An Extension of the Multi-machine Multi-level Proportional Lot Sizing and Scheduling Model for Product-Life-Cycle Demand

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Abstract—Often lot sizing and scheduling models have neglected the consideration of influence of product life cycles (PLCs). But, accordingly as desirable in a firm's production strategy, decisions of lot sizing scheduling may have to respond to the stage changes in a product's life cycle. In this paper, we propose an extension of the lot sizing scheduling, the multi-item, multi-level product-structure and multi-machine proportional lot sizing scheduling model by Kimms (1999), by the concept of PLC. The advantages have been realized and include both the setup and holding cost improvements and an improved lot sizing scheduling that better matches the products' demands in the PLCs. In addition, the combined effects of the setup (cost) learning effect and cash flow are examined in the model and the genetic algorithm is adopted as the solution aid tool. A numerical example is provided and demonstrates the advantages of this model and the effects of the factors considered.

Keywords—Proportional lot sizing and scheduling problem; Product life cycle; Cash flow, Learning curve; Genetic algorithms

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