# 浙江工业大学

# 毕业论文（文献综述、外文翻译）

## 题目　论文题目是论文的题目

专　　业：工业工程

班　　级：健行 1001

学生姓名：陈大仙

指导老师：玄奘

2013-2014 学年

# 目　　录

# 第一章　绪论

## 1.1　课题研究的背景和意义

## 1.2　课题研究的国内外现状

# 第二章　*** 相关理论

# 第三章　案例分析

# 第四章　总结

# 参考文献


[1] 姚建国, 杨胜春. 电网调度自动化系统发展趋势展望 [J]. 电力系统自动化, 2007, 31(13):7–11.

[2] McDonnell J R, Wagen D. Evolving Recurrent Perceptions for Time-Series Modeling[J]. IEEE Trans. on Neural Networks, 1994, 5(1):24–38.

[3] 胡伟. LaTeX 2ε 完全学习手册 [M]. 北京: 清华大学出版社, 书号: 978-7-302-24159-1, 2011.

[4] 邓建松, 彭冉冉, 陈长松. LaTeX 2ε 科技排版指南 [M]. 北京: 科学出版社, 书号: 7-03-009239-2/TP.1516, 2001.

[5] Lamport L. LaTeX — A Document Preparation System: User's Guide and Reference Manual[M]. 2nd. Reading, Massachusetts: Addison-Wesley, 1985.

[6] Knuth D E. The TeXbook[M]. Computers and Typesetting, vol. A. Reading, Massachusetts: Addison-Wesley, 1986.

[7] Knuth D E. Computer Modern Typefaces[M]. Computers and Typesetting, vol. E. Reading, Massachusetts: Addison-Wesley, 1986.

[8] Bezos J. The titlesec and titletoc Packages[M]. 2nd. Cityname: University of SomeName, 2002: 10–20.

[9] P. Oostrum, ifuleyou@bbs.ctex.org 译. LaTeX 下的页面布局 [M]. 天津: 某某大学出版社, 2001:10–20.

[10] Shell M. How to Use the IEEEtran LaTeX Class[J]. Journal of LaTeX Class Files, 2002, 1(11):10–20.

[11] TeXGuru. LaTeX2ε 用户手册 [M]. 天津: 某某大学出版社, 1999:10–20.

[12] K. Reckdahl 原著, 王磊 译. Using Import graphics in LaTeX2ε, LaTeX2ε 插图指南 [M]. 天津: 某某大学出版社, 2000:10–20.

[13] X.Yao. Evolutionary Artifitial Neural Networks[J]. J. Of Neural Systems, 1993(4):203–222.

[14] 宋乐. 异源图像融合及其评价方法的研究 [D]. 天津: 天津大学, 2008.

[15] Agrawal A, Raskar R. Resolving objects at higher resolution from a single motion-blurred image[C]. Computer Vision and Pattern Recognition, 2007. CVPR'07. IEEE Conference on, 2007:1–8.

[16] Zhang J, Li X, Chen J, et al. A tree parent storage based on hashtable for XML construction[C]. Communication Systems, Networks and Applications (ICCSNA), 2010 Second International Conference on, 2010，1:325–328.

[17] S.Niwa, Suzuki M, Kimura K. Electrical Shock Absorber for Docking System Space[C]. IEEE International Workshop on Intelligent Motion Control. Istenbul: Bogazici University, 1990:825–830.

# 某装配车间分批调度案例研究

Rock Lin, Ching-Jong Liao
Department of Industrial Management, National Taiwan University of Science and Technology, Taipei 106, Taiwan

**摘要：**本文探讨了在某机械工厂装配车间内的生产调度问题。该装配工艺包含两个阶段：在第一阶段，所需零件在一批同速机上同时装配，并且这些同速机的准备时间也相同；装配完成的部件进入第二阶段进，并在不同的异速机上进行系统集成组装。同速机和异速机在切换生产产品簇的时候都需要考虑换线时间。本文建立了一个混合整数规划 (MIP) 模型以求解小型问题，并提出了用于求解中、大型问题的三个启发式方法。经过计算检验，相比较其余两个方法，其中一个利用滚动时域调度策略的整批产品簇排序启发式组合的方法 (RFBFS)，在解决问题方面有较高质量。实践表明，RFBFS 方法确实显著优于现行方法。

**关键词：**混合整数规划、作业划分、批量生产、产品簇调度

## 1 引言

在机械制造工厂中，经常会遇到批量调度问题，我们将在本文具体研究工厂中的两阶段组装车间的调度。

## 2 现行调度方法

下面将引入相关符号，并对案例中的工厂所运用的现行调度方法进行描述。

### 2.1 符合说明与相关假设

为了方便问题描述，符号说明如下：

### 2.2 生产制造过程

### 2.3 准备时间和产品簇

### 2.4 目标函数

### 2.5 现行调度方法

## 3 方法改进

3.1456

## 4 方法改进

4.1456

## 5 总结和展望

Int. J. Production Economics 139 (2012) 473–483

Contents lists available at SciVerse ScienceDirect

Int. J. Production Economics

journal homepage: www.elsevier.com/locate/ijpe

# A case study of batch scheduling for an assembly shop

Rock Lin, Ching-Jong Liao *

*Department of Industrial Management, National Taiwan University of Science and Technology, Taipei 106, Taiwan*

ARTICLE INFO

*Article history:*
Received 11 February 2011
Accepted 13 April 2012
Available online 1 June 2012

*Keywords:*
Mixed integer programming
Job dividing
Batch processing
Family scheduling
Lower bound

ABSTRACT

This paper addresses a scheduling problem for a two-stage assembly shop in a machinery factory. At stage one, all parts of jobs are assembled simultaneously on a batch machine with a common processing time and a constant batch setup time. Then the assembled jobs are moved to the second stage to perform system integration with different processing times on a discrete machine. On both machines, a family setup time is required when the processing switches from one family to a different one. The objective is to minimize the weighted sum of makespan, total completion time and total tardiness. A Mixed Integer Programming (MIP) model is developed for solving small-size problems, and three heuristics are proposed for solving medium- and large- size problems. Computational experiments show that RFBFS, a full batch family sorting heuristic combining with rolling horizon scheduling strategy, is better than the other two heuristics in terms of solution quality. Real-life implementation also shows that the performance of RFBFS is significantly better than the current method.



## 1. Introduction

In this paper, we study a batch scheduling problem for a two-stage assembly shop which is encountered frequently in machinery factories. The problem is similar to the two-stage assembly scheduling problem in the literature (Yokoyama, 2001; Lin and Cheng, 2002; Koulamas and Kyparisis, 2007; Sung and Kim, 2008), where raw materials are fabricated into parts in the first stage and then all the parts are assembled into final products in the second stage. However, the fabrication of parts becomes more difficult and expensive due to the complicated technology and processes, and hence outsourcing of parts (purchasing) has been a routine procedure. Therefore, we model the assembly shop as a two-stage flow shop which consists of module assembly in the first stage and system integration in the second stage.

In the past two decades, technology has kept developing and there has been a need to increase diversity. The combination of these two trends results in multi- function and high-performance products, which makes the production of machinery much more complicated than before. In such an environment, the machinery factories face the following scheduling problems in their shop management:

(1) How to reduce cycle time?
(2) How to reduce work-in-process (WIP)?
(3) How to fulfill timely delivery?
(4) How to deal with insertion of rush orders?

This paper is motivated from a machinery factory in Taiwan, Hemingstone Machinery Co., Ltd., which produces over 10 different products of plastic bag making machines for customer orders. Currently, the orders are sequenced by the EDD rule. To respond quickly to the customer needs, a product (job) is assembled simultaneously by several workers within a frame (see Fig. 1). Due to the space limitation, idle times and waiting times easily occur resulting from the interference of workers. In order to reduce the idle times and waiting times, we propose the strategies of job dividing (derived from the concept of lot splitting) and batch processing to make the shop more efficient. To shorten the completion time, we also perform a strategy of family scheduling where jobs in the same family are grouped into batches to eliminate the family setups (Liao and Liao, 2008; Schaller and Gupta, 2008). As depicted in Fig. 2, the first stage is modeled as a batch machine so that *c* skilled workers can assemble *c* jobs separately and simultaneously. The second stage is modeled as a discrete machine in which jobs entering in batches are processed sequentially and leave one by one. As such, most of the idle times due to the interference with each other in the first stage can be diminished, and family scheduling can reduce the job setups and family setups in both stages.

Objective functions are used to evaluate the performance of a scheduling solution approach. In this paper, jobs in a batch share a batch setup and jobs within a family share a family setup. Such batching of jobs may delay the processing of other jobs and cause them to be tardy. To resolve this trade-off, we use a

* Correspondence to: Department of Industrial Management, National Taiwan University of Science and Technology, 43 Keelung Road, Section 4, Taipei 106, Taiwan. Tel.: +886 2 27376337.
*E-mail address:* cjliao@mail.ntust.edu.tw (C.-J. Liao).

0925-5273/$ - see front matter © 2012 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.ijpe.2012.05.002