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Advances in Hybrid Evolutionary Optimization with Learning for Manufacturing Scheduling

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***Abstract*—**Many combinatorial optimization problems (COPs) in the real-world manufacturing systems impose on more complex issues, such as complex structure, nonlinear constraints, and multiple objectives to be handled simultaneously and make the problem intractable to the traditional approaches because of NP-hard combinatorial problems. In order to develop an efficient solution algorithm that is in a sense "best solution" that is, whose reasonable computational time for NP-hard COPs met in practice, we have to consider the following very important issues:
- Quality of solution,
- Computational time and
- Effectiveness of the nondominated solutions for multiobjective optimization problem (MOP).

Evolutionary Algorithms (EAs) has attracted significantly attention with respect to complexity scheduling problems, which is referred to evolutionary scheduling. However, EAs differ in the implementation details and the nature of the particular scheduling problem applied. In order to have an effective implementation of EAs for a scheduling, this talk focuses on making a survey of researches based on using hybrid EAs. Starting from scheduling description, we identify the classification and graph representation of scheduling problems. Then we present the various representations, hybridization techniques, and machine learning (ML) techniques to enhancing EAs. Finally, we also present successful applications in manufacturing scheduling based on ML concept.