

Model Predictive Fermentor Temperature Control with Cooling Jacket Dynamics

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Abstract: This study focuses on the model predictive control of a beer fermentation reactor. Because of some inherent loads in the system, PI control provides fruitless results. Bacteria's activity varies fast with oscillation of temperature, so in order to accurate and optimal control of this reactor MPC policy was applied on it. Results of simulation shows unoscillatory and robust control of fermentor. Gains of controller also were evaluated by solving Riccati differential matrix.

Key Words: MPC, Fermentation.

Introduction

Model Predictive Control (MPC) refers to a class of algorithms that computes a sequence of manipulated variable adjustment in order to optimize behavior of a plant. Predictive methods have many names including, Dynamic Matrix Control (DMC), Internal Model Control (IMC) and Model Algorithm Control (MAC). All of these approaches can be cast as an LQR type of problem.

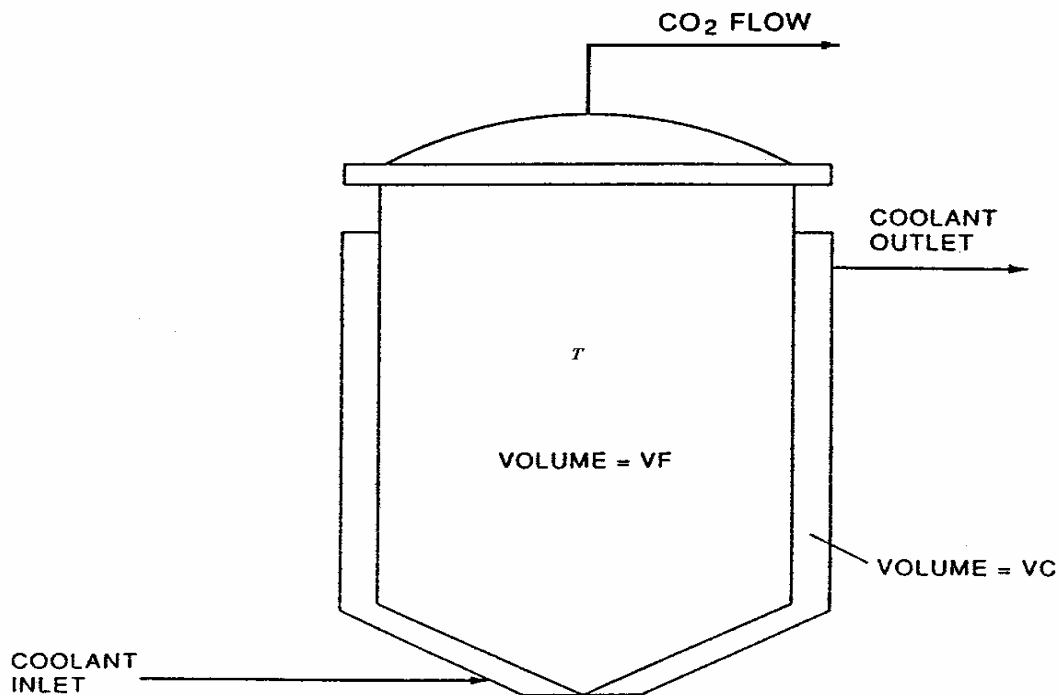


Fig.1- Fermentor Configuration