An Application of Simulated Annealing in FMS Scheduling

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ABSTRACT

Scheduling in a flexible manufacturing system (FMS) differs fromthat in a conventional job shop because each operation of a job may beperformed by any one of several machines. The routing flexibility is afeature that distinguishes FMS scheduling from a classic general jobshop problem. In the general job shop scheduling problem, theresearchers only concerns about the job sequence on each machine; However, routing and sequencing need to be decided simultaneously inthe FMS environment. First, a heuristic algorithm is proposed to get the initialsolution for the FMS scheduling problem with the due date constraint.Then, A near optimal improving method known as simulated annealing(SA) is employed to improve the solution found in the first phase. Through statistical analysis, it has been shown that the proposedalgorithm produces a significantly shorter mean job tardiness thanthat of some commonly used dispatching rules which have beenrecognized for their better performance relative to the addressedobjective. The computational effort required also is small enough forpractical implementation.

Keywords : Scheduling ; Flexible Manufacturing System ; Job Shop ; Routing Flexibility ; Mean Tardiness ; Simulated Annealing

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