SOME CONTROL AND OPTIMIZATION PROBLEMS FOR THE BIOLOGICAL WASTE-WATER TREATMENT
– talk –

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The biological treatement of water ressources in bioreactors often uses mathematical models and automatic control for deriving decision making tools. The simplest model of continously stirred tank reactor (CSTR) is the chemostat one, for which the input flow is the control variable.

For microbial strains with growth inhibition, the system can be unstable in open-loop, requiring a feedback control. But reducing the input flow above its nominal value during the transient requires to have a upstream storage capacity. We shall present different strategies [3, 2] to globally stabilize the process with a constant input flow, playing with spatial inhomogeneity.

The treatment of natural reservoirs of large volumes such as lakes usually require to operate in constant volume, disturbing as little as possible the supported life. For this purpose, we consider the minimal time control control in "closed circuit" with an external bioreactor, and study the influence of spatial inhomogeneity in the continuation of the preliminary work [1].

The models rely on the good knowledge of growth kinetics, especially for determining the optimal steady state in terms of maximization of the production. We shall present a new approach of extremum seeking based on a functional identification of the growth curve [4].

Références

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