

On the Problem of scheduling deliveries

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1 System Model

1.1 The input of the scheduling problem

A map with location set V . The distance between two locations u, v is denoted by $d(u, v)$ (measured by meters) and $T(u, v)$ (measured in time).

There are n Jobs to be assigned. Each job has its deadline, source $s \in V$, destination $t \in V$.

There are m drivers. Each driver has its expected available time, location when available.

A function $f : \mathbf{R} \mapsto \mathbf{R}_+$ that maps *the difference between complete time and deadline* to the cost of delay. $f(t) = 0, \forall t \leq 0$.

A weight parameter α .

1.2 Optimization target

Let S denote a scheduling solution. We want to minimize $w(S) + \alpha f(S)$, where $w(S)$ is the total distance travelled by each driver and $f(S)$ is the sum cost caused by delayed jobs.