

WORKSHOP ON EMPIRICAL METHODS FOR THE ANALYSIS OF ALGORITHMS

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*In conjunction with the International Conference on Parallel Problem
Solving From Nature (PPSN IX)*

Organizing Committee

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Web Page: <http://www.imada.sdu.dk/~marco/EMAA06/>

Preface

In the last few decades, the Analysis of Algorithms has developed into a mature research field with several theoretical results in many application domains. However, not all algorithms can be analyzed fully theoretically, and, especially for those which are highly stochastic in nature, the analysis should follow the same principles of other empirical sciences. Unfortunately, the use of empirical methods is not yet widespread in this field, and the choice of appropriate methods for different analysis scenarios, such as comparison, prediction and generalization of algorithm performance, is currently not fully understood.

The idea of organizing the EMAA Workshop arose as a way of promoting the discussion of empirical methods for the analysis of algorithms, with special focus on stochastic search algorithms, such as evolutionary algorithms, tabu search, ant colony optimization and many others. This is also why it was proposed as a Parallel Problem Solving from Nature Workshop. A carefully chosen international programme committee was invited to support the Workshop, including computer scientists with significant experience on empirical analysis of algorithms and statisticians from areas considered relevant to the main topic of the Workshop, such as design of experiments and multivariate statistics.

The Workshop had four invited talks given by researchers whose contribution to empirical research in algorithms has been undoubtedly relevant. McGeoch presented several alternatives to assess algorithm performance from an empirical perspective beside solution quality and run-time. Ruiz reviewed several statistical techniques that can be used for the comparison of algorithms. Preuss and Bartz-Beielstein introduced the audience to the automatic fine-tuning of metaheuristics. Finally, Fonseca and da Fonseca discussed several relevant issues in the empirical research of algorithms for multiobjective problems.

The contributions submitted to EMAA were reviewed by both computer scientists and statisticians and six works were finally accepted. Bartz-Beielstein and Preuss, Ridge and Kudenko, and Volker and Eiben present and discuss techniques for fine-tuning the parameters of metaheuristics. Long and Fox, and Narizzano *et al.* describe the way empirical comparisons of algorithm performances is carried out in international benchmark competitions. Finally, Alba and Luque discuss metrics of performance for metaheuristics under a parallel computational environment.

We are grateful to the authors for their outstanding contributions and to the reviewers for their timely, fair and helpful reports. We have no doubts, indeed, that an important part of the scientific merit of EMAA is due to the review team: Thomas Bartz-Beielstein, Mauro Birattari, Livio Finos, Carlos M. Fonseca, Viviane Grunert da Fonseca, Max Manfrin, Catherine C. McGeoch, Fortunato Pesarin, Rubén Ruiz, Luigi Salmaso, and Thomas Stützle. In particular, we would like to thank the speakers that accepted our invitation: Carlos M. Fonseca, Catherine C. McGeoch, Mike Preuss and Rubén Ruiz. We hope that these proceedings that collect the works presented at the Workshop will be a useful reading and a source of inspiration for future research.

August 2006

Luis Paquete, Marco Chiarandini, and Dario Basso
Organizing Committee
EMAA Workshop

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Organizing Committee

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Referees

Thomas B.-Beielstein	Carlos M. Fonseca	Fortunato Pesarin
Dario Basso	Viviane G. da Fonseca	Rubén Ruiz
Mauro Birattari	Max Manfrin	Luigi Salmaso
Marco Chiarandini	Catherine C. McGeoch	Thomas Stützle
Livio Finos	Luís Paquete	

Schedule

9:00 - 9:10 L. Paquete

Welcome session.

9:10 - 9:55 C. McGeoch (invited speaker)

What to measure.

9:55 - 10:20 E. Alba and G. Luque

Evaluation of parallel metaheuristics.

10:20 - 11:00 Coffee break

11:00 - 11:45 R. Ruiz (invited speaker)

An overview of basic and advanced statistic techniques for calibrating and comparing algorithms.

11:45 - 12:10 D. Long and M. Fox

The international planning competition series and empirical evaluation of AI planning systems.

12:10 - 12:35 M. Narizzano, L. Pulina and A. Tacchella

Competitive evaluation of automated reasoning tools: Empirical scoring and statistical testing.

12:35 - 14:00 Lunch

14:00 - 14:45 M. Preuss and T. Bartz-Beielstein (invited speakers)

Sequential parameter optimization and the role of tuning in experimental analysis.

14:45 - 15:10 E. Ridge and D. Kudenko

Sequential experiment designs for screening and tuning parameters of stochastic heuristics.

15:10 - 15:35 T. Bartz-Beielstein and M. Preuss

Considerations of budget allocation for sequential parameter optimization.

15:35 - 16:00 Coffee break

16:00 - 16:45 C. Fonseca and V. da Fonseca (invited speakers)

The attainment-function approach to stochastic multiobjective optimiser assessment and comparison.

16:45 - 17:10 V. Nannen and A. Eiben

Generality of results obtained by the parameter calibration and relevance estimation method.

17:10 - 17:30 M. Chiarandini

Summary and discussion.

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