

An integrated optimization model for product design and production allocation in a make to order manufacturing system

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Abstrak

A mechanical assembly consists of several components to perform an intended function. At the design stage, the intended function must be converted into critical product dimensions. After determining the dimensions, a designer must determine the assembly tolerance and allocate this tolerance to the tolerances of the corresponding components. After determining the optimal tolerances, process selection must be conducted along with production allocation to the selected process. There are three aspects in commercial competition that must be considered by a manufacturing company: cost, quality, and delivery. The aim of this research is to develop an optimization model for process selection for a make to order company to minimize manufacturing cost, quality loss, and lateness cost. The model attempts to determine optimal tolerance and production allocation, which takes into consideration the production capacity and process sequence. Hence, the model attempts to include not only the product design decision, but also to solve the process selection and allocation problems. A numerical example is provided to show the implementation of the model.