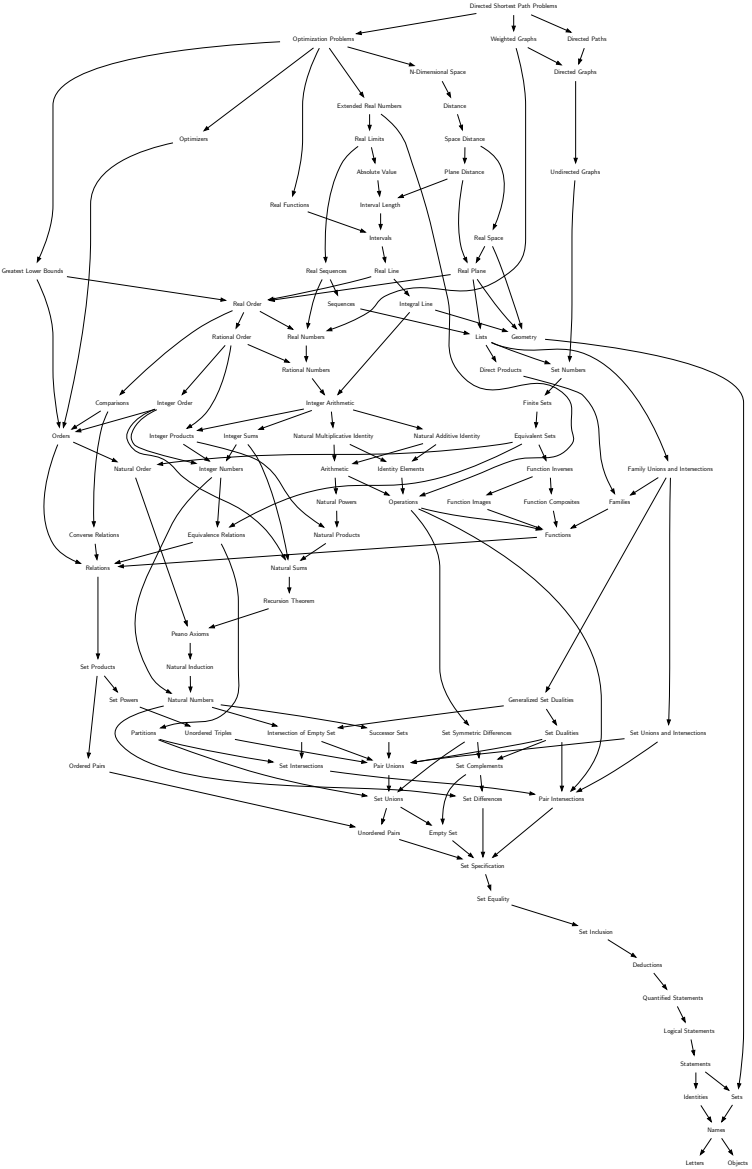
Let $((V, E), w : E \to \mathbf{R})$ be a weighted directed graph. Let v be a source and w be a sink. Let $\mathcal{X}$ denote the set of (directed) paths from v to w. Let $f : \mathcal{X} \to \mathbf{R}$ be so that if $x \in X$ is a path from v to w, then $f(x)$ is the weight of the path. In other words, $f(x)$ 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
Optimization Problems
Weighted Graphs
Directed Paths
N-Dimensional Space
Directed Graphs
Extended Real Numbers
Distance
Optimizers
Real Limits
Space Distance
Absolute Value
Plane Distance
Undirected Graphs
Real Functions
Interval Length
Intervals
Real Space
Greatest Lower Bounds
Real Sequences
Real Line
Real Plane
Real Order
Sequences
Integral Line
Rational Order
Real Numbers
Lists
Geometry
Rational Numbers
Direct Products
Set Numbers
Comparisons
Integer Order
Integer Arithmetic
Finite Sets
Orders
Integer Products
Integer Sums
Natural Multiplicative Identity
Natural Additive Identity
Equivalent Sets
Natural Order
Integer Numbers
Arithmetic
Identity Elements
Function Inverses
Family Unions and Intersections
Natural Powers
Operations
Function Images
Function Composites
Families
Converse Relations
Equivalence Relations
Natural Products
Functions
Relations
Natural Sums
Recursion Theorem
Peano Axioms
Set Products
Natural Induction
Set Powers
Natural Numbers
Generalized Set Dualities
Partitions
Unordered Triples
Intersection of Empty Set
Successor Sets
Set Symmetric Differences
Set Dualities
Set Unions and Intersections
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