Tribhuvan University
Institute of Science and Technology

An Efficient Algorithm for Mixed Model Just-in-Time Production System with Chain Constraints

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Mukunda Bdr. Khadka

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Central Department of Computer Science and Information Technology

Supervisor's Recommendation

I hereby recommend that this dissertation prepared under my supervision by **Mr. Mukunda Bdr. Khadka** entitled "**An Efficient Algorithm for Mixed Model Just-in-Time Production System with Chain Constraints"** in partial fulfillment of the requirements for the degree of M. Sc. in Computer Science and Information Technology be processed for the evaluation.

… … … … … … … … … …

Dr. Tanka Nath Dhamala
Head, Central Department of Computer Science and IT
Institute of Science and Technology
Tribhuvan University, Nepal

Date: … … …. … … …

Tribhuvan University
Institute of Science and Technology
Central Department of Computer Science and Information Technology

LETTER OF APPROVAL

We certify that we have read this dissertation and in our opinion it is satisfactory in the scope and quality as a dissertation in the partial fulfillment for the requirement of Masters Degree in Computer Science and Information Technology.

Date: … … …. … … …

Evaluation Committee

… … …. … … … …

Prof. Dr. Jeevan Jyoti Nakarmi
Act. Head,
Central Department of Computer Science and Information Technology,
Tribhuvan University, Nepal

… … …. … … … …

Dr. Tanka Nath Dhamala
Head,
Central Department of Computer Science and Information Technology,
Tribhuvan University, Nepal

(Supervisor)

. … … …. … … … …
(External Examiner)

… … …. … … … …
(**Internal Examiner**)

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Mukunda Bdr. Khadka
CDCSIT, TU

ABSTRACT

There has been growing interest in scheduling problems where the jobs are penalized both for being early and for being tardy. A mixed model manufacturing facility running under a just-in-time production system is controlled by setting the production schedule for the highest level in the facility, which is usually a mixed model final assembly line. The schedule is set to achieve the goals of the organization, which under JIT are to keep a constant rate of part usage and to maintain a smooth production load. We consider the former goal in this dissertation.

This dissertation includes different literature as well as the recent trends in JIT environment. Our concern in this dissertation is to find out the possible optimal sequences for controlling JIT production system for mixed-model production systems with Chain Constraints and min-sum deviation objective. For this, we consider non-overlapping chains, and by considering each chain as a pseudo job and their length as demands, we can have a pseudo schedule from EDD, which is later replaced by the real job, can lead a combined optimal chain sequence.

Therefore, in this case, an optimal sequence can be obtained in efficient time complexity. Our results extend the previous results on non-overlapping chain sequences with absolute-deviation objective function.

Contents

ABBREVIATIONS

CPU	Central Processing Unit
EDD	Earliest Due Date
FCFS	First Come First Serve
GSM	Goal Chasing Method
JIT	Just-in-Time
MAC	Medium Access Control
NP	Non-deterministic Polynomial
ORV	Output Rate Variation
OS	Operating System
PRV	Product Rate Variation
PRVP	Product Rate Variation Problem
SJF	Shortest Job First
SRTN	Shortest Remaining Time Next
TPS	Toyota Production System
UTM	Universal Turing Machine