

Repetitive Control of Propane Dehydrogenation (CATOFIN) Process

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The CATOFIN process is a propane dehydrogenation process for production of propylene. It uses multiple adiabatic fixed-bed reactors where dehydrogenation and regeneration (decoking) are performed alternatively over roughly ten minutes of period for each operation. Taking advantage of the periodic operation, the present research concerns the development of a repetitive control method to improve the operation of the CATOFIN process. The controller is designed to perform feedback action during the regeneration cycle and to run only the Kalman filter during the dehydrogenation cycle. To improve the performance while overcoming the nonlinearity of the process, a linearized time-varying process is derived from the first-law model and used for the controller design. Numerical study has shown that the proposed control system outperforms conventional feedback control methods.