

Job sequencing and layout optimization in virtual production line

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ABSTRACT

Most of the problems involving the design and planning of manufacturing systems are combinatorial and NP-hard. It covers all aspect of creating and operating a manufacturing system before it is implemented. The main activities in creating and operating a manufacturing system are determining the job size, resources needed, equipment layout, routing sequence, and process scheduling. This problem must be solved before it is implemented in real factory. A new trend is using virtual factory approach for testing and validating the proposed design and planning. Designer will have feel at the factory while doing layout planning and design. The contribution of this paper is the integration of two optimization models such as: layout and sequence (job) optimization to those factories who want to produce the various kinds of products with fixed and changeable machine locations as integrated approach for designing a virtual production line. Due to the combinatorial nature of the solution spaces, genetic algorithm is applied for both sequencing and layout. A case study is also reported to demonstrate the feasibility of the proposed approach.

KEYWORDS:

Genetic Algorithm; Multi-Part Multi-Machine Sequencing; Virtual Factory Layout

ACKNOWLEDGEMENTS

The authors wish to thank the University of Malaya for providing the research grants through TECHNOFUND- TF004/2007A project.

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