

Process Dynamics and Control of Biological Systems for Chemical Engineering Students

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Abstract

Efforts have been devoted to introducing biological concepts and recent developments into the Chemical Engineering curriculum. While some initiatives focus on the incorporation of laboratory-based components into existing courses, other programs aim to enhance the curriculum by adding biological applications to conventional problems [1]. The challenge is to select areas of biological sciences where the theories learned at the undergraduate level are adequate to describe and regulate the processes. Familiarity with the topics is a pre-requisite because the issues that arise in biotechnology, for example, may be different from those related to a chemical reactor system. Experiences gathered so far have shown that, at least for the students, an understanding of the specific biological application is necessary to fully appreciate the solution strategies. In this project, a series of problems, which include Laplace transforms, dynamic response and controller tuning, are written to facilitate the dissemination of biological knowledge and promote the learning of process control.

Reference 1. Mitchell, Taran F.; Fernandez, Erik J.; Chalmers, Jeffrey; Good, Theresa; Prince, Michael J.; Simon, Laurent; O'Connell, John; Komives, Claire F. (2010), Novel resource for chemical engineering faculty and undergraduate students interested in biotechnology: Bioengineering Educational Materials Bank, 239th ACS National Meeting, San Francisco, CA, United States, March 21-25.