Paper Template for BMOBench

Michael Shell
School of Electrical and
Computer Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332–0250
Email: http://www.michaelshell.org/contact.html

Homer Simpson
Twentieth Century Fox
Springfield, USA
Email: homer@thesimpsons.com

James Kirk
and Montgomery Scott
Starfleet Academy
San Francisco, California 96678–2391
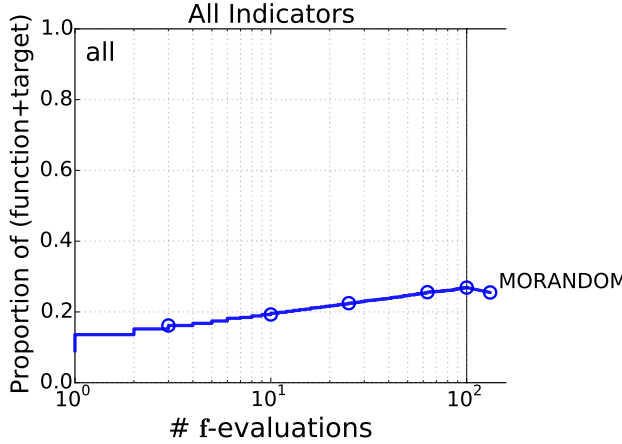Telephone: (800) 555–1212
Fax: (888) 555–1212

Fig. 1. Data profiles aggregated over all the problems across all the quality indicators computed for each of the compared algorithms. The symbol indicates the maximum number of function evaluations.

Abstract—**The abstract goes here.**

I. INTRODUCTION

II. NUMERICAL EXPERIMENTS

A. Setup

The numerical experiments are set up according to [1], where each algorithm is run on 100 multi-objective problems categorized over seven groups: low-dimensional, high-dimensional, uni-modal, multi-modal, and mixed categories.

The procedure for assessing the solution quality of an algorithm is based on recording its *runtime*: the number of function evaluations required by the algorithm for its solution to reach a specific (target) quality value. The recorded runtimes are then expressed in terms of data profiles, which capture various aspects of the algorithms' convergence behavior. For more details, one can refer to [1].

B. Results

C. Empirical Runtime Evaluation

In order to evaluate the complexity of the algorithms (measured in runtime), the algorithms are run on a representative set of the problems. The empirical complexity of an algorithm is then computed as the running time (in seconds) of the algorithm summed over all the problems given divided by the
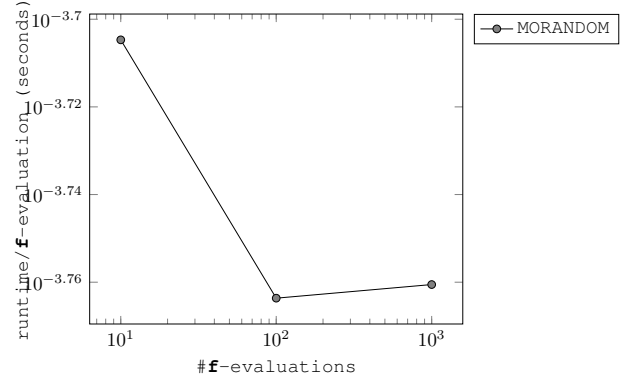

Fig. 3. A $semi$-log plot visualizing the runtime per one function evaluation (in seconds) of the compared algorithms. All the algorithms were run on a selected set of problems over a set of evaluation budgets, namely BK1, DPAM1, L3ZDT1, DTLZ3, and FES3; with an evaluation budget $\in \{10, 100, 1000, 10000\}$ per problem on a PC with: 64-bit Windows 7, Intel Xeon E5 CPU @ 3.20GHz, 16GB of memory.

total number of function evaluations used. The results for four different evaluation budgets are shown in Figure 3.

III. CONCLUSION

The conclusion goes here.

ACKNOWLEDGMENT

The authors would like to thank...

REFERENCES

[1] A. Al-Dujaili and S. Suresh, "BMOBench: Black-box multi-objective optimization benchmarking platform," *ArXiv e-prints*, vol. arXiv:1605.07009, 2016.
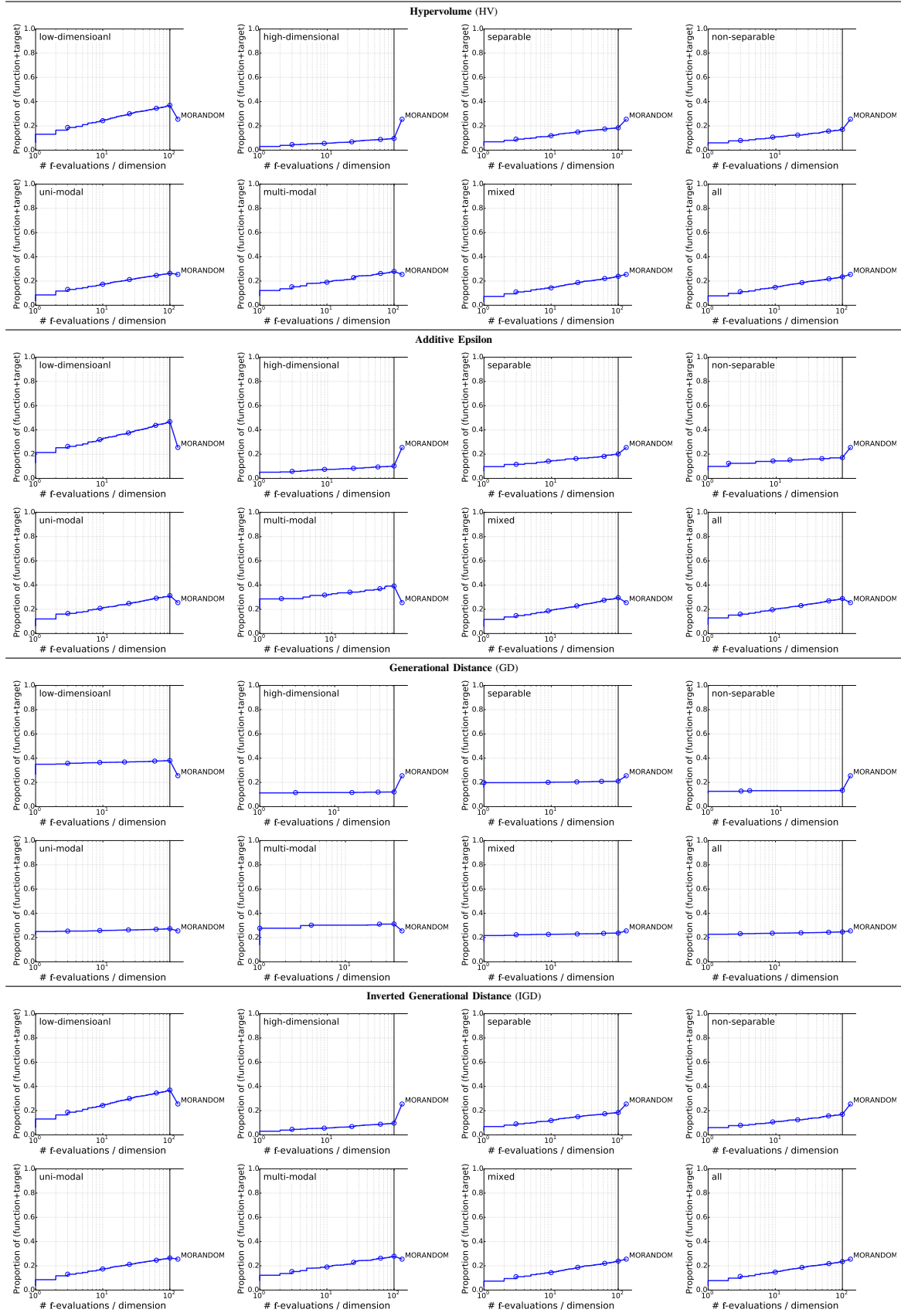
Fig. 2. Data profiles aggregated over problem categories for each of the quality indicators computed. The symbol × indicates the maximum number of function evaluations.