Co-existence of Microbial Ecology in a Chemostat using a Robust Feedback

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Abstract

Chemostat models including a single limiting substrate and n competing species is a benchmark model of mathematical population biology. A particular concern in a chemostat is the co-existence of microbial ecology population. The co-existence problem consists of finding the conditions for a long survival of dominant and weak species. This work explores the use of robust feedback control for studying the co-existence of microbial ecology in chemostats. Simulation results are presented for an anaerobic digester. We hope that our control approach can be useful to improve the knowledge of the mechanism of co-existence/competition of microbial species, which has applications in the operation of biological processes.

Keywords: Chemostat, Population co-existence, robust feedback, anaerobic digestion.