Integrating Process Planning, WMS Dispatching, and WPPW Weighted Due Date Assignment Using a Genetic Algorithm

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Abstract : Conventionally, process planning, scheduling, and due-date assignment functions are performed separately and sequentially. The interdependence of these functions requires integration. Although integrated process planning and scheduling, and scheduling with due date assignment problems are popular research topics, only a few works address the integration of these three functions. This work focuses on the integration of process planning, WMS scheduling, and WPPW due date assignment. Another novelty of this work is the use of a weighted due date assignment. In the literature, due dates are generally assigned without considering the importance of customers. However, in this study, more important customers get closer due dates. Typically, only tardiness is punished, but the JIT philosophy punishes both earliness and tardiness. In this study, all weighted earliness, tardiness, and due date related costs are penalized. As no customer desires distant due dates, such distant due dates should be penalized. In this study, various levels of integration of these three functions are tested and genetic search and random search are compared both with each other and with ordinary solutions. Higher integration levels are superior, while search is always useful. Genetic searches outperformed random searches.

Keywords : process planning, weighted scheduling, weighted due-date assignment, genetic algorithm, random search

Conference Title : ICETM 2016 : International Conference on Engineering and Technology Management

Conference Location : Istanbul, Türkiye

Conference Dates : July 21-22, 2016