

**AN INVESTIGATION ON THE PERFORMANCE OF DISPATCHING RULES IN FMS SCHEDULING**

Jain, A.; Jain, P. K. & Singh, I. P.

Mechanical Engineering Department, National Institute of Technology, Kurukshetra, India  
E-mail: ajaijain12@indiatimes.com

**Abstract**

This paper provides four new dispatching rules and investigates the performance of dispatching rules for makespan, mean flow time, maximum flow time and variance of flow time performance measures in an FMS. The proposed dispatching rules are evaluated with respect to existing dispatching rules such as SPT (shortest processing time) and PT2 (processing time over remaining operation). These existing dispatching rules are reported to be performing better than other dispatching rules in FMS from current literature. Simulation studies are performed in four manufacturing environments. Based on the analysis of results, several conclusions are drawn, highlighting some interesting aspect about the number of pallets released to the system on the performance of dispatching rules. 19 refs.

**Key words:** *FMS, Scheduling, Dispatching Rules, Priority Rules*

---

**OUTPUT FEEDBACK POLE PLACEMENT CONTROLLER FOR DELAYED SYSTEMS**

Cherid, A.

Department of Mathematical Sciences, KFUPM, Dhahran, Saudi Arabia  
E-mail: acherid@kfupm.edu.sa

**Abstract**

This paper considers the problem of output feedback stabilization of a delay system by a finite order controller. The idea is based on (1) using a linear transformation to obtain a delay free system that represents the retarded system; (2) a controller is then computed based on this finite order system. Under the condition of spectral stabilizability, it is then shown how to obtain an output stabilizing feedback control law. 13 refs.

**Key Words:** *Time-lag Systems, Output Feedback Controllers, Reduction to Finite Order Auxiliary Systems, Simulation*

---

**INJECTION MOULDING SIMULATION IN THE AUTOMATED PRODUCT DESIGNING SYSTEMS**

Matin, I.; Hodolic, J. & Budak, I.

University of Novi Sad, Faculty of Technical Sciences, Institute of Production Engineering, Novi Sad, Serbia and Montenegro  
E-mail: matini@uns.ns.ac.yu

**Abstract**

Development and application of program systems enabling the simulation of product manufacturing process have opened wide possibilities for product analyses during designing, hence contributing to quality increase and cost decrease, because practical experiments leading to high costs have been replaced by simulation. This paper deals with the problems of designing plastic products with the use of Pro/ENGINEER and CATIA, as well as CAD/CAM/CAE software, with the emphasis on application for plastic injection simulation Pro/PLASTIC ADVISER, Moldflow Part and their usage. The paper presents the analysis and comparison of the named applications in the example of one product. 15 refs.

**Key Words:** *CAD, Injection Moulding, Plastic, Pro/ENGINEER*

---

**SIMULATION STUDY ON THE PERFORMANCE ANALYSIS OF VARIOUS SEQUENCING RULES**

Buchmeister, B.; Kremljak, Z.; Pandza, K. & Polajnar, A.

University of Maribor, Faculty of Mechanical Engineering, Maribor, Slovenia  
E-mail: borut.buchmeister@uni-mb.si

**Abstract**

Sequencing rules are probably the most frequently applied heuristics for solving (job shop) scheduling problems in practice. In this paper, we consider the impact of selected sequencing rules on the job shop performance. Special discrete-event simulator has been developed to carry out this computer simulation study. The analysis of simulation tests (for different resource utilisation and different due date allowances) was used to evaluate the performance of investigated sequencing rules against several (conflicting) criteria. Unique is the number of compared rules and the number of performance measures. We performed some benchmark tests of sequencing rules for multiple criteria performance optimisation. The degree to which a sequencing rule fulfils the performance objectives is presented by the system of grading points from 0 to 99. If we presume equal importance of all criteria and use the average grade of all conditions, the best rule was SRPT. 31 refs.

**Key Words:** *Sequencing Rules, Simulation Analysis, Performance Measures, Job Shop*

---

**AN INTER-CELL FLOW REDUCTION HEURISTIC USING PRODUCTION VOLUME OF PARTS**

Pattanaik, L. N.; Jain, P. K. & Mehta, N. K.

Department of Mechanical and Industrial Engineering, Indian Institute of Technology, Roorkee, Roorkee (Uttaranchal), India  
E-mail: lnp13dme@iitr.ernet.in

**Abstract**

Design of machine cells is an essential and decisive step in cellular manufacturing. Most cell design algorithms assume unit quantity for the parts during cell formation, which give wrong value of total inter-cellular movements, as the actual demands for parts are unequal. Further, most of the existing algorithms use binary incidence matrix as the input for cell design. However, with 'backtracking' in the operation sequence of the parts, the exact inter-cellular movements cannot be found by using binary matrix. A few cell formation algorithms address the issue of 'backtracking', though not comprehensively. Also, little work has been reported regarding the effect of production volume of parts on cell design.

To address these issues, a new heuristic is proposed in which the operation sequence of the parts and their quantities are considered for cell design. The computational results of the proposed heuristic are compared with existing algorithms available in the literature. 38 refs.

**Key Words:** *Inter-cellular Movements, Backtracking, Component-Machine Incidence Matrix, Machine Load Matrix*