IEEE Transactions on Evolutionary Computation

Special Issue on Evolutionary Computation in Scheduling

I. Aim and Scope

Scheduling problems represent an important research challenge in both theory and practice, having relevance across a wide range of disciplines including operations research, artificial intelligence, computer science, engineering, manufacturing and management, etc. Scheduling problems range from the classical production scheduling to various complex problems with different characteristics, including timetabling (educational timetabling, railway scheduling, sports scheduling and project scheduling, etc), personnel scheduling (crew scheduling, nurse rostering and driver scheduling, etc), routing (multicast routing and variants of vehicle routing problems) and bin packing (2D or strip packing, etc), space allocation, and so on. Variants of each of these problems, although classified under the same problem, often have widely differing constraints and problem features, thus requiring the design of efficient and adaptive algorithms, which often are suited to an evolutionary methodology.

A significant number of research publications addressing scheduling problems have appeared in the last few decades. Among these, evolutionary algorithms have been shown that they can be successfully utilized to provide high quality solutions for complex scheduling problems with large search spaces. Research developments in both theory and practice have significantly extended the scope of scheduling problems which are able to be solved in both continuous and discrete domains.

II. Topics

This special issue aims to bring together the latest research advances in investigating and understanding algorithms in evolutionary computation for solving a wide range of scheduling problems. We invite papers representing high quality research which reflects the recent advances of evolutionary computation in scheduling and demonstrates state-of-the-art theory and practice in this area.

Despite many successes, significant research challenges remain in order to design efficient and effective evolutionary scheduling algorithms, supported by deeper theoretical understanding. For example, the theoretical analysis of the representation in evolutionary algorithms is worthwhile investigating. It would also be interesting to explore the hybridisation of meta-heuristics, exact/approximation algorithms and computational intelligence with evolutionary algorithms. Utilising methodologies from different disciplines is also worthy of research in order to investigate effective evolutionary algorithms in scheduling.

Please note that work on simple applications of evolutionary algorithms, without fundamental investigations on the theory of evolutionary computation in scheduling, will not be considered for this special issue. We will also not accept papers that use computational intelligence methods lacking any evolutionary computation component.

Authors are encouraged to submit their original work on the following (but not limited to) topics:

- Evolutionary computation in:
  - Production scheduling
  - Personnel scheduling
  - Sports scheduling
  - Educational timetabling
  - Project scheduling
  - Transportation scheduling
  - Dynamic scheduling and rescheduling
  - Other scheduling problems
- Theoretical or empirical analysis of evolutionary algorithms in scheduling
- Representation issues in evolutionary scheduling
- Complexity issues of evolutionary algorithms in scheduling
- Comparison and integration of other techniques with evolutionary approaches in scheduling. Integrations with cross-discipline techniques including exact methods, meta-heuristics, computational intelligence and decision support methodologies, etc, are strongly encouraged.
- Multi-objective evolutionary algorithms in scheduling
- Adaptive evolutionary algorithms in scheduling
- Cooperative search of evolutionary algorithms in scheduling
- Parallel distributed processing / frameworks in scheduling

III. Important Dates

15 June 2011:	Submission deadline
1 October 2011:	Notice of the first round review
15 December 2011:	Revision due
29 February 2012:	Final notice of acceptance / reject
15 April 2012:	Final manuscript due

IV. Submission

Manuscripts should be prepared according to the instructions of the "Information for Authors" section of the journal, available at http://ieee-cis.org/pubs/tec/authors/. Submissions should be done through the IEEE TEC journal website: http://mc.manuscriptcentral.com/tevc-ieee and clearly indicate "Special Issue on Evolutionary Computation in Scheduling" in the comments to the Editor-in-Chief.

Submitted papers will be reviewed by at least three reviewers. The submission of a manuscript implies that it is the authors' original unpublished work and is not being submitted for possible publication elsewhere.

V. Guest editors

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