



002126

CENTRAL LIBRARY
MAHIDOL UNIVERSITY
BIFURCATION ANALYSIS OF A PRODUCT INHIBITION MODEL
OF
A CONTINUOUS FERMENTATION PROCESS

BY

CHALARD CHIARANAI

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
[APPLIED MATHEMATICS]

IN THE
FACULTY OF GRADUATE STUDIES
OF
MAHIDOL UNIVERSITY

1986

อภินันท์นาการ

๑๓๓

Faculty of Graduate Studies ...

ABSTRACT

A product inhibition model of a continuous fermentation process is considered. The study employs a simple set of nonlinear ordinary differential equations based on the model proposed by Yano and Koga [12].

The study shows that if the yield term is a constant the model does not admit any periodic solutions. If the yield term is a variable function of ethanol concentration, oscillation in the cell and ethanol concentration is shown to be a Hopf bifurcation in the underlying system of ordinary differential equations which comprises the model. Further, we show that our model exhibits oscillation only in the counterclockwise direction when its trajectory is viewed in the X-P phase plane.
