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Modeling and Optimal Control of Conversion Section of Styrene Plant to Overcome Effect of Catalyst Deactivation on Production Capacity

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Highlights

- Ethylbenzene dehydrogenation reactors are modeled at pseudo steady condition
- The accuracy of the developed model is validated against available plant data.
- A real time optimization problem is formulated to maintain styrene production and selectivity at desired level

Abstract

In this research, a pseudo steady state model is developed based on the mass and energy balance equations to simulate conversion section of a styrene monomer production plant. The conversion section includes three radial flow reactors in series, equipped with inter stage coolers. Typically, dehydrogenation catalyst experiences deactivation due to loss and migration of promoters, and increasing temperature and steam flow rate are practical solutions to prevent production decay in the plant. In the first step, accuracy of the simulation results is proved against plant data. Since

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