Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : MANIER | Given names : Marie-Ange

Status (prof., assistant prof., …) : Full Professor

Laboratory : Institut FEMTO-ST, CNRS | Website address : https://www.femto-st.fr

Institution : UTBM (Université de Technologie de Belfort-Montbéliard) | Website address : http://www.utbm.fr

Scientific competence of the supervisor:

Combinatorial optimization, Operations Research, workshop scheduling with transport, Vehicle routing problems, Supply chain management

Two major publications in the field proposed for the PhD :

1. Tsogbetse I., Bernard J., Manier H., and Manier M.-A., Impact of Encoding and Neighborhood on Landscape Analysis for the Job Shop Scheduling Problem. IFAC-PapersOnline, Conference IFAC MIM'22, 55 (10), 2022.
2. Zhang, Q., Manier, H., and, Manier, M.-A., A Genetic Algorithm with Tabu search procedure for flexible job shop scheduling with transportation constraints and bounded processing times, COR journal, 39 (7), 2012.

Website address of the personal page :

Supervisor's email : marie-ange.manier@utbm.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** I-12

Title : Design of metaheuristics for constrained workshop scheduling

Subject :

In previous work, we have shown the impact of the choice of the encoding-neighborhood operator association on the performance of metaheuristics. We have opened up a number of interesting prospects for overcoming scientific locks in the design of metaheuristics and in the field of scheduling optimization. This thesis aims to address some of these issues: The first locks concerns the characterization of the solution space of the problem under study. For this goal it is necessary to define relevant and effective metrics for the analysis of fitness landscapes. The aim of this analysis is to help us exploit the properties of encodings and neighborhood operators to design metaheuristics dedicated to solving constrained instances in scheduling, an important class of problems in the field of combinatorial optimization. A third important step is to test these results by implementing the best configurations identified in different classes of metaheuristics, and analyzing and comparing their performance. Another issue is the effectiveness of tests to validate scientific proposals for the design of metaheuristics, based on the number and diversity of instances. One of the key points of the relevance of our research results will be the generation of new instances representative of the problems to be solved (ranging from the "classic" job shop to complex job shop variants with transport and time lag constraints).

Keywords :

Metaheuristics, Jobshop scheduling problems, operational research, combinatorial optimization

Expected collaborations :

Background required from the applicant :

A solid foundation in combinatorial optimization, and programming skills are needed. In addition, a background in scheduling problems and operations research methods would be appreciated.

Existence of a PDF file detailing the proposal ("yes" or "no") : yes

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