

CASES: Computer-aided Assembly Sequence Evaluation System

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ABSTRACT

This study deals with a computerized evaluation system for assembly sequences, which evaluates all feasible assembly sequences and finds the most efficient assembly sequence in the Flexible Assembly Systems (FAS) environment. The proposed system, called CASES ('Computer-aided Assembly Sequence Evaluation System), automatically evaluates assembly sequences in two stages: (1) Evaluation based on assembly activity performance (2) Evaluation based on the FAS performance. The first stage of CASES aims to reduce the solution space of all feasible assembly sequences and finds only promising feasible sequences. The evaluation criteria are based on assembly activity performance such as equipment constraints, ease of part handling, ease of part joining, and the number of tool changes throughout an assembly process. With the reduced set of assembly sequences, the second stage finds the most efficient assembly sequence in the FAS environment. For evaluation based on the FAS performance, CASES solves a scheduling problem, MFASSP (Modified FAS Scheduling Problem), to find an assembly sequence which provides the minimal makespan. CASES is illustrated with real assemblies.