

DIRECTED SHORTEST PATH PROBLEMS

Why

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Definition

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

Let $((V, E), w : E \to \mathbb{R})$ 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 $f : \mathcal{X} \to \mathbb{R}$ 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

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

²Future editions will include the numerous examples.

