## Solving the economic lot scheduling problem with multiple facilities in parallel using the time-varying lot sizes approach

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## Abstract

The conventional *Economic Lot Scheduling Problem* (ELSP) is concerned with the lot sizing and scheduling of several products so as to minimize the average total costs on a single facility. This study is interested in an extension of the ELSP, namely, the ELSP with multiple identical facilities in parallel (which is also called the multi-facility ELSP). In order to solve this problem efficiently, we propose two solution approaches in a two-phase scheme in this study. In the first phase, we use an existing heuristic and a genetic algorithm to search for better product assignments that determine which product should be produced on which facility. When an assignment is secured, we employ a *Time-Varying Lot Sizes* (TVLS) heuristic to obtain a feasible production sequence (or schedule) for each facility in the second phase. Our numerical experiments show that our approaches outperform an existing heuristic in the literature when the problem size is large and the facility utilization rate is high. On the other hand, we have an interesting observation that was never reported in the literature, namely, the TVLS approach may obtain worse solutions than a well-known upper bound in the literature for some cases.

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