October 2007

KNITRO 6.0 User Options for AMPL

KNITRO user options can be set from AMPL by typing the name of the option and a numeric value. When using AMPL's interactive mode, set all options in a single command; for example,

```
ampl:  option knitro_options "maxit=100 opttol=1.0e-5";
```

When running KNITRO directly with an AMPL problem, set user options on the command line with the problem name; for example,

```
knitroampl testproblem.nl maxit=100 opttol=1.0e-5
```

A complete list of available KNITRO options can always be shown by typing:

```
knitroampl -=
```

OPTION	DESCRIPTION	DEFAULT
alg algorithm	optimization algorithm used: 0: let KNITRO choose the algorithm 1: Interior/Direct (barrier) algorithm 2: Interior/CG (barrier) algorithm 3: Active Set algorithm	0
bar_feasible	whether feasibility is given special emphasis: 0: no special emphasis on feasibility 1: iterates must honor inequalities 2: emphasize first getting feasible before optimizing 3: implement both options 1 and 2 above	0
bar_feasmodetol	tolerance for entering stay feasible mode	1.0e-4
bar_initmu	initial value for barrier parameter	1.0e-1
bar_initpt	initial point strategy for barrier algorithms 0: let KNITRO choose the initial point strategy 1: shift the initial point to improve barrier performance 2: do not alter the initial point supplied by the user	0
bar_maxbacktrack	maximum number of linesearch backtracks	3
bar_maxrefactor	maximum number of KKT refactorizations allowed	0
bar_murule	barrier parameter update rule: 0: let KNITRO choose the barrier update rule 1: monotone decrease rule 2: adaptive rule based on complementarity gap 3: probing rule (Interior/Direct only) 4: safeguarded Mehrotra predictor-corrector type rule 5: Mehrotra predictor-corrector type rule 6: rule based on minimizing a quality function	0

OPTION	DESCRIPTION	DEFAULT
bar_penaltycons	technique for penalizing constraints in the barrier algorithms: 0: let KNITRO choose the strategy 1: do not apply penalty approach to any constraints 2: apply a penalty approach to all general constraints	0
bar_penaltyrule	penalty parameter rule for step acceptance: 0: let KNITRO choose the strategy 1: use single penalty parameter approach 2: use more tolerant, flexible strategy	0
blasoption	specify the BLAS/LAPACK function library to use: 0: use KNITRO built-in functions 1: use Intel Math Kernel Library functions 2: use the dynamic library specified with "blasoptionlib"	0
debug	enable debugging output: 0: no extra debugging 1: print info to debug solution of the problem 2: print info to debug execution of the solver	0
delta	initial trust region radius scaling	1.0e0
feastol	feasibility termination tolerance (relative)	1.0e-6
feastol_abs	feasibility termination tolerance (absolute)	0.0e-0
gradopt	gradient computation method: 1: use exact gradients 2: compute forward finite-difference approximations 3: compute centered finite-difference approximations	1
hessopt	Hessian (Hessian-vector) computation method: 1: use exact Hessian derivatives 2: use dense quasi-Newton BFGS Hessian approximation 3: use dense quasi-Newton SR1 Hessian approximation 4: compute Hessian-vector products by finite diffs 5: compute exact Hessian-vector products 6: use limited-memory BFGS Hessian approximation	1
honorbnds	0: allow bounds to be violated during the optimization 1: enforce bounds satisfaction of all iterates 2: enforce bounds satisfaction of initial point	2
lmsize	number of limited-memory pairs stored in LBFGS approach	10
lpsolver	1: use internal LP solver in Active Set algorithm 2: use ILOG-CPLEX LP solver in Active Set algorithm (requires a valid CPLEX license) (specify library location with "cplexlibname")	1
maxcgit	maximum allowable conjugate gradient (CG) iterations: 0: let KNITRO set the number based on the problem size n: maximum of $n > 0$ CG iterations per minor iteration	0
maxcrossit	maximum number of allowable crossover iterations	0
maxit	maximum number of iterations before terminating 0: let KNITRO set the number based on the problem n: maximum limit of $n > 0$ iterations	0
maxtime_cpu	maximum CPU time in seconds before terminating	1.0e8
maxtime_real	maximum real time in seconds before terminating	1.0e8

OPTION	DESCRIPTION	DEFAULT
mip_branchrule	MIP branching rule: 0: let KNITRO choose the branching rule 1: most-fractional branching 2: pseudo-cost branching 3: strong branching	0
mip_debug	MIP debugging level 0: no MIP debugging output 1: print MIP debugging information	0
mip_gub_branch	Branch on GUBs 0: do not branch on GUB constraints 1: allow branching on GUB constraints	0
mip_heuristic	heuristic search approach 0: let KNITRO decide whether to apply a heuristic 1: do not apply any heuristic 2: use feasibility pump heuristic 3: use MPEC heuristic	0
mip_heuristic_maxit	heuristic search iteration limit	100
mip_implications	Add logical implications 0: do not add constraints from logical implications 1: add constraints from logical implications	1
mip_integer_tol	threshold for deciding integrality	1.0e-8
mip_integral_gap_abs	absolute integrality gap stop tolerance	1.0e-6
mip_integral_gap_rel	relative integrality gap stop tolerance	1.0e-6
mip_knapsack	add knapsack cuts 0: do not add knapsack cuts 1: add knapsack inequality cuts only 2: add knapsack inequality and equality cuts	1
mip_lpalg	LP subproblem algorithm 0: let KNITRO decide the LP algorithm 1: Interior/Direct (barrier) algorithm 2: Interior/CG (barrier) algorithm 3: Active Set (simplex) algorithm	0
mip_maxnodes	maximum nodes explored	100000
mip_maxsolves	maximum subproblem solves	200000
mip_maxtime_cpu	maximum CPU time in seconds for MIP	1.0e8
mip_maxtime_real	maximum real time in seconds for MIP	1.0e8
mip_method	MIP method 0: let KNITRO choose the method 1: branch and bound method 2: hybrid method for convex nonlinear models	0
mip_outinterval	MIP node output interval	10
mip_outlevel	MIP output level	1
mip_outsub	enable MIP subproblem debug output	0
mip_pseudoinit	method to initialize pseudo-costs 0: let KNITRO choose the method 1: use average value 2: use strong branching	0

OPTION	DESCRIPTION	DEFAULT
mip_rootalg	root node relaxation algorithm 0: let KNITRO decide the root algorithm 1: Interior/Direct (barrier) algorithm 2: Interior/CG (barrier) algorithm 3: Active Set algorithm	0
mip_rounding	MIP rounding rule 0: let KNITRO choose the rounding rule 1: do not attempt rounding 2: use fast heuristic 3: apply rounding solve selectively 4: apply rounding solve always	0
mip_selectrule	MIP node selection rule 0: let KNITRO choose the node select rule 1: use depth first search 2: use best bound node selection 3: use a combination of depth first and best bound	0
mip_strong_candlim	strong branching candidate limit	10
mip_strong_level	strong branching level limit	10
mip_strong_maxit	strong branching subproblem iteration limit	1000
mip_terminate	termination condition for MIP 0: terminate at optimal solution 1: terminate at first integer feasible solution	0
ms_enable	0: multi-start not enabled 1: multi-start enabled	0
ms_maxbndrange	maximum range to vary unbounded x when generating start points	1.0e3
ms_maxsolves	maximum number of start points to try during multi-start 0: let KNITRO set the number based on problem size n: try exactly $n > 0$ start points	0
ms_maxtime_cpu	maximum CPU time for multi-start, in seconds	1.0e8
ms_maxtime_real	maximum real time for multi-start, in seconds	1.0e8
ms_num_to_save	number feasible points to save in "knitro_mspoints.log"	0
ms_savetol	tolerance for feasible points to be considered distinct	1.0e-6
ms_startptrange	maximum range to vary all x when generating start points	1.0e20
ms_terminate	termination condition for multi-start 0: terminate after ms_maxsolves 1: terminate at first local optimum (if before ms_maxsolves) 2: terminate at first feasible solution (if before ms_maxsolves)	0
newpoint	0: no action 1: save the latest new point to file "knitro_newpoint.log" 2: append all new points to file "knitro_newpoint.log"	0
objrange	maximum allowable objective function magnitude	1.0e20
opttol	optimality termination tolerance (relative)	1.0e-6
opttol_abs	optimality termination tolerance (absolute)	0.0e-0
outappend	append output to existing files: 0: do not append 1: do append	0
outdir	directory where output files are created	

OPTION	DESCRIPTION	DEFAULT
outlev	printing output level: 0: no printing 1: just print summary information 2: print basic information every 10 iterations 3: print basic information at each iteration 4: print all information at each iteration 5: also print final (primal) variables 6: also print final Lagrange multipliers (sensitivies)	2
outmode	0: direct KNITRO output to standard out (e.g., screen) 1: direct KNITRO output to the file "knitro.log" 2: print to both the screen and file "knitro.log"	0
pivot	initial pivot threshold for matrix factorizations	1.0e-8
presolve_dbg	0: no debugging information 2: print the KNITRO problem with AMPL model names	0
scale	0: do not scale the problem 1: perform automatic scaling of functions	1
soc	0: do not allow second order correction steps 1: selectively try second order correction steps 2: always try second order correction steps	1
xtol	stepsize termination tolerance	1.0e-15