Hsu, Sze-Bi; **Waltman, Paul**; **Wolkowicz, Gail S. K.**

Global analysis of a model of plasmid-bearing, plasmid-free competition in a chemostat. (English) Zbl 0802.92027

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Summary: A model of competition between plasmid-bearing and plasmid-free organisms in a chemostat was proposed in a paper of *G. Stephanopoulis* and *G. Lapidus* [Chem. Engin. Sci. 43, 49-57 (1988)]. The model was in the form of a system of nonlinear ordinary differential equations. Such models are relevant to commercial production by genetically altered organisms in continuous culture. The analysis there was local (using index arguments). This paper provides a mathematically rigorous analysis of the global asymptotic behavior of the governing equations in the case of uninhibited specific growth rate.

MSC:

92D40 Ecology
34C99 Qualitative theory for ordinary differential equations
92C40 Biochemistry, molecular biology
34D05 Asymptotic properties of solutions to ordinary differential equations
34C25 Periodic solutions to ordinary differential equations
37N99 Applications of dynamical systems

Keywords:

plasmid-bearing organism; microbial ecology; global attractors; plasmid- free organisms; chemostat; genetically altered organisms; continuous culture; global asymptotic behavior; uninhibited specific growth rate

Full Text: DOI

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