

Successive Linearization-based Repetitive Control of Simulated Moving Bed Process

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A novel advanced control technique for the SMB process has been proposed. In the proposed technique, regulation of both extract and raffinate purities measured at the terminal time of each switching period is performed by a successive linearization-based repetitive controller which utilizes the past period data as feed back information. The repetitive controller was designed on the basis of a successively linearized model of the first-law SMB model. For this, we have first proposed a novel scheme for reduced-order ODE modeling of a convection-dominant SMB process. The linearized model for the controller design was derived from this model. Through application to a numerical SMB process, it was found that the proposed control technique performs quite satisfactorily against model error as well as set point and disturbance changes.