

GLOPTLAB – Quickstart Guide

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This is the Quickstart Guide to GLOPTLAB. It guides the reader through the first steps in the use of GLOPTLAB, a testing and development platform for solving quadratic constraint satisfaction problems, written in MATLAB.

First we describe how to install GLOPTLAB. In Section 2 we give a step-by-step instruction making the user become familiar with GLOPTLAB quickly.

Additionally to this guide the user may find helpful tooltips given in the graphical user interface (GUI) of GLOPTLAB. For further details – in particular information on how to extend GLOPTLAB easily by adding user defined methods – see [1].

1 Installation

1. Download the GLOPTLAB installer from
<http://www.mat.univie.ac.at/~dferi/gloptlab/download.html>.
2. Run the installer and follow the instructions.
3. Start GLOPTLAB.

Please note that initialization of INTLAB may take a few minutes the first time you start GLOPTLAB.

2 First steps

Problem formulation. After the installation the user can start formulating a problem. The problem formulation should be given in SMPL [4] or AMPL [2] syntax, using an arbitrary text editor or alternatively the *New* button in GLOPTLAB. To convert the problem to the GLOPTLAB internal problem format one can use either the *Convert* button in GLOPTLAB for problems written in SMPL or, for more general problems written in AMPL, converters provided by the COCONUT environment [3], [5]. After conversion select the *.glb* or *.def* file among the problem files and press *Add* (you can also select and add multiple problems here). To get familiar with the problem formulation one can pick *testproblem.sml* (i.e., a simple problem of finding the intersection of 2 circles), convert and add it to the problem files.

The steps needed for problem formulation are illustrated in Figure 2.1.

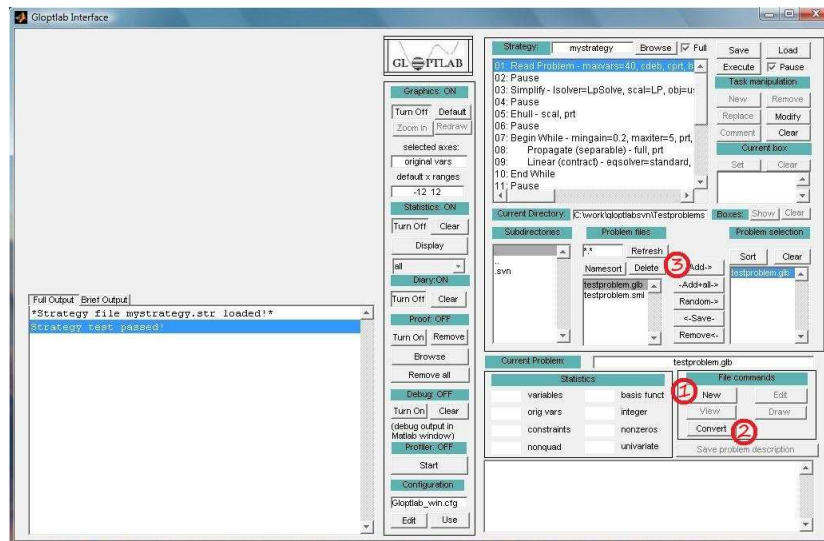


Figure 2.1: The first steps for problem formulation: 1) Create a new problem. 2) Convert to GLOPTLAB format. 3) Add the problem.

Solving the problem. To solve the formulated problem one has to select a strategy of tasks. The GLOPTLAB GUI allows to modify the strategy under *Task manipulation*. For details about different strategies and tasks see [1]. To solve *testproblem.sml* one can select the default *mystrategy*

strategy. Having specified a strategy one starts the solution of the problem by pressing the *Execute* button. If *Pause* is enabled one has to click *Execute* again after each pause in the strategy.

Figure 2.2 shows the described steps.

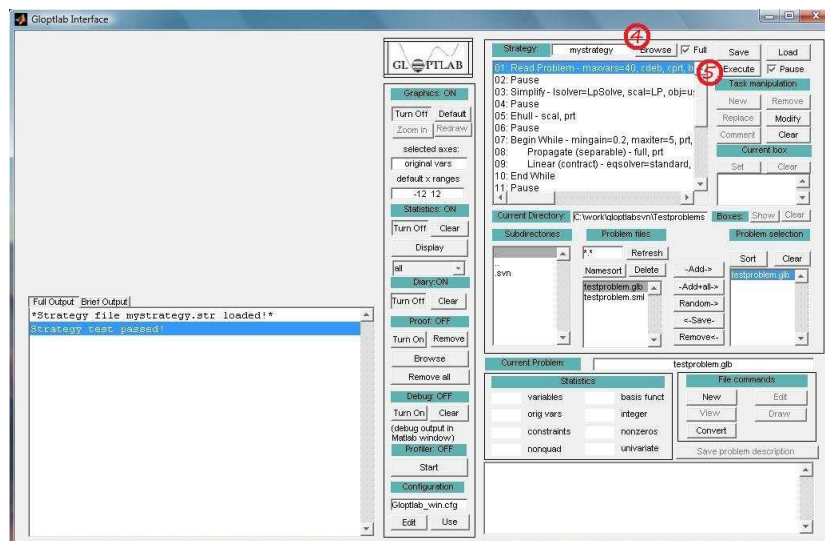


Figure 2.2: The steps to solve a given problem: 4) Select a strategy. 5) Execute the tasks of the selected strategy.

Results. In the default setting graphics are turned ON, thus the graphics window in the upper left corner of GLOPTLAB illustrates the results of the latest solution strategy, cf. Figure 2.3. In the bottom left corner one can study the text output, either the *brief* output or the *full* output. In the phase of getting familiar with GLOPTLAB we recommend to have a look at the full output.

Rerunning GLOPTLAB. If you have exited GLOPTLAB and run it again later you will notice a dialog box asking to continue from the last state. This helps if you wish to continue at the same point where you stopped working with GLOPTLAB the last time you used it.

And now: Try it yourself and enjoy GLOPTLAB!

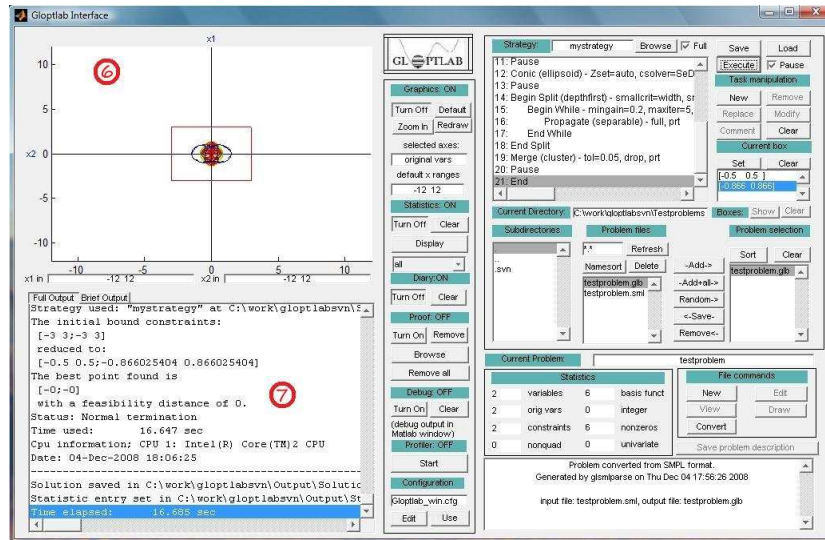


Figure 2.3: The output of the results: 6) Graphical output. 7) Text output.

References

- [1] F. Domes. GloptLab, a configurable framework for the rigorous global solution of quadratic constraint satisfaction problems. in preparation, 2007–2008.
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- [3] H. Schichl et al. The COCONUT Environment, 2000–2008. Software.
- [4] M. C. Markót. SMPL - A Simplified Modeling Language for Mathematical Programming. Technical report, University of Vienna, 2008.
- [5] H. Schichl. Mathematical modeling and global optimization, habilitation thesis, 2003. to appear.