

Generic mathematical formulations for scheduling of multipurpose batch plants

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July 22, 2020

Abstract

In this work, we develop two generic mixed-integer linear programming formulations for scheduling of multipurpose batch plants using the unit-specific event-based modelling approach. While related non-recycling production and consumption tasks are allowed to take place at the same event points but in different real time in the first model, they are not allowed in the second model. We also introduce the concept of indirect and direct material transfer, which allows to conditionally align the operational sequence of related production and consumption tasks. Processing units are able to hold materials previously produced over multiple event points. The computational results demonstrate that the proposed models do not require a task to span over multiple event points to generate the optimal solution. As a result, the proposed models are able to generate the same or better solutions with up to one order of magnitude less computational time compared to the existing models.

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