Crude Oil Pooling Problem

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Overview

The time representation concept is a key decision in scheduling models since it has a major effect in model size, solution quality and computational performance. Continuous-time formulations relying on a single time grid have the advantage of requiring fewer slots to represent the schedule than its continuous-time counterpart. This is particularly important in the context of non-convex blending constraints that are written for every time slot. On the other hand, the discrete-time representation handles time-varying inventory costs in a linear manner, since the location of every time point in the grid is known a priori. It may compensate the added complexity from a larger number of blending constraints.

Figure 1 - Reference time grids for discrete- and continuous-time formulations.

The reference time grids used by the source based formulations are given in Figure 1. The slot boundaries of the continuous-time grid are referred to as event points \( t \in T \), to emphasize that the state of the system typically changes between consecutive time slots. The exact location \( T_t \) of every event point \( t \) except the first \( (T_1 = 0) \) and the last \( (T_{|T|} = H) \) is unknown. In contrast, it is known a priori, \( f_{t_t} \), for the discrete-time formulation, as a function
of the chosen slot size $\delta$. In particular, $f_{t_1} = 0$ and $f_{|T|} = H$, with the time horizon $H$ being problem data. Note that the cardinality of set $T$, $|T|$, selected by the user, affects solution quality, more so for the continuous-time formulation.

**References**


