1   SUMMARY

This module does not directly provide an algorithm, but rather the definitions of *symbols* that are used througout GALAHAD. A symbol is a publicly available predefined string which can be used as an integer value. The purpose of symbols to is allow meaningful names to be given to these integers, thus allowing a more natural expression of algorithmic or storage options, otherwise represented by integer values that may not be illuminating or mnemonic.

In order to avoid conflicts with other user variable names , all symbols are of the form `GALAHAD_NAME`, where we refer to `NAME` as the name of this symbol.

ATTRIBUTES — Versions: `GALAHAD_SYMBOLS`. **Date:** March 2002. **Origin:** N. I. M. Gould, Rutherford Appleton Laboratory, and Ph. L. Toint, The University of Namur, Belgium. **Language:** Fortran 95 + TR 15581 or Fortran 2003.

2   HOW TO USE THE PACKAGE

Access to the package requires a `USE` statement such as

        USE GALAHAD_SYMBOLS

Note that the symbol's name may be redefined in the use statement, as in

        USE GALAHAD_SYMBOLS, DENSE => GALAHAD_DENSE

allowing the use of the shorter `DENSE` symbol within the code that uses the module. It is then good policy to make the `DENSE` symbol private to the code.

2.1   The GALAHAD symbols

The symbols provided by the `SYMBOLS` module are listed in Tables 2.1 and 2.2 with their associated integer value and by broad categories.

3   GENERAL INFORMATION

Use of common: None.

Workspace: None.

Other routines called directly: None.

Portability: ISO Fortran 95 + TR 15581 or Fortran 2003. The package is thread-safe.

Symbol	Value
GALAHAD_DIAGONAL	-3
GALAHAD_DENSE	-2
GALAHAD_SPARSE_by_ROWS	-1
GALAHAD_COORDINATE	0
GALAHAD_INACTIVE	-2
GALAHAD_STRUCTURAL	-1
GALAHAD_ELIMINATED	0
GALAHAD_ACTIVE	1
GALAHAD_RANGE	2
GALAHAD_UPPER	3
GALAHAD_LOWER	4
GALAHAD_FREE	5
GALAHAD_POSITIVE	1
GALAHAD_NEGATIVE	-1
GALAHAD_ALL_ZEROS	0
GALAHAD_ALL_ONES	1
GALAHAD_SILENT	0
GALAHAD_TRACE	1
GALAHAD_ACTION	2
GALAHAD_DETAILS	3
GALAHAD_DEBUG	4
GALAHAD_CRAZY	5
GALAHAD_NONE	0
GALAHAD_BASIC	1
GALAHAD_SEVERE	2
GALAHAD_UNDEFINED	-100
GALAHAD_NONE	0
GALAHAD_USER_DEFINED	2
GALAHAD_AUTOMATIC	10
GALAHAD_NEVER	3
GALAHAD_INITIAL	4
GALAHAD_ALWAYS	5
GALAHAD_UNCONSTRAINED	0
GALAHAD_CONSTRAINED	1
GALAHAD_SUCCESS	0
GALAHAD_MEMORY_FULL	-1
GALAHAD_FILE_NOT_OPENED	-2
GALAHAD_COULD_NOT_WRITE	-3
GALAHAD_TOO_FEW_BITS_PER_BYTE	-4
GALAHAD_FURTHER_PROGRESS_IMPOSSIBLE	-5
GALAHAD_MAX_ITERATIONS_REACHED	-6
GALAHAD_NOT_INITIALIZE	-7
GALAHAD_WRONG_N	-8
GALAHAD_WRONG_M	-9
GALAHAD_SORT_TOO_LONG	-10
GALAHAD_NOT_DIAGONAL	-11
GALAHAD_REDUCE_SIZE	1
GALAHAD_FULL_PRESOLVE	2

Symbol	Value
GALAHAD_TIGHTEST	0
GALAHAD_NON_DEGENERATE	1
GALAHAD_LOOSEST	2
GALAHAD_GAUSS_NEWTON	0
GALAHAD_NEWTON	1
GALAHAD_ADAPTIVE	0
GALAHAD_FULL	1
GALAHAD_CURRENT	0
GALAHAD_SMALLEST	1
GALAHAD_BEST_FIT	0
GALAHAD_BEST_REDUCTION	1
GALAHAD_FORCE_TO_ZERO	0
GALAHAD_LEAVE_AS_IS	1
GALAHAD_KEEP	0
GALAHAD_DELETE	1
GALAHAD_1	1
GALAHAD_2	2
GALAHAD_3	3
GALAHAD_4	4
GALAHAD_5	5
GALAHAD_6	6
GALAHAD_7	7
GALAHAD_8	8
GALAHAD_9	9
GALAHAD_10	10
GALAHAD_11	11
GALAHAD_12	12
GALAHAD_EXACT	0
GALAHAD_FORWARD	1
GALAHAD_CENTRAL	2
GALAHAD_BFGS	1
GALAHAD_DFP	2
GALAHAD_PSB	3
GALAHAD_SR1	4
GALAHAD_CG	1
GALAHAD_DIAGONAL_CG	2
GALAHAD_USERS_CG	3
GALAHAD_EXPANDING_BAND_CG	4
GALAHAD_MUNKSGAARD_CG	5
GALAHAD_SCHNABEL_ESKOW_CG	6
GALAHAD_GMPS_CG	7
GALAHAD_BAND_CG	8
GALAHAD_LIN_MORE_CG	9
GALAHAD_MULTIFRONTAL	11
GALAHAD_MODIFIED_MULTIFRONTAL	12

Figure 2.1: GALAHAD symbols.

Symbol	Value	Symbol	Value
GALAHAD_ok	0	GALAHAD_error_allocate	- 1
GALAHAD_error_deallocate	- 2	GALAHAD_error_restrictions	- 3
GALAHAD_error_bad_bounds	- 4	GALAHAD_error_primal_infeasible	- 5
GALAHAD_error_dual_infeasible	- 6	GALAHAD_error_unbounded	- 7
GALAHAD_error_no_center	- 8	GALAHAD_error_analysis	- 9
GALAHAD_error_factorization	- 10	GALAHAD_error_solve	- 11
GALAHAD_error_uls_analysis	- 12	GALAHAD_error_uls_factorization	- 13
GALAHAD_error_uls_solve	- 14	GALAHAD_error_preconditioner	- 15
GALAHAD_error_ill_conditioned	- 16	GALAHAD_error_tiny_step	- 17
GALAHAD_error_max_iterations	- 18	GALAHAD_error_cpu_limit	- 19
GALAHAD_error_inertia	- 20	GALAHAD_error_file	- 21
GALAHAD_error_io	- 22	GALAHAD_error_upper_entry	- 23
GALAHAD_error_sort	- 24	GALAHAD_error_input_status	- 25
GALAHAD_error_unknown_solver	- 26	GALAHAD_not_yet_implemented	- 27
GALAHAD_error_qp_solve	- 28	GALAHAD_unavailable_option	- 29
GALAHAD_warning_on_boundary	- 30	GALAHAD_error_call_order	- 31
GALAHAD_error_integer_ws	- 32	GALAHAD_error_real_ws	- 33
GALAHAD_error_pardiso	- 34	GALAHAD_error_wsmp	- 35
GALAHAD_error_mc64	- 36	GALAHAD_error_mc77	- 37
GALAHAD_error_lapack	- 38	GALAHAD_error_permutation	- 39
GALAHAD_error_alter_diagonal	- 40	GALAHAD_error_access_pivots	- 41
GALAHAD_error_access_pert	- 42	GALAHAD_error_direct_access	- 43
GALAHAD_error_f_min	- 44	GALAHAD_error_unknown_precond	- 45
GALAHAD_error_schur_complement	- 46	GALAHAD_error_technical	- 50
GALAHAD_error_reformat	- 52	GALAHAD_error_ah_unordered	- 53
GALAHAD_error_y_unallocated	- 54	GALAHAD_error_z_unallocated	- 55
GALAHAD_error_scale	- 61	GALAHAD_error_presolve	- 62
GALAHAD_error_qpa	- 63	GALAHAD_error_qpb	- 64
GALAHAD_error_qpc	- 65	GALAHAD_error_cqp	- 66
GALAHAD_error_dqp	- 67	GALAHAD_error_mc61	- 69
GALAHAD_error_mc68	- 70	GALAHAD_error_metis	- 71
GALAHAD_error_spral	- 72	GALAHAD_warning_repeated_entry	- 73

Figure 2.2: GALAHAD symbols: error codes.