

# Automatic Design of Dispatching Rules for Job Shop Scheduling Problems

Marta Leonina Tessitore, Marcella Samà, Dario Pacciarelli

Roma Tre University, Via della Vasca Navale 79, 00146 Rome, Italy  
{marta.tessitore}@uniroma3.it {sama, pacciarelli}@ing.uniroma3.it

**Abstract.** A wide range of heuristics and meta-heuristics have been developed over the last decades to successfully tackle hard combinatorial optimization problems, such as timetabling, production scheduling, and vehicle routing problems. However, designing efficient heuristics that provide good quality solutions in reasonable time on large scale optimization problems is typically problem-specific and requires an in-depth problem knowledge. In the last years, the automatic design of dispatching rules has received increasing attention, emerging as a way to compete with state-of-the-art problem-specific approaches, offering more generalized techniques able to deliver good quality solutions for a variety of scheduling problems, by directly searching in the heuristics' space. As a result, a growing number of articles focusing on hyper-heuristic methods have been applied to Job Shop Scheduling (JSS) problems. The current state-of-the-art on hyper-heuristic works related to JSS problems comprises methods that are broadly concerned with intelligently selecting or generating a suitable heuristic for given problems. This work provides a comprehensive overview of existing selection and generation hyper-heuristic approaches for JSS problems, and presents critical discussion, current research trends and directions for future application of hyper-heuristics models to real-life problems or specific case-studies.

**Keywords:** Production Scheduling; Job Shop Scheduling; Hyper-heuristic.

## References

- [1] Burke, E., Kendall, G., Newall, J., Hart, E., Ross, P., Schulenburg, S. (2003). Hyperheuristics: an emerging direction in modern search technology. In: Glover, F., Kochenberger, G.A. (eds.) *Handbook of Metaheuristics*, pp. 457–474. Kluwer Academic Publishers, Dordrecht
- [2] Fisher, H. and Thompson, G. L. (1961). Probabilistic Learning Combinations of Local Job-Shop Scheduling Rules. In *Factory Scheduling Conference*, Carnegie Institute of Technology, May 10-12.