OPTIMIZATION OF BATCH PROCESS PLANT
(SOFTWARE DEVELOPMENT)

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ABSTRACT

This thesis looks at ways in which more enhanced computer control can be provided in the batch process industries. Proposals are made for a system with fully integrated facilities. These proposal cover the performance enhancement of batch plant based on graph theory, batch process modelling by mean of timed Petri Nets, control and optimization based on dynamic programming and the principle of optimality. The method adopted here is to find these optimal values by using dynamic programming method. Dynamic programming is a method for the optimization or mathematical representation of systems in which one works by stages or sequences using the principle of optimality. By proper application dynamic programming can cut across all the fields of mathematical programming. Therefore optimization of a batch process plant is proposed.

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CHAPTER 1

1. INTRODUCTION

1.1 Introduction to the problems

For years, continuous operations have been the most prevalent and sought-after mode in processing plant especially in chemical and food industries. One of the reasons for this is that continuous process have been much easier to standardize than batch process, where the batch processes appear to be rather individual [1].

In recent years however, there has been a renewed interest in batch processes for a variety of reasons. The most appealing feature of batch processes is their flexibility in producing multiple products in a single plant through sharing of process equipment [2]. The batch operations are economically desirable, especially when small amounts of complex, high value added chemicals are produced or when a large number of products are made using similar production paths [3]. This trend is expected to continue over the next decades.

Batch processes are intrinsically more complex, and often poorly understood than continuous processes, not only because of their multiproduct character, but also because the transfer of materials from one operation to another has to be coordinated in time as well as in quality [3]. The coordination of the tasks while allocating constrained process resources, such as processing units, raw materials and utilities, further increases the operating difficulties [4]. Even though the use of computers in the batch process industry has increased considerably in recent years, the implementation of conventional computer technology is not adequate for executing the total supervisory control of the batch process.

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