STUDENT PROJECTS

MULTI-PURPOSE BATCH PROCESS HEAT INTEGRATION

by Bjanka Jovancic

Mixed integer linear programming (MILP) formulations in a generalised algebraic modelling system (GAMS) may be used to model batch process activities such as scheduling, heat integration and heat storage.

An investigation in the University of Pretoria's Department of Chemical Engineering aimed to implement a new time horizon constraint into the scheduling MILP formulations of Majozi and Zhu (2001); to test the fixed batch size heat integration MILP formulation of Majozi (2006) and, if necessary, reformulate it; and to develop an MILP model for heat storage in a heat transfer medium (HTM).

The new time horizon constraint was successfully implemented. It ensures that batch production does not begin after the end of the time horizon. The heat integration model for fixed batch size (Majozi, 2006) was successfully reformulated, and yields an objective value that is 22% higher than that of the variable batch size model and 18% higher than the objective value of the same model without heat integration. 🔹

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→ *Bjanka Jovancic delivering the talk with which she won the award for best oral presentation at the prize-giving ceremony of the University of Pretoria's Department of Chemical Engineering*

→ *Representations of a state task network (STN) and a state sequence network (SSN) to solve heat integration problems*