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Multi-agent job shop scheduling system based on co-operative approach of idle time minimisation

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Abstract

In this paper, a distributed multi-agent scheduling system (MASS) based on co-operative approach is proposed to solve static and dynamic job shop scheduling problems (JSSP). The proposed system is composed of two kinds of agents, Supervisor agents and Resource agents. The Supervisor agent decomposes JSSP into interrelated sub-problems and the Resource agents co-operate, through a distributed approach of local idle time minimisation, to solve this problem which is known as one of the most difficult NP-hard problems. Computational results are presented to show the efficiency of MASS in static job shop scheduling. Then, a comparison of the computational results between MASS and some common dispatching rules, on dynamic job arrivals, is studied in terms of effectiveness and stability. Finally, the developed system is validated within an illustrative example, to demonstrate the feasibility of MASS.

Keywords:

job shop scheduling | distributed multi-agent system | combinatorial optimisation

Related Research Data

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