

Model Identification of Continuous Fermentation under Noisy Measurements

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Abstract:

The dynamic model concept plays a central role in automatic control. Understanding the dynamic behavior of chemical and biological processes depends first on understanding the steady state behavior of these processes, then the dynamic characteristics of the process (e.g., the time constant, gain and deadtime) can be used to determine how long it takes to approach the new steady state and what path the process takes. The dynamic models can be used for bioprocess design, analysis of bioprocess control approaches, operator training, and start-up / shutdown strategy development. This paper will present bioprocess model identification of continuous fermentation for gluconic acid production under measurement noise. In this study, the input and output data was generated from first principle dynamic bioprocess model using Contois kinetic model and mass balances. Simulated measurement noises were then added to process variables. The data was then analyzed using System Identification Toolbox in Matlab. The final results obtained are in the form of Laplace-transfer functions.

Key words: *Biology, chemical, dynamic, laplace, model, simulation*