

Bruce McCarl's GAMS Newsletter Number 22

Expanded GAMS User's Guide by McCarl et al

The McCarl Guide was renamed and other authors were added to

- fully reflect GAMS staff involvement with its construction (Earlier they did not want this) and
- indicate it is an expansion over the older users guide which is very incomplete.

The Guide was recently updated to be compatible with version 22.5 of GAMS. This document will be distributed with GAMS systems 22.6 and newer. For the time being a [pdf copy](#) is available. All of the new GAMS and IDE features below are discussed in this document.

New language commands

GAMS as documented in the updated Expanded GAMS Users Guide now includes

- New functions and features that identify the version number of the GAMS release system.gamsrelease and gamsrelease this gives 22.5 or 22.6 etc.
- New \$ conditions \$Eval, \$EvalGlobal, \$Evallocal and \$Ife that allow evaluation and comparison of numerical control variable expressions
- The function poly(x, a0, a1, a2, a3..) that evaluates a polynomial of the form $\sum_{i=0}^n a_i x^i$
- A command line parameter Appendout (ao)=2 that will redirect the listing file to standard outout (Typically the screen) . This feature is not available when running under the IDE.
- A syntax set.setname that allows one to reference all elements of a the set named setname in a set or parameter definition, ie set k /set.i,set.j/ would put all elements of sets I and j in the set k. \$offmulti may be needed if set elements are in common. Parameter kk(k) /set.i 10/ would define all elements in k associated with set elements in I with a value of 10.
- A set of rules where local, global and scoped control variables can have common names and a priority order (first local, then scoped then global) in accessing these as discussed under the control variables definition section of the Expanded Users Guide.
- A new option Option dispwidth=n which can widen the allowed with of column labels in display statements where n can be as large as 20.

The GAMS IDE now

- When asked to Open several selected files in a new window will create a single new window with multiple tabs.
- Contains a spelling check option under the Edit menu.
- An option when a GDX file is opened that can write a single symbol or all symbols to an Excel file that is activated through a right mouse click.

Some new library models are also included

Solvers

A couple of new solvers are present

- **AlphaECP:** A solver for mixed integer non-linear problems that is an implementation of the Extended Cutting Plane method by Tapio Westerlund and Toni Lastusilta from Abo Akademi University, Finland. It requires the presence of a licensed MIP solver.
- **COINBONMIN:** A Basic Open-source Nonlinear Mixed INteger programming solver that provides an implementation of an NLP-based branch-and-bound algorithm, an outer-approximation decomposition algorithm, an implementation of Quesada and Grossmann's branch-and-cut algorithm, and a hybrid outer-approximation based branch-and-cut algorithm.
- **LINDOGLOBAL:** A Global Optimization Solver from Lindo Systems, Inc. that finds proven optimal solutions to non-convex mixed integer non-linear problems. Use requires a license for GAMS/CONOPT. The size of a model solved is limited to 2,000 equations and 3,000 variables.

Some new options were added to **CONVERT:**

- **NLP2MCP** that reformulates a non-integer program as a mixed complementarity problem (MCP)
- **AmplNLC** that converts a model into C code for evaluating objectives, constraints, and their derivatives.
- **Jacobian** that creates a GDX file containing the basic model data (matrix, initial point, evaluation of constraints at initial point and bounds)
- **LindoMPI** that creates an MPI file which is readable by Lindo.

Linear Interpolation code

Tom Rutherford recently wrote up a GAMS code illustrating how to do linear interpolation of input data. It is at <http://www.mpsge.org/interpolate.htm>. Tom also has other utilities available at <http://www.mpsge.org/inclib/tools.htm>.

Shademap

Uwe Schneider just released what he calls [GAMS - SHADEMAP](#) which is a GAMS callable tool for shading or coloring regions of simple maps during a GAMS run using GAMS generated results. The interface links to SHADEMAP which was created by [Mark Horridge](#). Uwe's interface is a modification of the interface developed by [Tom Rutherford](#). Uwe's interface is available at [http://www.uni-hamburg.de/Wiss/FB/15/Sustainability/schneider/shademap/GAMS to Shademap.htm](http://www.uni-hamburg.de/Wiss/FB/15/Sustainability/schneider/shademap/GAMS_to_Shademap.htm).

GTREE: An IDE replacement

Gtree (by LEI) is a tool to show the structure of the GAMS code in a tree and do some other functions. Gtree is a replacement of the GAMS/IDE and is freeware. I have not used it so cannot comment further.

Courses offered

I teach

Basic GAMS June 10-13, 2008 in the Colorado mountains at Frisco (near Breckenridge). The course is designed for those without GAMS usage experience but has also proved useful for those with up to a years experience.

Advanced GAMS class Aug 5-8, 2008 in the Colorado mountains at Frisco (near Breckenridge). The course covers such diverse topics as links to other programs like spreadsheets, speeding up GAMS, scaling, debugging, improving output and advanced basis use along with many other topics.

Further information and other courses are listed on <http://www.gams.com/courses.htm>.

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