

H

MOEA Software Availability

H.1 Introduction

This appendix describes some of the main public-domain MOEA software that is currently available. This description includes the following information:

Name: Name of the software system

Description: Any relevant information about the system

Environment: Software environment for which the software is intended

Language: Programming language in which the software is written

Availability: Software availability

Original sources of each of the systems analyzed are cited, but readers should be aware of the fact that many of these systems are also mirrored at the EMOO repository located at (see under **Software**):

`http://delta.cs.cinvestav.mx/~ccoello/EMOO/`

with a mirror at:

`http://www.lania.mx/~ccoello/EMOO`

Note that although commercial software for multi-objective optimization also exists (e.g., iSIGHT, which is briefly described in Chapter 5), such systems are not included here, since we limited the contents of this appendix to public-domain software.

Table H.1: MOEA Software

Name	Description	Environment	Availability
Metaheuristic Algorithms in Java (JMetal)	Includes implementations in Java of: NSGA-II [358], SPEA2 [1712], PAES [858], OMOPSO [1546], AbYSS [1137], MOCeII [1136]. It also includes several test functions	Any platform supporting Java	Antonio J. Nebro (antonio@lcc.uma.es), or download at: http://neo.lcc.uma.es/metal/index.html
Multiple-Objective MetaHeuristics Library in C++ (MOMHLib++)	Includes: Pareto Simulated Annealing [305, 306], Serafini's Multiple Objective Simulated Annealing [1416], Ulungu et al.'s Multiple Objective Simulated Annealing [1564], Multiple Objective Genetic Local Search (MOGLS) [753], Ishibuchi & Murata's Multiple Objective Genetic Local Search [728], NSGA [1457], NSGA-II [347], Multiple Objective Multiple Start Local Search [760]; Full source code in C++; Fully documented; Open architecture for new contributions	Linux/Unix; Standard C++ compiler	Andrzej Jaskiewicz (jaskiewicz@cs.put.poznan.pl) or download at: http://www-idss.cs.put.poznan.pl/~jaskiewicz/MOMHLib/
Micro-GA for Multiobjective Optimization	Includes several test functions; Full Source Code	Linux (i386 & SPARC), Solaris or SunOS and G++ (GNU C++ Compiler)	Gregorio Toscano Pulido (gtoscano@gmail.com) or download at: http://delta.cs.cinvestav.mx/~ccoello/EM00/EM00software.html
The Pareto Archived Evolution Strategy (PAES)	Full source code in C, including tools for statistical comparison; Test functions and results	Linux/Unix; GNU C Compiler	Joshua D. Knowles (J.Knowles@manchester.ac.uk) or download at: http://dbkgroup.org/knowles/multi/
ParEGO: an algorithm for multiobjective optimization of expensive functions	Full source code in C, including test functions	Linux/Unix; GNU C Compiler	Joshua D. Knowles (J.Knowles@manchester.ac.uk) or download at: http://dbkgroup.org/knowles/parego/
MOCK: Multiobjective clustering with automatic determination of the number of clusters	Full source code in C++ with a Java interface; includes generators of synthetic data sets	Linux/Unix; GNU C++ Compiler	Julia Handl (Julia.Handl@gmx.de) or download at: http://dbkgroup.org/handl/mock/

Table H.1: continued

Name	Description	Environment	Availability
Test problems generator for the Multiobjective Quadratic Assignment Problem	Data files and C source code	Linux/Unix; GNU C Compiler	Joshua D. Knowles (J.Knowles@manchester.ac.uk) or download at: http://dbkgroup.org/knowles/mQAP/
Multi-Objective Evolutionary Algorithm Toolbox	Graphical interface; Constraint-handling facilities; Allows incorporation of preferences or goals. Described in [1508]	Windows 95 or better and MatLab 5.3 or better	Tan Kay Chen (eletankc@nus.edu.sg) or download at: http://vlab.ee.nus.edu.sg/~kctan/moea.htm
Nondominated sorting genetic algorithm (NSGA)	Full source code in C with three unconstrained test functions; Supports binary, integer, real, and enumerated types for the design variables	Linux/Unix; Standard C compiler	Kalyanmoy Deb (deb@iitk.ac.in) or download at: http://www.iitk.ac.in/kangal/soft.htm
Nondominated sorting genetic algorithm II (NSGA-II)	Full source code in C with constrained test functions; Supports real-encoding (and genetic operators) for the design variables	Linux/Unix; Standard C compiler	Kalyanmoy Deb (deb@iitk.ac.in) or download at: http://www.iitk.ac.in/kangal/soft.htm
ϵ -MOEA (there are revisions available)	Full source code in C with constrained test functions; Supports real-encoding (and genetic operators) for the design variables	Linux/Unix; Standard C compiler	Kalyanmoy Deb (deb@iitk.ac.in) or download at: http://www.iitk.ac.in/kangal/soft.htm
A C++ Library for MOEAs	Full source code in C++ of VEGA [1390], SPEA [1719], NPGA [686], NSGA [1457] and the Pareto Tree Searching Genetic Algorithm (PTSGA) [221]; Code tailored to solve multiobjective knapsack problems	Linux/Unix; Standard C compiler	Xianming Chen (xchen@nankai.edu.cn) or download at: http://delta.cs.cinvestav.mx/~ccoello/EM00/EM00software.html
Multi-Objective, Probabilistic Selection Evolutionary Algorithms (MOPSEA)	MOEA that uses noisy nondominated ranking	MatLab Mex-file; Requires Unix/Linux and MatLab 5.3 or better; Documented in [700]	Evan J. Hughes (e.j.hughes@cranfield.ac.uk) or download at: http://delta.cs.cinvestav.mx/~ccoello/EM00/EM00software.html
Strength Pareto Evolutionary Algorithm (SPEA)	Full source code in C++	Linux/Unix; Standard C++ compiler	Eckart Zitzler (zitzler@tik.ee.ethz.ch) or download at: ftp://ftp.tik.ee.ethz.ch/pub/people/zitzler/spea.cc

Table H.1: continued

Name	Description	Environment	Availability
Kit for Evolutionary Algorithms (KEA)	A software package for development, analysis and application of multiobjective evolutionary algorithms	Java	Download at: http://ls11-www.cs.uni-dortmund.de/people/schmitt/Daten/Kea/kea.jsp
Platform and Programming Language Independent Interface for Search Algorithms (PISA)	Public-domain implementations of NSGA-II [358], SPEA2 [1713] and the Indicator Based Evolutionary Algorithm [1711]; Test problems and performance measures	Linux and Windows; Standard C compiler	Download at: http://www.tik.ee.ethz.ch/pisa/
Graphical User Interface for Multi-objective Optimization (Guimoo)	Tools for the analysis of results produced by a multi-objective evolutionary algorithm	Platform independent; Binary executables available for Windows	Download at: http://guimoo.gforge.inria.fr/
PARAllel and DIStributed Evolving Objects (ParadisEO)	Tools for the design of both serial and parallel (or distributed) multi-objective evolutionary algorithms	Linux/Unix; GNU C++ compiler	Download at: http://www2.lifl.fr/~cahon/paradisEO/index.html