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Author HSIANG-YUN WANG
Author's Email Address No Public.
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Abstract
ABSTRACT
Because the concept of the importance of the environmental protection and the techniques of the biochemical waste treatment have received more attention in recent years, the cultivation of the microorganism has become an important research subject.
A study is conducted to analyze the steady states and dynamic behavior of the reactions of the cell-substrate and the prey-predator interaction in two continuous cultures in series. For the reaction of cell-substrate in two continuous cultures in series, if the specific growth rate of the Substrate-Inhibition model is used for cell, there are three types of steady states for this reaction system. These three types of steady states and stability are analyzed in detail. The dynamic behavior of this reaction system is analyzed by the numerical method and computer graphs. The results show that the dynamic behavior of this system consists of stable steady states.
For the prey-predator interaction, a common interaction between two organisms inhabiting the same environments involves one organism (predator) deriving its nourishment by capturing and ingesting the other organism (prey). If the specific growth rates of Substrate Inhibition model and Monod model are used for the prey and predator respectively, there are six types of steady states for the two continuous cultures in series reaction system and the six types of steady states and stability are analyzed in detail in this research. The dynamic equations of this system are solved by the numerical method and the dynamic analysis is performed by the computer graphs. The results show that the dynamic behavior of this system consists of stable steady states and limit cycles.
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