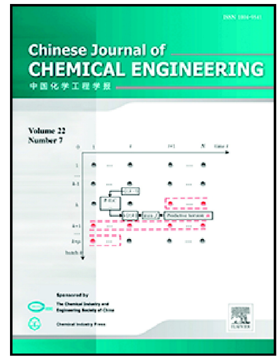

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A Decision Tree based Decomposition Method for Oil Refinery Scheduling *

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Abstract Refinery scheduling attracts increasing concerns in both academic and industrial communities in recent years. However, due to the complexity of refinery processes, little has been reported for success use in real world refineries. In academic studies, refinery scheduling is usually treated as an integrated, large-scale optimization problem, though such complex optimization problems are extremely difficult to solve. In this paper, we proposed a way to exploit the prior knowledge existing in refineries, and developed a decision making system to guide the scheduling process. For a real world fuel oil oriented refinery, ten adjusting process scales are predetermined. A C4.5 decision tree works based on the finished oil demand plan to classify the corresponding category (*i.e.* adjusting scale). And then, a specific sub-scheduling problem with respect to the determined adjusting scale is solved. The proposed strategy is demonstrated with a scheduling case originated from a real world refinery.

Keywords refinery scheduling, decision tree, C4.5, decomposition method

1 INTRODUCTION

Refinery scheduling has attracted increasing concerns because of increasing environmental standard, intense global competition, and volatile market demand. Fruitful and valuable reports have been published in the last decade.

The dominant research on oil refinery scheduling focus on the integrated model based optimization. The general framework for refinery planning and scheduling were proposed by Pinto and co-workers [1-3]. Jia & Ierapetritou proposed a continuous time formulation for refinery scheduling problem and spatially decomposed it into three sub-problems[4, 5]. In the work of Dogan & Grossmann[6], a decomposition method for simultaneous integrated planning and scheduling problem is proposed. Wu &

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