NAG Library Chapter Contents

E04 – Minimizing or Maximizing a Function

E04 Chapter Introduction – a description of the Chapter and an overview of the algorithms available

Routine Name	Mark of Introduction	Purpose
e04aba	20	nagf_opt_one_var_func Minimum, function of one variable, using function values only
e04abf	6	nagf_opt_one_var_func_old Minimum, function of one variable, using function values only
e04bba	20	nagf_opt_one_var_deriv Minimum, function of one variable, using first derivative
e04bbf	6	nagf_opt_one_var_deriv_old Minimum, function of one variable, using first derivative
e04cbf	22	nagf_opt_uncon_simplex Unconstrained minimum, Nelder–Mead simplex algorithm, using function values only
e04dga	20	nagf_opt_uncon_conjgrd_comp Unconstrained minimum, preconditioned conjugate gradient algorithm, using first derivatives (comprehensive)
e04dgf	12	nagf_opt_uncon_conjgrd_comp_old Unconstrained minimum, preconditioned conjugate gradient algorithm, using first derivatives (comprehensive)
e04dja	20	nagf_opt_uncon_conjgrd_option_file Supply optional parameter values for e04dgf/e04dga from external file
e04djf	12	nagf_opt_uncon_conjgrd_option_file_old Supply optional parameter values for e04dgf/e04dga from external file
e04dka	20	nagf_opt_uncon_conjgrd_option_string Supply optional parameter values to e04dgf/e04dga from a character string
e04dkf	12	nagf_opt_uncon_conjgrd_option_string_old Supply optional parameter values to e04dgf/e04dga from a character string
e04fcf	7	nagf_opt_lsq_uncon_mod_func_comp Unconstrained minimum of a sum of squares, combined Gauss–Newton and modified Newton algorithm, using function values only (comprehensive)
e04fff	26.1	nagf_opt_handle_solve_dfls Derivative free (DFO) solver for a nonlinear least squares objective function with bounded variables
e04fyf	18	nagf_opt_lsq_uncon_mod_func_easy Unconstrained minimum of a sum of squares, combined Gauss–Newton and modified Newton algorithm, using function values only (easy-to-use)
e04gbf	7	nagf_opt_lsq_uncon_quasi_deriv_comp Unconstrained minimum of a sum of squares, combined Gauss–Newton and quasi-Newton algorithm, using first derivatives (comprehensive)
e04gdf	7	nagf_opt_lsq_uncon_mod_deriv_comp Unconstrained minimum of a sum of squares, combined Gauss–Newton and modified Newton algorithm, using first derivatives (comprehensive)
e04gyf	18	nagf_opt_lsq_uncon_quasi_deriv_easy Unconstrained minimum of a sum of squares, combined Gauss–Newton and quasi-Newton algorithm, using first derivatives (easy-to-use)
e04gzf	18	nagf_opt_lsq_uncon_mod_deriv_easy Unconstrained minimum of a sum of squares, combined Gauss–Newton and modified Newton algorithm, using first derivatives (easy-to-use)
e04hcf	6	nagf_opt_check_deriv Check user's routine for calculating first derivatives of function

e04hdf	6	nagf_opt_check_deriv2 Check user's routine for calculating second derivatives of function
e04hef	7	nagf_opt_lsq_uncon_mod_deriv2_comp Unconstrained minimum of a sum of squares, combined Gauss–Newton and modified Newton algorithm, using second derivatives (comprehensive)
e04hyf	18	nagf_opt_lsq_uncon_mod_deriv2_easy Unconstrained minimum of a sum of squares, combined Gauss–Newton and modified Newton algorithm, using second derivatives (easy-to-use)
e04jcf	23	nagf_opt_bounds_bobyqa_func Bound constrained minimum, model-based algorithm, using function values only
e04jyf	18	nagf_opt_bounds_quasi_func_easy Bound constrained minimum, quasi-Newton algorithm, using function values only (easy-to-use)
e04kdf	6	nagf_opt_bounds_mod_deriv_comp Bound constrained minimum, modified Newton algorithm, using first derivatives (comprehensive)
e04kyf	18	nagf_opt_bounds_quasi_deriv_easy Bound constrained minimum, quasi-Newton algorithm, using first derivatives (easy-to-use)
e04kzf	18	nagf_opt_bounds_mod_deriv_easy Bound constrained minimum, modified Newton algorithm, using first derivatives (easy-to-use)
e04lbf	6	nagf_opt_bounds_mod_deriv2_comp Bound constrained minimum, modified Newton algorithm, using first and second derivatives (comprehensive)
e04lyf	18	nagf_opt_bounds_mod_deriv2_easy Bound constrained minimum, modified Newton algorithm, using first and second derivatives (easy-to-use)
e04mfa	20	nagf_opt_lp_solve Linear programming (LP), dense, active-set method
e04mff	16	nagf_opt_lp_solve_old Linear programming (LP), dense, active-set method
e04mga	20	nagf_opt_lp_option_file Supply optional parameter values for e04mff/e04mfa from external file
e04mgf	16	nagf_opt_lp_option_file_old Supply optional parameter values for e04mff/e04mfa from external file
e04mha	20	nagf_opt_lp_option_string Supply optional parameter values to e04mff/e04mfa from a character string
e04mhf	16	nagf_opt_lp_option_string_old Supply optional parameter values to e04mff/e04mfa from a character string
e04mtf	26.1	nagf_opt_handle_solve_lp_ipm Linear programming (LP), sparse, interior point method (IPM)
e04mwf	26.0	nagf_opt_miqp_mps_write Write MPS data file defining LP, QP, MILP or MIQP problem
e04mxf	24	nagf_opt_miqp_mps_read Read MPS data file defining LP, QP, MILP or MIQP problem
e04mzf	18	nagf_opt_qpconvex1_sparse_mps Read MPS data file defining LP or QP problem, deprecated
e04nca	20	nagf_opt_lsq_lincon_solve Linear programming (LP) convex quadratic programming (QP) or linearly-constrained linear least squares problem, dense
e04ncf	12	nagf_opt_lsq_lincon_solve_old Linear programming (LP) convex quadratic programming (QP) or linearly-constrained linear least squares problem, dense
e04nda	20	nagf_opt_lsq_lincon_option_file Supply optional parameter values for e04ncf/e04nca from external file
e04ndf	12	nagf_opt_lsq_lincon_option_file_old Supply optional parameter values for e04ncf/e04nca from external file

e04nea	20	nagf_opt_lsq_lincon_option_string Supply optional parameter values to e04ncf/e04nca from a character string
e04nef	12	nagf_opt_lsq_lincon_option_string_old Supply optional parameter values to e04ncf/e04nca from a character string
e04nfa	20	nagf_opt_qp_dense_solve General (possibly non-convex) quadratic programming (QP), dense, active-set method
e04nff	16	nagf_opt_qp_dense_solve_old General (possibly non-convex) quadratic programming (QP), dense, active-set method
e04nga	20	nagf_opt_qp_dense_option_file Supply optional parameter values for e04nff/e04nfa from external file
e04ngf	16	nagf_opt_qp_dense_option_file_old Supply optional parameter values for e04nff/e04nfa from external file
e04nha	20	nagf_opt_qp_dense_option_string Supply optional parameter values to e04nff/e04nfa from a character string
e04nhf	16	nagf_opt_qp_dense_option_string_old Supply optional parameter values to e04nff/e04nfa from a character string
e04nka	20	nagf_opt_qpconvex1_sparse_solve Linear programming (LP) or convex quadratic programming (QP), sparse, active-set method
e04nkf	18	nagf_opt_qpconvex1_sparse_solve_old Linear programming (LP) or convex quadratic programming (QP), sparse, active-set method
e04nla	20	nagf_opt_qpconvex1_sparse_option_file Supply optional parameter values for e04nkf/e04nka from external file
e04nlf	18	nagf_opt_qpconvex1_sparse_option_file_old Supply optional parameter values for e04nkf/e04nka from external file
e04nma	20	nagf_opt_qpconvex1_sparse_option_string Supply optional parameter values to e04nkf/e04nka from a character string
e04nmf	18	nagf_opt_qpconvex1_sparse_option_string_old Supply optional parameter values to e04nkf/e04nka from a character string
e04npf	21	nagf_opt_qpconvex2_sparse_init Initialization routine for e04nqf
e04nqf	21	nagf_opt_qpconvex2_sparse_solve Linear programming (LP) or convex quadratic programming (QP), sparse, active-set method, recommended
e04nrf	21	nagf_opt_qpconvex2_sparse_option_file Supply optional parameter values for e04nqf from external file
e04nsf	21	nagf_opt_qpconvex2_sparse_option_string Set a single option for e04nqf from a character string
e04ntf	21	nagf_opt_qpconvex2_sparse_option_integer_set Set a single option for e04nqf from an integer argument
e04nuf	21	nagf_opt_qpconvex2_sparse_option_double_set Set a single option for e04nqf from a real argument
e04nxf	21	nagf_opt_qpconvex2_sparse_option_integer_get Get the setting of an integer valued option of e04nqf
e04nyf	21	nagf_opt_qpconvex2_sparse_option_double_get Get the setting of a real valued option of e04nqf
e04pcf	24	nagf_opt_bnd_lin_lsq Computes the least squares solution to a set of linear equations subject to fixed upper and lower bounds on the variables. An option is provided to return a minimal length solution if a solution is not unique
e04raf	26.0	nagf_opt_handle_init Initialization of a handle for the NAG optimization modelling suite for problems, such as, linear programming (LP), quadratic programming (QP), nonlinear programming (NLP), least squares (LSQ) problems, linear semidefinite programming (SDP) or SDP with bilinear matrix inequalities (BMI-SDP)

e04rdf	26.0	nagf_opt_sdp_read_sdpa A reader of sparse SDPA data files for linear SDP problems
e04ref	26.0	nagf_opt_handle_set_linobj Define a linear objective function to a problem initialized by e04raf
e04rff	26.0	nagf_opt_handle_set_quadobj Define a linear or a quadratic objective function to a problem initialized by e04raf
e04rgf	26.0	nagf_opt_handle_set_nlnobj Define a nonlinear objective function to a problem initialized by e04raf
e04rhf	26.0	nagf_opt_handle_set_simplebounds Define bounds of variables of a problem initialized by e04raf
e04rjf	26.0	nagf_opt_handle_set_linconstr Define a block of linear constraints to a problem initialized by e04raf
e04rkf	26.0	nagf_opt_handle_set_nlnconstr Define a block of nonlinear constraints to a problem initialized by e04raf
e04rlf	26.0	nagf_opt_handle_set_nlnhess Define a structure of Hessian of the objective, constraints or the Lagrangian to a problem initialized by e04raf
e04rmf	26.1	nagf_opt_handle_set_nlnls Define a nonlinear least squares objective function to a problem initialized by e04raf
e04rnf	26.0	nagf_opt_handle_set_linmatineq Add one or more linear matrix inequality constraints to a problem initialized by e04raf
e04rpf	26.0	nagf_opt_handle_set_quadmatineq Define bilinear matrix terms to a problem initialized by e04raf
e04rxf	26.1	nagf_opt_handle_set_get_real Retrieve or write a piece of information in a problem handle initialized by e04raf
e04ryf	26.0	nagf_opt_handle_print Print information about a problem handle initialized by e04raf
e04rzf	26.0	nagf_opt_handle_free Destroy the problem handle initialized by e04raf and deallocate all the memory used
e04stf	26.0	nagf_opt_handle_solve_ipopt Run an interior point solver on a sparse nonlinear programming problem (NLP) initialized by e04raf and defined by other routines from the suite
e04svf	26.0	nagf_opt_handle_solve_pennon Run the Pennon solver on a compatible problem initialized by e04raf and defined by other routines from the suite, such as, semidefinite programming (SDP) and SDP with bilinear matrix inequalities (BMI)
e04uca	20	nagf_opt_nlp1_solve Nonlinear programming (NLP), dense, active-set SQP method, using function values and optionally first derivatives, recommended
e04ucf	12	nagf_opt_nlp1_solve_old Nonlinear programming (NLP), dense, active-set SQP method, using function values and optionally first derivatives, recommended
e04uda	20	nagf_opt_nlp1_option_file Supply optional parameter values for e04ucf/e04uca or e04uff/e04ufa from external file
e04udf	12	nagf_opt_nlp1_option_file_old Supply optional parameter values for e04ucf/e04uca or e04uff/e04ufa from external file
e04uea	20	nagf_opt_nlp1_option_string Supply optional parameter values to e04ucf/e04uca or e04uff/e04ufa from a character string
e04uef	12	nagf_opt_nlp1_option_string_old Supply optional parameter values to e04ucf/e04uca or e04uff/e04ufa from a character string

e04ufa	20	nagf_opt_nlp1_rcomm Nonlinear programming (NLP), dense, active-set, SQP method, using function values and optionally first derivatives (reverse communication, comprehensive)
e04uff	18	nagf_opt_nlp1_rcomm_old Nonlinear programming (NLP), dense, active-set, SQP method, using function values and optionally first derivatives (reverse communication, comprehensive)
e04uga	20	nagf_opt_nlp1_sparse_solve Nonlinear programming (NLP), sparse, active-set SQP method, using function values and optionally first derivatives
e04ugf	19	nagf_opt_nlp1_sparse_solve_old Nonlinear programming (NLP), sparse, active-set SQP method, using function values and optionally first derivatives
e04uha	20	nagf_opt_nlp1_sparse_option_file Supply optional parameter values for e04ugf/e04uga from external file
e04uhf	19	nagf_opt_nlp1_sparse_option_file_old Supply optional parameter values for e04ugf/e04uga from external file
e04uja	20	nagf_opt_nlp1_sparse_option_string Supply optional parameter values to e04ugf/e04uga from a character string
e04ujf	19	nagf_opt_nlp1_sparse_option_string_old Supply optional parameter values to e04ugf/e04uga from a character string
e04uqa	20	nagf_opt_lsq_gencon_deriv_option_file Supply optional parameter values for e04usf/e04usa from external file
e04uqf	14	nagf_opt_lsq_gencon_deriv_option_file_old Supply optional parameter values for e04usf/e04usa from external file
e04ura	20	nagf_opt_lsq_gencon_deriv_option_string Supply optional parameter values to e04usf/e04usa from a character string
e04urf	14	nagf_opt_lsq_gencon_deriv_option_string_old Supply optional parameter values to e04usf/e04usa from a character string
e04usa	20	nagf_opt_lsq_gencon_deriv Minimum of a sum of squares, nonlinear constraints, dense, active-set SQP method, using function values and optionally first derivatives
e04usf	14	nagf_opt_lsq_gencon_deriv_old Minimum of a sum of squares, nonlinear constraints, dense, active-set SQP method, using function values and optionally first derivatives
e04vgf	21	nagf_opt_nlp2_sparse_init Initialization routine for e04vhf
e04vhf	21	nagf_opt_nlp2_sparse_solve Nonlinear programming (NLP), sparse, active-set SQP method, using function values and optionally first derivatives, recommended
e04vjf	21	nagf_opt_nlp2_sparse_jacobian Determine the pattern of nonzeros in the Jacobian matrix for e04vhf
e04vkf	21	nagf_opt_nlp2_sparse_option_file Supply optional parameter values for e04vhf from external file
e04vlf	21	nagf_opt_nlp2_sparse_option_string Set a single option for e04vhf from a character string
e04vmf	21	nagf_opt_nlp2_sparse_option_integer_set Set a single option for e04vhf from an integer argument
e04vnf	21	nagf_opt_nlp2_sparse_option_double_set Set a single option for e04vhf from a real argument
e04vrf	21	nagf_opt_nlp2_sparse_option_integer_get Get the setting of an integer valued option of e04vhf
e04vsf	21	nagf_opt_nlp2_sparse_option_double_get Get the setting of a real valued option of e04vhf
e04wbf	20	nagf_opt_init Initialization routine for e04dga, e04mfa, e04nca, e04nfa, e04nka, e04uca, e04ufa, e04uga and e04usa

e04wcf	21	nagf_opt_nlp2_init Initialization routine for e04wdf
e04wdf	21	nagf_opt_nlp2_solve Nonlinear programming (NLP), dense, active-set SQP method, using function values and optionally first derivatives
e04wef	21	nagf_opt_nlp2_option_file Supply optional parameter values for e04wdf from external file
e04wff	21	nagf_opt_nlp2_option_string Set a single option for e04wdf from a character string
e04wgf	21	nagf_opt_nlp2_option_integer_set Set a single option for e04wdf from an integer argument
e04whf	21	nagf_opt_nlp2_option_double_set Set a single option for e04wdf from a real argument
e04wkf	21	nagf_opt_nlp2_option_integer_get Get the setting of an integer valued option of e04wdf
e04wlf	21	nagf_opt_nlp2_option_double_get Get the setting of a real valued option of e04wdf
e04xaa	20	nagf_opt_estimate_deriv Estimate (using numerical differentiation) gradient and/or Hessian of a function
e04xaf	12	nagf_opt_estimate_deriv_old Estimate (using numerical differentiation) gradient and/or Hessian of a function
e04yaf	7	nagf_opt_lsq_check_deriv Check user's routine for calculating Jacobian of first derivatives
e04ybf	7	nagf_opt_lsq_check_hessian Check user's routine for calculating Hessian of a sum of squares
e04ycf	11	nagf_opt_lsq_uncon_covariance Covariance matrix for nonlinear least squares problem (unconstrained)
e04zmf	26.0	nagf_opt_handle_opt_set Option setting routine for the solvers from the NAG optimization modelling suite
e04znf	26.0	nagf_opt_handle_opt_get Option getting routine for the solvers from the NAG optimization modelling suite
e04zpf	26.0	nagf_opt_handle_opt_set_file Option setting routine for the solvers from the NAG optimization modelling suite from external file