OPTIMIZATION TECHNOLOGY CENTER

PCx User Guide: Supplement for PCxGUI[1]

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Technical Report OTC 98/06

July 31, 1998

ABSTRACT

We describe the installation and use of a graphical interface for PCx, the primal-dual interior-point code for linear programming. The interface is coded in Java and is therefore platform-independent.

Key words: linear programming, primal-dual interior-point methods, software, Java.

[1] This work was supported by the Mathematical, Information, and Computational Sciences Division subprogram of the Office of Computational and Technology Research, U.S. Department of Energy, under Contract W-31-109-Eng-38.

1 Introduction

PCx is a linear programming solver based on a primal-dual interior-point algorithm. Instructions for downloading, installing and using PCx on a variety of platforms can be found in the PCx User Guide (Czyzyk et al. [1]) and the supplement for Windows 95/NT (Czyzyk et al. [2]). This present supplement describes PCxGUI, a Java-coded graphical interface to PCx that allows users to modify input parameters and choose input files more easily than in the standard command-line and file-based interface.

2 Obtaining and Installing Java PCx

Compressed files containing documentation, the necessary Java class files, the copyright statement, and some sample input files can be obtained through the World Wide Web or by anonymous ftp. The home page is

`http://www.mcs.anl.gov/otc/Tools/PCx/PCxGUI/`

This page contains links to the files `PCxGUI.exe` and `PCxGUI.tar.gz`. The former is intended for PC users, and the latter for Unix users. Download and save one of these files in a new directory, and then uncompress it. You may find it convenient to uncompress the files in a subdirectory of your PCx installation, although this is not required. Note that we include only the class files, and not the source, because there should be no need to recompile the code.

PCxGUI requires the Java Development Kit TM (JDK), version 1.1 or better to be installed on your system. JDK is freely available for many systems from:

`http://java.sun.com/products`

Source code, test problem results, and further information about PCx can be found on the main PCx home page at

`http://www.mcs.anl.gov/otc/Tools/PCx/`

3 Running PCx

Once PCxGUI and JDK have been installed, the command

```
java PCxGUI
```

will launch the interface, which has been modeled after the one provided by the Windows 95/NT version of PCx [2]. In the main window, users can browse their file system for an input file, and ask PCx to solve the problem.

Selecting **Open** from the **File** menu enables the user to select an MPS input file that describes their linear program from theis file system. The **Solve** button activates the PCx solver. When execution has terminated, the results are written to an output file that can be viewed by clicking on the **View Results** button. Any history files generated by PCx in the course of execution will either be stored in the directory containing the Java interface, or in the directory containing the MPS file.

The parameters to PCx can be changed from their default values by clicking on the **Edit Parameters** button. This action brings up a new window which displays the current value of each parameter. These values can be edited. The new values can be implemented by clicking the **OK**, while the **Cancel** button will cause them to be discarded. The **Reset Parameters** button causes all parameters to be reset to their default values. It is important to note that any changes made by the user to the parameters do not become effective until the OK button is selected. that the user makes to any parameters will not be used by PCx until **OK** is selected. These parameters will be used for all subsequent solves in the current session, unless they are modified again. Each fresh session of PCxGUI starts with the default parameter values. See Table 1 for the correspondence between the parameter keywords of [1] and the field names in the Edit Parameters window.

When it is executed for the first time, PCxGUI will need to be told the location of the PCx executable. This can be done by selecting **Options→Find PCx Executable**. Whenever the location of the executable is changed, PCxGUI will need to be notified of the new location.

Each time an LP is solved, the values of the parameters that have been entered are written into a file called `specs`. It is a bad idea to edit this file while PCxGUI is running, otherwise the parameters that are actually used may be different than those desired.

Keyword in [1]	Field name in Edit Parameters window
`boundname`	Bound Name
`cachesize`	Cache Size
`centerexp`	Centering Parameter
`dualfeastol`	Dual Feasibility Tolerance
`history`	Write history file?
`HOCorrections`	Perform Higher-Order Corrections?
`inputdirectory`	No equivalent
`iterationlimit`	Iteration Limit
`max`	Maximization
`MaxCorrections`	Maximum Corrections
`min`	Minimization
`objectivename`	Objective Name
`opttol`	Optimality Tolerance
`preprocess`	Presolve?
`presolve`	Presolve?
`prifeastol`	Primal Feasibility Tolerance
`rangename`	Range Name
`refinement`	Perform iterative refinement?
`rhsname`	RHS Name
`scaling`	Perform scaling?
`solution`	Write solution file?
`stepfactor`	Step Scaling Minimum
`unrolling level`	Level of Loop Unrolling

Table 1: Correspondence between keywords in the PCx User Guide and field names in the Edit Parameters window of PCxGUI

References

[1] J. Czyzyk, S. Mehrotra, and S. J. Wright, *PCx User Guide*, Technical Report OTC 96/01, Optimization Technology Center, Argonne National Laboratory and Northwestern University, October 1996.

[2] J. Czyzyk, M. Stolarski, and S. J. Wright, *PCx User Guide: Windows 95/NT Supplement*, Technical Report OTC 97/03, Optimization Technology Center, Argonne National Laboratory and Northwestern University, April 1997.