

**Li, Weidong; Gao, L.; Li, Xinyu****Application of intelligent strategies for cooperative manufacturing planning.** (English)

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Summary: Manufacturing planning is crucial for the quality and efficiency of product development. Process planning and scheduling are the most important and challenging tasks in manufacturing planning. These two processes are usually arranged in a sequential way. Recently, a significant trend is to make the processes to work more concurrently and cooperatively to achieve a globally optimal result. In this paper, several intelligent strategies have been developed to build up cooperative process planning and scheduling (CPPS). Three game theory-based strategies, i.e., Pareto strategy, Nash strategy and Stackelberg strategy, have been introduced to analyze the cooperative integration of the two processes in a systematic way. To address the multiple constraints in CPPS, a fuzzy logic-based analytical hierarchical process (AHP) technique has been applied. Modern heuristic algorithms, including particle swarm optimization (PSO), simulated annealing (SA) and genetic algorithms (GAs), have been developed and applied to CPPS to identify optimal or near-optimal solutions from the vast search space efficiently. Experiments have been conducted and results show the objectives of the research have been achieved.

**MSC:**

- 90B35 Deterministic scheduling theory in operations research
- 90B50 Management decision making, including multiple objectives
- 90C59 Approximation methods and heuristics in mathematical programming
- 91A80 Applications of game theory

**Keywords:**

game theory; genetic algorithms; particle swarm optimization; simulated annealing; analytical hierarchical process; collaborative system

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