

Repetitive Control of Simulated Moving Bed Process based on Cycle-wise Linearization of Reduced-Order Fundamental Model by Cubic Spline Collocation Method

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In this research, a novel repetitive control (RC) method for the SMB process has been proposed on the basis of the successive linearization of a fundamental SMB model. For this, we derived an ordinary differential equation (ODE) model of the SMB process using the cubic spline collocation method. At each switching period, the discrete-time nonlinear ODE model is repeatedly linearized along the operation trajectory of the previous period and used for renewing the repetitive controller. The control objective was chosen to steer product purities averaged over a switching period at the extract and raffinate ports to their respective targets by manipulating two flow rates while satisfying input constraints.