

Sliding mode control for a continuous bioreactor

Abstract

Application of sliding mode control for a continuous bioreactor operation is studied, both by deterministic and adaptive approaches. Based on the results from these two approaches, a hybrid approach to sliding mode control is proposed. Performance of this sliding mode controller is shown through simulation studies for two different fermentation processes. To assess the performance of the controller, set point changes, external disturbances and variations in parameters are considered. The good performance of the sliding mode controller for the nonlinear system is demonstrated, especially for its ability to reject disturbances. The invariance property of sliding mode controller is also shown. Its performance is also compared with a conventional PI controller.