MERLIN-3.1.1 A new version of the Merlin optimization environment

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Abstract

We present a new version of the Merlin optimization package that contains an interface routine enabling the use of Merlin as a non-interactive local optimizer, and a capability to search for the global minimum when the objective function is multimodal. The present package also contains the Merlin Control Language compiler, which previously was distributed as a separate program. Additional features are a new automatic installation procedure and a convenient running script.

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NEW VERSION SUMMARY

Title of program: MERLIN-3.1.1

Catalogue identifier:

Program obtainable from: CPC Program Library, Queen's University of Belfast, N. lreland. Also obtainable from Merlin's home page at the University of Ioannina: http://merlin.cs.uoi.gr

Catalogue identifier of previous version: ADHQ [1] , ADHR [2]

Authors of the original program: D. G. Papageorgiou, I. N. Demetropoulos and I. E. Lagaris

Does the new version supersede the original program: Yes

Computer for which the new version is designed and others on which it has been tested:
Designed to be portable to any machine. Tested on SGI running IRIX, SUN running Solaris, INTEL and AMD based Linux machines, employing several compilers, CYGWIN environment under Microsoft Windows.

Installation: University of Ioannina, Greece.

Programming language used: ANSI Fortran–77

Memory required to execute with typical data:
Approximately $O(n^2)$ words, where n is the number of variables.

No. of bits in a word: 64

No. of processors used: 1

Has the code been vectorized or parallelized?: No

No. of bytes in distributed program, including test data, etc.: 721381 bytes.

Distribution format: gzipped tar file.

Keywords: Global and Local Optimization, Modeling, Curve-Fitting, Neural Network Training.

Reasons for the new version
Responding to user feedback we enhanced the Merlin package so as to simplify the installation and execution procedures and provide new facilities.

Summary of revisions
The new features are the following.

(1) We have automated the installation procedure for Unix systems by using the "make" facility. On non-Unix systems one may proceed with the instructions included in the previous version (Merlin 3.0). The new installation procedure has also been tested successfully in the "CYGWIN" [3] environment under Microsoft Windows. Installation instructions can be found in the new distribution.
(2) We have added the "run-merlin" Unix script that simplifies the compilation-linking-execution sequence. For instance it arranges automatically for the addition of the necessary "dummy" routines to satisfy the linker. It also simplifies the insertion of the user-plugins.
(3) We have added an interface routine (SUBROUTINE OPTIMA) that permits a user to call from his own program the whole Merlin environment as a common library minimization routine. We also added two new commands, command PRICE that implements a global optimization algorithm and command CHKMIN that checks if a point is a true minimum or not.
(4) Various bug-fixes and improvements
(5) The Merlin's control language compiler is also updated and included.

Restrictions on the complexity of the problem
The only restriction is set by the available memory of the hardware configuration.

Typical running time
Depending on the objective function.

References
[1] D. G. Papageorgiou, I. N. Demetropoulos, I. E. Lagaris, *Merlin–3.0. A multidimensional optimization environment*, Comput. Phys. Commun. **109** (1998) 227-249
[2] D. G. Papageorgiou, I. N. Demetropoulos, I. E. Lagaris, *The Merlin Control Language for strategic optimization*, Comput. Phys. Commun. **109** (1998) 250-275
[3] http://www.cygwin.com/