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Optimization of the mechanical vapor compression (MVC) desalination process using mathematical programming

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ABSTRACT

A mathematical model for the optimization of the mechanical vapor compression (MVC) desalination process is presented. The mathematical model involves the real physical constraints for the evaporation process. Nonlinear equations in terms of chemical–physical properties and design equations are used to model the process. A general algebraic modeling system (GAMS) is used to implement the model. The generalized reduced gradient algorithm CONOPT 2.041 is used as an NLP solver. The effects of some relevant process parameters on the system performance are studied. The output results from the proposed model were successfully compared with those of the literature.

Keywords: Mechanical vapor compression; Single-effect evaporation; Modeling and optimization of seawater desalination processes; General algebraic modeling systems (GAMS)

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