

GAMS as a Tool for Applied Analysis: Significance, and the Future

Presented at the Celebration of
Alex Meeraus' 60th Birthday

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Plan of Presentation

Personal perspectives

Personal History

Discussion of Contribution of GAMS to Ag Econ
Profession

Discussion of emerging user community

Discussion of possible enhancements

Personal History with GAMS

1975 or 1976 I was engaged in building Fortran matrix generators/ report writers and assembly language LP solver, plus a generalized matrix generator, report writer and model debugger

Came to interview at World Bank DRC.

Was interviewed by Alex Meeraus. He said there had to be a better way to generate and report and talked about a package he was developing. I said model debugging also important.

1977 model debugger developed for MPS files.

Personal History with GAMS

1985 GAMS was being taught to the World Bank and I was imported to help in the teaching but was not a GAMS user

1988 GAMS came out for Mini computers. I then became a GAMS user and I got a Prime version

1989 GAMS did not do enough on model debugging for me and GAMSCHK was borne

1990 or so GAMS on PC and Egypt project

1992 GAMS BAS

1992 or so HP workstation version and GAMS became my main program

Personal History with GAMS

1994 or so No more 640 K and PC Game was on

1996 My first ½ million variable model

~1998 First commercial course

~1999 Advanced Class born

2000 My first million variable MIP

2000 Newsletter starts

2001 Basic Course

2002-3 Documentation

2003 Model unraveling software

All with Alex's help and or gracious forbearance

Contribution of GAMS to Ag Econ Profession

1975 or 1976

- Ag Economists spent months developing model software to generate and report. Large effort was spent on data
- Solvers used MPSX, Optima and others. Nonlinear and MIP solvers home grown

Today

- Models can be developed in days and data imported from other systems
- Solvers much more widely available with MIP, NLP and MINLP widely available plus GLOBAL emerging

Contribution of GAMS to Ag Econ Profession

Today

- I do not know an Ag Economist that does many and varied studies who does not use GAMS (A few use their own stuff but in limited settings.)
- More broadly GAMS appears predominant in electricity, petroleum, much of military, chemical engineering, CGE, and agricultural economics

Collectively

GAMS through its existence, open solver design and conceptual design and rigorous high computing standards has revolutionized math programming modeling. Alex's birthday is worthy of celebration

Present trends that color the future

- DOS dead, LINUX is last computer nerd hangout
- New users want windows; few will see LINUX
- Everyone wants to link to everything – external databases, spreadsheets and programs
- GAMS market is limited by ability to handle program links and DOS like commands. GDX and EXECUTE etc may not appeal.
- I had a big GAMS client tell me they were seeing if they could switch to spreadsheet addins.
- A prominent user said if he could choose from afresh today he would look hard at alternatives.

So now what about the future

I approach this with some trepidation. I don't own 4 houses in Georgetown, Alex has led creation of a great very useful product, I have not

But

- few things in life are perfect
- The computer industry has frequently shown us resting on ones laurels causes one to fall behind the pack and get buried in the dust. Where are the companies that made TRS-80, Commodore 64, KAYPRO, Osbourne, VISICALC, WoRDSTAR and 1-2-3.
- So now for my 2 cents worth

If I were King

Several developments would occur

These involve

- Language Features
- Windows Products
- GAMS support efforts and aids

If I were King

Language Features

- Variable domain `x.exists(I,j,k)$condition=yes;`
- Execution time write and read of ASCII and CSV
- Dump SAMEAS and allow `X(I,J)$ (I=J) =10;`
- Dynamic calculation with `= =` syntax.
- Text items and text item arithmetic manipulation
`Mylabel="root"+set.tl(I); put mylabel`
- `$IF / ENDIF`
- Remove replace/merge bug
- Improve profile and memory information
- Incorporate more on model analysis/warnings

If I were King

Windows Products – Hard stuff Data Import/Export Assistant(s)

- Data Import assistant
 - Common interface to files in Excel, Access, Ascii, CSV
 - Visual windows oriented preview
 - Point and click
 - GDXXRW like command memorization
- Data Export assistant
 - Ditto for data from GAMS

If I were King

Windows Products – Hard stuff

Model Inspector

Runs to a point and allows one to view any parameter

Fancy expandable GAMSCHK examination of a generated model and post optimality computations

Nonlinear function evaluator that expands and evaluates terms

If I were King

Windows Products – Hard stuff

Code Completer

- Memorizes set, parameter etc names
- Does code completion laying out beginning and ending)'s for loops and sums etc
- Contains menu of the commands by type
- Has context sensitive help with examples
- Has syntax coloring for known sets, variables etc
- Knows about parameter definitions including active set elements that can be viewed
- Allows one to trace items through cross reference list
- Gives tips on run away cases and speed problems

If I were King

GAMS support efforts and aids

Documentation

- Retire the old one
- Publish the new one
- Review and coauthor the new one
- Commit to philosophy that nothing goes undocumented
- Improve documentation in releases – show visually and colorfully how to get to system document and what is in your package plus on the web and tell people that the web site is on CD
- Solver manuals – no more one big one + COnvert

If I were King

GAMS support efforts and aids

- Web

 - Organize a little better

 - Make more examples and tutorials

- Email

 - Announce releases

Enough Critical Suggestions -- Grateful Appreciation

GAMS has advanced the profession and Alex is GAMS. He is modest but meritorious of high praise.

All in this room have been enriched by his efforts. I thank him personally as he has contributed to my life and career in many ways.

I hope I am here for his 70th birthday celebrating accomplishments not only in existence today but also arising between today and that tomorrow. I have no doubt that he will make such accomplishments.

I would like to be a beneficiary and lend a hand supporting future efforts.

I wish Alex a happy and productive future.