Heterogeneous batch distillation processes: Real system optimisation

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Abstract

In this paper, optimization of batch distillation processes is considered. It deals with real systems with rigorous simulation of the processes through the resolution full MESH differential algebraic equations. Specific software architecture is developed, based on the BatchColumn® simulator and on both SQP and GA numerical algorithms, and is able to optimize sequential batch columns as long as the column transitions are set. The efficiency of the proposed optimization tool is illustrated by two case studies. The first one concerns heterogeneous batch solvent recovery in a single distillation column and shows that significant economic gains are obtained along with improved process conditions. Case two concerns the optimization of two sequential homogeneous batch distillation columns and demonstrates the capacity to optimize several sequential dynamic different processes. For such multi-objective complex problems, GA is preferred to SQP that is able to improve specific GA solutions.

Keywords: Optimisation; Batch distillation; Heterogeneous azeotrope; Batch distillation sequence