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# Analogy Process in Real-time Control of Parts Input for Flexible Production System \*

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## Abstract

We consider a parts input problem in a flexible production system consists of 2 production lines that are an Up-Stream production line and a Down-Stream production line. The Up-Stream production line processes incoming materials by several machine tools and after processing them, delivers the parts to the Down-Stream production line via buffers. In this paper, the parts input rules to the Up-Stream production line is based on the observation of the parts line-up situation on buffers. By using the parts observation, a real-time control of parts input by pattern recognition called Real-Time Parts Input by Pattern Recognition System (RT-PIPS) is proposed. The pattern recognition consists of pattern classification process and pattern identification process. Simulations of virtual production systems have been carried out to verify that RT-PIPS is useful in real-time parts input control.

*Key words:* Production, Real-time, Analogy, pattern classification

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## 1 Introduction

Today, the processing of tremendous type parts and assembling are performed by many production lines. One of the mass production styles that produce multiple type parts is Flexible Transfer Lines (FTLs). FTL is one of the major form of flexible production systems. Often, many FTLs operate under the Just In Time (JIT) production policy in conditions where each of the FTLs are linked together. The conceptual JIT production policy is defined as “the basis of the Toyota production system in which the right parts are needed in the assembly line at the time they are needed, and only in the amount needed” to achieve “the absolute elimination of waste” [16]. A JIT production system is a pull production system, in which the most well known is called the *Kanban* system [11, 12, 19]. In other words, the Down-Stream production line informs the Up-Stream production line of the needed types and amount of parts beforehand. For instance, a parent company makes a weekly pre-decided production schedule of certain parts (such as 3000 pieces of part A, 2500 pieces of part B ...etc.), in advance. Normally, the Up-Stream production line will schedule the part input to the production line based on the pre-decided production schedule.

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