

Disassembly sequence planning in a disassembly cell context.

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Abstract

In this paper a two-phase approach is proposed for determining the optimal disassembly sequence when the disassembly system has a cellular configuration. Operations are first grouped into cells based on the resources they require with the goal of minimizing machine acquisition costs. The aim is to group together those operations that use similar equipment in order to achieve good utilization levels of such equipment. A maximum cell size may be imposed. Once the cells have been formed and the operations have been assigned to them, a metaheuristic algorithm (namely GRASP) is used to search for the disassembly sequence for each product that leads to the minimum number of intercellular movements. To account for uncertainty regarding the condition in which the product may arrive, each disassembly task is assumed to be required with a certain probability, regardless of the other tasks. AND/OR precedence relations among the disassembly tasks are also considered. The proposed approach is illustrated on a randomly generated disassembly problem.

Keywords: Cellular manufacturing, disassembly, reverse logistics, GRASP.
