Installing and Using the Executable-Image Version of GEMPACK on Windows PCs

GEMPACK Document No. GPD-7

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http://www.gempack.com.au

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Abstract

This document describes how to install and use the Executable-Image Version of GEMPACK on a Windows PC. The Executable-Image Version allows the full range of modelling tasks (building new models or modifying existing models).

With a Limited Executable-image licence, models are limited to those that can be implemented and solved within about 32 megabytes of memory. This is large enough for many medium-sized models but not sufficient for large models.

With an Unlimited Executable-image licence, the size of models which can be implemented and solved is limited only by the amount of memory on your PC.

Authors and Earlier Editions

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TABLE OF CONTENTS

1 THE EXECUTABLE-IMAGE VERSION OF GEMPACK 1

1.1 GEMPACK programs supplied with the Executable-Image Version 1
1.1.1 Fine print 2

1.2 Models supplied with the Executable-Image Version 2

1.3 Current Release 2

1.4 Contacting GEMPACK 2

2 SYSTEM REQUIREMENTS FOR THE EXECUTABLE-IMAGE VERSION 3

2.1 Disk space free 3

2.2 Memory required 3

3 INSTALLATION INSTRUCTIONS 5

3.1 Preparation before installing 5
3.1.1 Your GEMPACK directory 5
3.1.2 Locating your licence file 5
3.1.3 Security and permissions 5

3.2 Performing the installation 6

3.3 After a successful install, fix the PATH and GPDIR 7
3.3.1 Checking and setting PATH and GPDIR 7

3.4 Set the Environment variable TMP 8

3.5 If you installed GEMPACK programs previously 8

3.6 GEMPACK licence 9

4 TESTING THE INSTALLATION 11

4.1 Checking the path and access to your GEMPACK licence 11
4.1.1 If you still have problems 11

4.2 Testing GEMPACK with the Stylized Johansen model 12

5 HANDS-ON COMPUTING ON THE PC 13

5.1 Using WinGEM 13

5.2 Not using WinGEM 13

6 WORKING WITH GEMPACK ON A PC 15

6.1 New model's directory location 15

6.2 If your model becomes too large 15
6.2.1 Limited Executable-Image licence limits 15
6.2.2 Limits for TABLO-generated programs with no licence 16
6.2.3 Limits for SAGEM 16
6.2.4 Not enough memory available on your computer 17

6.3 Text editor 17

6.4 File association 17

6.5 Keep and Temporary directories and GEMPACK Windows programs 17

6.6 Copying GEMPACK programs to other PCs **18**
6.6.1 Windows programs 18
6.7 Accessing the CoPS web pages from the CD **18**
6.8 Using GEMPACK in a teaching situation **19**
6.9 Using GEMPACK in a DOS Box **19**
6.9.1 Interrupting programs 19
6.9.2 Controlling and logging screen output 20
6.10 DOS batch files **20**
7 GEMPACK DOCUMENTS **21**
8 INDEX **22**

CHAPTER 1

1 The Executable-Image Version of GEMPACK

This document tells you how to install the Executable-Image Version of GEMPACK on a PC running Windows XP or Vista.

The Executable-Image version of GEMPACK can be used to build new models or modify existing models.

With an Limited Executable-image licence (see section 1.9.2 of GPD-1), models are limited to those which can be implemented and solved within about 32 megabytes of memory (even when the computer on which the software is installed has more than this amount of memory). This includes many medium-sized models, but excludes large models such as ORANI or MONASH at the usual disaggregation of 100 or more sectors and many intertemporal models. Precise details of the size of models that can be handled are given in section 6.2.1 below.

With an Unlimited Executable-image licence (see section 1.9.3 of GPD-1), the size of models which can be implemented and solved is limited only by the amount of memory on your PC.

The user documentation for GEMPACK can be found in the other GEMPACK documents.[1] The GEMPACK document GPD-1 *Introduction to GEMPACK* should be your starting point. You can carry out the installation and testing described below without being familiar with GEMPACK. But if you intend to use GEMPACK for modelling, we recommend you at least quickly read chapters 1 to 3 in GPD-1 before attempting any modelling on your PC (and perhaps before you install GEMPACK on your PC).

An introduction to the different GEMPACK programs can be found in section 1.7 of GPD-1, while a guide to the models supplied with GEMPACK (including the Executable-Image version) is given in section 1.8 of GPD-1. A guide to the full user documentation for GEMPACK can be found in chapter 6 of GPD-1. Hands-on examples for GEMPACK can be found in chapters 2, 3 and 4 of GPD-1 and in GEMPACK document GPD-8.

Most of the GEMPACK documentation was written for Release 8.0 (2002), but still applies to Release 10.0. Enhancements new for Release 9.0 (2005) are described in GPD-5. Enhancements new for Release 10.0 (2008) are described in GPD-9.

1.1 GEMPACK programs supplied with the Executable-Image Version

The GEMPACK Fortran programs included with the Executable-Image Version of GEMPACK are:

TABLO	for processing the description of your model
GEMSIM	for carrying out simulations with your model
GEMPIE	for printing simulation results
SAGEM	for carrying out Johansen simulations
MODHAR	for building or modifying Header Array data files
SEEHAR	for looking at Header Array data files
SLTOHT	for converting simulation results to other forms
MKHAR	for moving data files between different computers

[1] References to GEMPACK documents identify the document by GEMPACK Document (GPD) number, rather than by author or date. References are always to the version of the document which is current at the date of issue of the cross-referencing document. The GEMPACK documents referenced are listed in a separate section at the end of the References section of this document. Comments from readers on this or any of the GEMPACK documents, either pointing out errors, inaccuracies, omissions or obscurities, or making other suggestions for improvements, will be welcomed. Please address such comments to support@gempack.com.

RWHAR	for moving data files between different computers
SUMEQ	for obtaining information about Equations files
SEENV	for obtaining information about Environment files
CMPHAR	for comparing data on two Header Array files
ACCUM	for side-joining solutions for spreadsheet programs
DEVIA	for preparing deviations between solutions for spreadsheets
RWSOL	for moving Solution files between different computers
MKSOL	for moving Solution files between different computers
CMBHAR	for combining Header Array files
TEXTBI	for recovering text files from binary files

The GEMPACK Windows programs included with the Executable-Image Version of GEMPACK are:

ViewHAR	for viewing and modifying your data files
ViewSOL	for viewing your Solution files
WinGEM	the Windows shell for GEMPACK
TABmate	Windows text editor for working with TABLO Input files
GemEdit	alternative Windows text editor sometimes used with WinGEM
RunGEM	for running an established model, and for sensitivity analysis
AnalyseGE	for analysing simulation results[2]

Other programs can be obtained from the GEMPACK Web site mentioned below.

1.1.1 Fine print

The executable images of the GEMPACK Fortran programs (such as TABLO.EXE) supplied with Release 10.0 are made with the Intel Fortran compiler (see chapter 3 of GPD-9)[3]. [For Release 9.0, the executable images were made with the Lahey Fortran compiler LF95.]

1.2 Models supplied with the Executable-Image Version

All versions of GEMPACK come with a standard set of example models, listed in chapter 1 of GPD-8 (and see section 1.6 of GPD-5). The supplied models include Stylized Johansen, Miniature ORANI, TRADMOD, ORANI-G, ORANI-F, GTAP, DMR, TREES, CRTS and 5SECT. These can all be solved with the Limited Executable-Image Version of GEMPACK.

1.3 Current Release

The current version of GEMPACK is Release 10.0 (May 2008).

1.4 Contacting GEMPACK

Information can be obtained from the GEMPACK Web site:

http://www.monash.edu.au/policy/gempack.htm

Contact details are at:

http://www.monash.edu.au/policy/gpcont.htm

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[2] See section 2.4 of GPD-4 for further details about AnalyseGE. See chapter 6 of GPD-8 for a hands-on introduction to the use of AnalyseGE.

[3] HAR files produced by these Intel-compiled programs (such as GEMSIM) have the same binary format as those produced by LF95-compiled programs (see chapter 3 of GPD-9).

CHAPTER 2

2 System Requirements for the Executable-Image Version

The Executable-Image Version of GEMPACK requires:

1. A PC running Windows XP or Vista[4].
2. Hard disk, requiring at least 200 MB free to install and test GEMPACK.
3. At least 512 MB of memory (RAM).

Most current Windows PCs easily satisfy these minimum requirements. Note that

- all the models which can be solved with a Limited Executable-Image GEMPACK licence (see section 6.2) use much less than 512 MB of memory (RAM).
- if you have an Unlimited Executable-Image Version, the size of models that you can solve is limited only by the amount of memory on your PC. Some large models require more than 512MB of memory.

If your computer satisfies requirements 1–3 above, you can omit the next section and go on to chapter 3.

2.1 Disk space free

To determine how much disk space is free:

1. in Windows, **right-click..Properties** on the icon for your hard drive in "My Computer" or
2. in a DOS box, enter the DOS command: **dir**
   The number of bytes free is shown on the screen at the end of the output. (1Mb is about a million bytes, so you will need about 200,000,000 bytes free to install, test and use GEMPACK.)

Implementing your own models takes more disk space. The larger the model, the more space you will need.

2.2 Memory required

The amount of memory you have limits the size of models you can build. Our experience is that many models that are being built now can be implemented with 512 MB of RAM.

If you run other programs at the same time (eg, Excel), you may need more RAM. Bear in mind that to do useful things with GEMPACK, you'd very often need to have an MSOffice application open at the same time.

Click on **Help | About** in the main menu of **My Computer**. This will tell you how much physical memory is available to Windows.

[4] Older 32-bit versions of Windows, such as Windows 2000 or 98, may well work with GEMPACK, but are no longer tested or officially supported.

CHAPTER 3

3 Installation Instructions

The Executable-Image Version of GEMPACK is supplied as a single installer EXE file with a name like "GPEI-10.0-000-install.exe". You might download this file, or receive it on a CD. Before running the installer, you may need to perform some of the preparatory steps listed below.

3.1 Preparation before installing

3.1.1 Your GEMPACK directory

The installer lets you choose where GEMPACK is installed – we call this your **GEMPACK directory**[5]. The default location – which we advise you to use if possible – is **C:\GP**.

If you have installed an earlier release of GEMPACK in C:\GP, you should rename that directory (for example, to C:\GP9 or C:\OLDGP) before installing Release 10.0. Use the *Windows Explorer* or *My Computer* to change the directory name. You can leave the earlier version on the disk until you have successfully installed and tested Release 10.0 (in case an unexpected problem occurs).

3.1.2 Locating your licence file

The installer will ask for the location of your Release 10 licence file, suffixed GEM (a Release 9 licence will not work). You may have been emailed such a file, or it may be on the install CD. If so, find it now.

If you do not have a licence file right now, the installer will create a temporary licence file, which you can replace later with a real (non-expiring) licence.

3.1.3 Security and permissions

Recent Windows versions such as Windows XP and Vista have introduced different User Accounts and different grades of Users. The simplest way of operating your computer is when you are the sole user of your computer and have full Administrator/Power User rights when using it to run GEMPACK.

To install GEMPACK, you may need Administrator or Power User privileges. Otherwise, the installer may be unable to change the PATH variable as part of the install procedure. Under Windows Vista, Administrator access will be needed to start the installer. In a work environment, you may need IT support personnel to supply [the password for] such access.

3.1.3.1 Notes for IT support:

You can install GEMPACK as Administrator, and run as Limited or Standard user, as long as permissions are set to allow Limited or Standard users to access needed files. Users of GEMPACK need to be able to read and execute the programs in the GEMPACK directory. In their working directories, Limited Users need full rights to read, write, execute and delete files.

The software requires that users be able to open and use a command prompt (cmd.exe) window.

Under Windows XP or Vista, you may find that, if one user has copied files to a directory for use by another user, the files "belong" to the first user and can not be deleted by the second user. If the

[5] We use the term "directory" rather than "folder".

second user tries to write to a file of the same name as one belonging to the first user, the write fails because the GEMPACK program is unable to delete the old file before creating a new version with the same name.

Users may sometimes need to alter or create files in the GEMPACK directory. Hence, we **do not recommend** that you install GEMPACK under C:\Program Files. Under Vista and some XP configurations, write/modify access is prohibited there.

Please assist the user by switching off "hide file extensions" (From Explorer, Tools...Folder Options...View).

3.2 Performing the installation

1. From Windows Explorer or My Computer, double-click the installer EXE. It may have a name such as **GPEI-10.0-00X-install.exe**.[6]
   - Under Vista and perhaps under XP, a warning window will appear. You may need to supply an Administrator password to continue.
2. **Welcome and copyright warning**. To agree to the copyright conditions click Next.
3. **Destination location**. Here you choose where GEMPACK will be installed; we refer to this directory as the **GEMPACK directory**. We recommend that you accept the suggested **C:\GP** directory. You may choose another existing or new directory by clicking the Browse button. If you do so, when you return to the original screen check carefully that the directory name is what you want. Sometimes the install program adds \GP to the end of the name you have selected. In choosing a directory name, bear in mind that:
   - GEMPACK programs **do not handle non-English characters** (see sections 5.9 and 5.9.3 in GEMPACK document GPD-1 for details).
   - Recent GEMPACK programs can handle long file or directory names, and names containing spaces. However, very long (or deeply-nested) directory names, or names containing characters outside [A-Z, 0-9] can occasionally cause problems, especially for older GEMPACK programs. We advise a simple directory name, such as C:\PROGS\GEMPACK
   - **Under Vista do not install in the Program Files directory**. Vista prevents you changing files there.
4. **Changes to your PATH and Environment.** The Install program can make changes to your PATH and the Environment variable GPDIR. We recommend that you agree to these changes. Alternatively, you may make these changes yourself: see section 3.3.1 about how to change your PATH and set GPDIR.
5. **Selecting a GEMPACK licence file (optional).** To run Release 10 Executable-Image GEMPACK, you need a Release 10 GEMPACK licence file LICEN.GEM located in the GEMPACK directory (the destination location chosen at step 2 above is the GEMPACK directory). If the Installer does not find an existing LICEN.GEM in the GEMPACK directory you may click Browse to select your licence file for installation. GEMPACK licence files have a .gem file extension. Possible licence file locations are:
   - in a GEMPACK directory from a previous install of Release 10 GEMPACK (note a Release 9 or earlier licence will not work),
   - on the Install CD,
   - the location you saved your email licence file attachment to. If you recently purchased GEMPACK, we usually email you a licence file inside a zip archive email attachment. First

[6] The initial release which will be labelled GPSC-10.0-000-install.exe. Later install programs will be labelled GPSC-10.0-00X-install.exe where X is 1,2,3 etc.

extract your licence file from the zip archive before selecting it.

The installer puts a copy of your licence file, if necessary renaming it to LICEN.GEM, in your GEMPACK directory.

If the Install program finds an existing LICEN.GEM in your chosen GEMPACK directory, it will not overwrite it, and the Browse button will be disabled. If the existing licence file is an old or wrong licence it is **your responsibility** to later place the correct Release 10 licence file into your GEMPACK directory, renamed if necessary to LICEN.GEM.

If you do not choose a licence file right now, the installer will create a temporary licence that will expire in three months. You can easily replace this later with a real (non-expiring) licence file. Simply rename your proper licence to LICEN.GEM and copy it into the GEMPACK directory (overwriting the temporary licence).

See section 1.2 of GEMPACK document GPD-9 for more details about GEMPACK licences.

6. **Ready to begin installation.** You may review your settings; click Back to make changes. Click Next to begin the installation. The Install program copies many files to your GEMPACK directory. Leave the CD in the CD drive until the installation is complete.
7. **Finished.** The program signals that Installation is finished. Just click Finish.

3.3 After a successful install, fix the PATH and GPDIR

For GEMPACK to run, you must make sure that the GEMPACK directory (usually C:\GP) is on your PATH, and that the Environment variable GPDIR is set to the GEMPACK directory.

If you allowed the installer to make changes to your PATH and the Environment variable GPDIR (see section 3.2 above), this has already been done; the next section tells how to check PATH and GPDIR settings.

If you did not allow the installer to make these changes, you must make them yourself, as described next.

3.3.1 Checking and setting PATH and GPDIR

The usual method to change the PATH and set the Environment variable GPDIR is by editing the System Properties. The important changes are that

- the directory into which you installed GEMPACK must be on your DOS path.
- if this GEMPACK directory is not C:\GP, the DOS environment variable GPDIR must be set equal to the GEMPACK directory.

You will need administrator access to make these changes. Follow steps 1 to 5 below to check that the installer made these changes, or to make them yourself:

1. For XP, right click on *My Computer* and select *Properties* | *Advanced* | *Environment Variables*. For Vista, select in turn: *Control panel* | *Classic view* | *System* | *Advanced system settings* | *Environment Variables*.
2. Select the system *Path* variable and add the GEMPACK directory to it (separated by a semicolon ;). You can add the GEMPACK directory to the beginning or end of the current PATH as you prefer. [If you have a previous GEMPACK directory on your Path, replace it with the new GEMPACK directory.] Click on the *Set* button to accept this change.
3. Set a new *system* Environment variable named GPDIR and give it a value C:\GP10 (or whatever your GEMPACK directory is called.) Select the *Set* button to accept this change.
   Note that if you have installed GEMPACK in the default directory C:\GP, it is not necessary to set

the Environment variable GPDIR. The GEMPACK programs will assume that C:\GP is the GEMPACK directory, which contains your GEMPACK licence and programs, if GPDIR is not set.

4. Set a new *user* Environment variable named GPDIR, in the same way.
5. Click on the *Ok* button to accept these changes to the Environment.

These changes will take effect when you next start Windows programs or open a new DOS box.

Test these changes by opening a new DOS box and entering "SET". This should show the altered path and the new Environment variable GPDIR.

3.4 Set the Environment variable TMP

GEMPACK Windows programs will often need to create various temporary files. The program has to locate a directory in which to create these files.

The actual location of the "temporary" directory is defined by your system. The name of a directory suitable for holding temporary files should be stored in the Environment variable TMP.

Make sure your Environment variable TMP is set to some simple short directory (for example C:\TEMP) or similar.

Problems may arise if:

(i) you have no "temporary" directory.

(ii) you are not allowed to create or modify files in the "temporary" directory.

(iii) the full pathname of a temporary file is very long, or contains spaces or Asian characters or non-English characters.

To set the Environment variable TMP to C:\TEMP, proceed as follows.

- **If you are running Windows XP**

You can right-click on "My Computer" and select "Properties | Advanced | Environment Variables"

and then edit the User Environment variable called TMP to be C:\TEMP.

Create a new directory C:\TEMP if you do not already have one.

- **If you are running Windows Vista**

You will need administrator access.

Select in turn: Control panel | Classic view | System | Advanced system settings | Environment Variables

Edit the User Environment variable called TMP to be C:\TEMP.

Create a new directory C:\TEMP if you do not already have one.

3.5 If you installed GEMPACK programs previously

If you installed GEMPACK programs previously in another directory, you may need to help some windows programs to find and use the Release 10 GEMPACK programs. We give the main examples below.

TABmate. You may need to tell TABmate where to find the Release 10 version of TABLO.EXE. To do this, go to the **Code and other** menu item under the **Options** menu. Then click on the **Change** button in the **Location of TABLO.EXE** part of the form and find the Release 10 version of TABLO.EXE.

RunMONASH and **RunDynam**. Click on the **Options** menu and use menu items such as **Which ViewSOL to use** to tell the program which versions of ViewSOL, ViewHAR and AnalyseGE to use.

RunGTAP. Click on ***Tools..Options*** and then use the various **Change** buttons to tell RunGTAP where to find the Release 10 versions of GEMSIM, ViewHAR, ViewSOL, TABmate, AnalyseGE, TABLO etc.

3.6 GEMPACK licence

Your GEMPACK licence must be called LICEN.GEM and it must be placed in your GEMPACK directory (that is, the directory in which you installed GEMPACK). The installer may have already done this: if so, skip this section.

If you already have a Release 10 licence on your computer in another directory, please copy the file LICEN.GEM to your current GEMPACK directory.

Please see section 1.2 of GEMPACK document GPD-9 for details about GEMPACK licences.

CHAPTER 4

4 Testing the Installation

In this chapter we suggest that you test the main features of the installation by carrying out a simulation with the Stylized Johansen model.

If this simulation does not work, you will need to go back to some of the steps in sections 3.3 and 3.4 above.

4.1 Checking the path and access to your GEMPACK licence

You need to check that your PATH has been set correctly and that GEMPACK programs are able to access your GEMPACK licence.

To do this, open a command prompt (DOS box) by going

Start..Run and type in "cmd" and hit OK.

This will start a DOS box running. In that DOS box, type in the commands

cd \temp (or some directory where you are able to write files)
tablo

If your PATH is set correctly, the GEMPACK program TABLO will start to run and it will find your GEMPACK licence. In this case you will be offered lots of options for the program TABLO.

If TABLO does not start running, your PATH is not as required. Please check again the steps in section 3.3 and then repeat this part of the testing.

If TABLO starts running, hit "Enter" (carriage-return).

If TABLO reports that it could not access your GEMPACK licence or that the licence is invalid, the error message will tell you where TABLO looked for the licence file. Please check that your Release 10 licence file (it must be called LICEN.GEM) is in your GEMPACK directory. If TABLO looks for LICEN.GEM in a directory which is different from the one in which you installed GEMPACK, check the parts of section 3.3 which relate to the Environment variable GPDIR. Repeat this testing once you have remedied any problems.

Stop TABLO running by typing **Control-C** (that is, hold down the Control key, which is usually on the left of your keyboard and may be labelled "Ctrl", and, while holding it down, touch the C key). TABLO should stop running (though you may need to type Control-C twice). Now type

exit

which should close the DOS box. You are now ready to carry out the test simulations, so please skip to the next section.

4.1.1 If you still have problems

If you still have problems, please run ViewHAR and select

Help | About ViewHAR/Diagnostics | Diagnostics

Save this information in a file, and email it to *support@gempack.com*.

4.2 Testing GEMPACK with the Stylized Johansen model

We suggest that you test the main features of the installation by carrying out a simulation with the Stylized Johansen model, as described in section 2.4 of GPD-1.[7] .

Start WinGEM running, following the procedure described in section 2.4.1 of GPD-1. Then prepare a directory for the model SJ (Stylized Johansen) and set the working directory, as described in sections 2.4.2 and 2.4.3 of GPD-1.

Since you are using an Executable-Image version of GEMPACK, you can not carry out the simulation using a TABLO-generated program in section 2.4.6 of GPD-1. You should carry out the simulation using GEMSIM, as described in section 2.4.7 of GPD-1. When the simulation has finished, check that the results of the simulation are as expected (see, for example, section 2.7 of GPD-1).

If any of these tests does not work, check again the steps in the installation in sections 3.3 and 3.4 above.

[7] If you are an experienced GEMPACK user, you may prefer to use the brief notes in section 2.4 of GPD-8, instead of GPD-1.

CHAPTER 5

5 Hands-On Computing on the PC

In this chapter we give suggestions for hands-on computing which will help you to become familiar with many important features of the use of GEMPACK on a PC. These are based on the models supplied with GEMPACK (see chapter 1 of GPD-8), especially the Stylized Johansen and Miniature ORANI models.

The example models sent with GEMPACK are all in the EXAMPLES subdirectory of your GEMPACK directory (usually C:\GP\EXAMPLES).

We recommend that you follow the Windows way of working as described in section 5.1 below unless you prefer to work at the DOS prompt, in which case you should follow section 5.2 below.

In either case, since you are using an Executable-Image Version of GEMPACK, you should carry out simulations using GEMSIM (not using a TABLO-generated program).

5.1 Using WinGEM

Detailed suggestions for hands-on computing using WinGEM can be found in chapter 2 of GPD-8. This begins with examples based on the Stylized Johansen and goes on to examples based on Miniature ORANI, GTAP and ORANI-G. You should ignore the examples that use TABLO-generated programs.

5.2 Not using WinGEM

Detailed suggestions for hands-on computing without using WinGEM can be found in chapter 3 "Unix/DOS Prompt: Hands-on Computing" of GPD-8. This begins with examples based on the Stylized Johansen and goes on to examples based on Miniature ORANI. You should ignore the examples that use TABLO-generated programs.

CHAPTER 6

6 Working with GEMPACK on a PC

The following sections contain other information relevant to working with GEMPACK on your PC.

6.1 New model's directory location

We suggest that you put each new model that you build in a separate directory on the hard disk, **not** in or under your GEMPACK directory. Note that your PATH setting (see section 3.3) will ensure that the GEMPACK programs are found correctly when, for example, you (or WinGEM) issue the command **tablo**

When you use WinGEM with any model, make sure that you set WinGEM's working directory to point to the directory containing the files for this model (as spelled out in section 2.4.3 of GPD-1).

6.2 If your model becomes too large

If your model becomes too large, you may exceed the limits of your Executable-Image licence, or your PC may run out of memory.

6.2.1 Limited Executable-Image licence limits

This subsection applies if you have a Limited Executable-Image GEMPACK licence. It does not apply if you have an Unlimited Executable-Image licence (see section 1.9 of GPD-1).

Limits are imposed on the size of the models you can run using this Executable-Image Version of GEMPACK. **The only program that may end with an error because your model has exceeded these limits is GEMSIM.** The limits only apply to simulations. There are no limits imposed on the size of data-manipulation tasks you can carry out with the Limited Executable-Image version of GEMSIM.

We expect that all simulations that could have been carried out with the Release 9.0 Limited Executable-Image version of GEMPACK will also be allowed with the Release 10.0 Limited Executable-Image version.

The limits on the size of simulations that the Limited Executable-Image version of GEMSIM can solve are:

- Total number of (components of) endogenous variables, including any backsolved for, must be no more than 30,000.
- Total number of (components of) variables (exogenous and endogenous, including any backsolved for) must be no more than 35,000.
- Total number of (components of) endogenous variables in the condensed system must be no more than 10,000.
- Total number of (components of) variables (exogenous and endogenous) in the condensed system must be no more than 16,000.
- Number of nonzeros in the Left Hand Side (LHS) Matrix (for any step of the simulation) must be no more than 75,000.
- Total number of reals and integers used for coefficients (pre-simulation and updated), plus those used to store simulation results, must be no more than 250,000.

- Total number of components of variables (in the condensed system or backsolved for) with one argument[8] and more than 40 components must not be more than 1000. [This condition should only affect single-country models with more than 40 sectors.]

All the other programs supplied with the Executable-Image version should be able to handle arbitrarily large tasks, subject only to the amount of memory on your computer.

If a simulation you are carrying out exceeds the limits for the version of GEMSIM supplied with your Limited Executable-Image version of GEMPACK, you will receive a message like the following one.

```
%% This simulation has exceeded the dimensions allowed with GEMSIM
     for your type of Executable-image GEMPACK licence.
 To continue you would need a source-code version of GEMPACK
   (or an "Unlimited Executable-image" licence, if appropriate for you).
 You can obtain these from the GEMPACK distributors.
```

This will be followed by details telling you by how much your simulation has exceeded the limits specified above.

With the Limited Executable-Image Version, your main alternative is to find another way of carrying out the same task. The only other alternative is to obtain a more powerful version of GEMPACK, either a Source-code version or an Unlimited Executable-Image version.

6.2.2 Limits for TABLO-generated programs with no licence

The limits shown above in section 6.2.1 for GEMSIM are also the limits for a Release 10.0 TABLO-generated program without any form of GEMPACK licence. If a simulation with a TABLO-generated program exceeds any of these limits, it will require at least an Introductory licence – see section 1.9.3 of GPD-1.

6.2.3 Limits for SAGEM

SAGEM does not require any licence for medium-sized models.

- If you have any GEMPACK licence [Introductory, Limited or Unlimited Executable-Image, or Source Code], there are no limits (apart from the total memory on your computer) on the size of models which can be solved using SAGEM. This applies even if you have an old or expired licence.
- If you have no licence, the same limits apply for **SAGEM** simulations as for GEMSIM simulations, namely

(i) Total number of (components of) endogenous variables in the Equations matrix must be no more than 10,000.

(ii) Total number of (components of) variables (exogenous and endogenous) in the Equations matrix must be no more than 16,000.

(iii) Number of nonzeros in the Left Hand Side (LHS) Matrix (for any step of the simulation) must be no more than 75,000.

[8] Variables with two or more arguments, only one of which ranges over a set of size more than 1, are also included here.

6.2.4 Not enough memory available on your computer

If the task you are carrying out with any of the programs supplied with the Executable-Image version of GEMPACK requires more memory that is available on your computer, you will receive a message saying that the program is stopping because it is

unable to allocate sufficient memory.

If this happens, you may be able to free up more memory by closing down any other applications running (for example, word processors), in which case you can then try to rerun the task. Otherwise you need to find some other way of carrying out the task (or buy more memory).

6.3 Text editor

When installing and using GEMPACK, you will need to be able to edit text files. This is best done using a text editor (that is, an editor designed for handling text files exclusively). The text editor NotePad is supplied with Windows – but many others are available.

We recommend that you use the text editor **TABmate**. TABmate has syntax highlighting which is excellent if you are writing or debugging TABLO Input files. TABmate can also be used for other text files, can open several files at the same time and has various Tools which are useful for GEMPACK development.

You can also use the older text editor GemEdit. If you use a word processor (such as Microsoft Word) to edit text files, be careful to save the resulting file as a text file.

6.4 File association

"File association" is the Windows mechanism due to which (for example):

- the ViewHAR icon is displayed beside HAR files in Explorer
- if you double-click a HAR file, it opens in ViewHAR

These happen because files suffixed HAR are "associated" with ViewHAR.exe. Usually the "association" is set up at install time. Only one program can be associated with each file type – so programs might compete to possess more popular suffixes. To stop such contests, Vista prevents any program from changing an existing association. This may mean, for example, that the GEMPACK installer cannot associate TABmate with TAB files (because Microsoft wants the TAB suffix for Visual Studio). In such cases, you must set up the association manually. In both XP and Vista you can change the HAR file association as follows:

- in Windows Explorer, right-click on a HAR file and choose **Open with...**.
- check box **Always use the selected program** should be ticked.
- Use the Browse button to select the latest ViewHAR.exe.

6.5 Keep and Temporary directories and GEMPACK Windows programs

Older versions of the GEMPACK Windows programs used to write INI files and temporary files in subdirectories of the Windows directory. This caused problems in Windows XP/Vista where a "standard" user may not be allowed to write or delete files in the Windows directory or any subdirectory of it. Now, however:

- The position of the Keep Directory where the INI files are stored has been changed to a subdirectory of the user's "My Documents" directory.

- The default place where GEMPACK Windows Programs write temporary files has been moved from under the Windows directory to a subdirectory of the (user's) TMP or TEMP Environment variable.[9] You can reset the TMP variable as described in section 3.4.
- In RunGEM, WinGEM, AnalyseGE and RunMONASH there are Menu Options within the programs which allow you to set your Temporary directory to a directory of your choosing. The program remembers this Temporary directory setting. When you start the programs for the first time, the default temporary directory is set from the value of the TMP or TEMP environment variable.
- For very unusual cases, there are ways to avoid problems with the Keep and the default Temporary directories by setting environment variables called **GPKEEP** and **GPTEMP**.
  Set a new environment variable called GPKEEP if you want to change the usual Keep Directory.
  Set a new environment variable called GPTEMP if you want to change the default temporary directory without changing the environment variable TMP.

If you are having problems with these features of one of the GEMPACK Windows programs, consult the relevant Help file for details and advice.

6.6 Copying GEMPACK programs to other PCs

If you have a GEMPACK site licence, you are entitled to copy GEMPACK programs to PCs covered by your site licence, for example, within the same department or institute.

You should note that the GEMPACK programs TABLO and GEMSIM require a GEMPACK licence. Accordingly, under the terms of your GEMPACK licence, you must not copy (or send copies of) executable images of these to machines outside the site which is covered by your GEMPACK licence.

You are allowed to send copies of the other GEMPACK programs outside of the site covered by your GEMPACK licence. However, you should note that

- SAGEM.EXE requires at least an Introductory GEMPACK licence to solve larger than medium-sized models (see section 6.2.3).

Of course you must not send a copy of your GEMPACK licence outside the site covered by your licence.

6.6.1 Windows programs

Anyone (with or without a GEMPACK licence) is entitled to download and install the GEMPACK Windows programs from the GEMPACK web site (see section 1.3 of GPD-1). However a GEMPACK licence may be required to work with larger than medium-sized models. See the Help files for the various programs for details.

The versions of these programs may be updated between GEMPACK Releases. You can check

http://www.monash.edu.au/policy/gpwingem.htm

on the GEMPACK web site to see if updates are available.

6.7 Accessing the CoPS web pages from the CD

The GEMPACK CD may contain a recent snapshot of the Centre of Policy Studies (CoPS) Web site at Monash University. The snapshot is created as a convenience for those who do not have easy or

[9] For example if your Environment variable TMP is set to C:\TEMP, the default temporary directory for WINGEM would be C:\TEMP\GPTEMP\WINGEM.

rapid Internet access. Please be aware that the real Web site may well have been updated since this CD was created. The real web address is *http://www.monash.edu.au/policy*

To access the CD snapshot of the web site, you do **not** have to be connected to the Internet. However, you do need a Web Browser, such as Firefox or Internet Explorer. Enter the location:

e:/welcome.htm where "e" is the drive letter of your CD drive.

Included in the CoPS Web pages are digital versions of many CoPS/Impact Project Working papers. The **Resources** web page links to the CoPS Archive, containing numerous examples of GEMPACK applications.

Links pointing to sites outside the Centre of Policy Studies, and *mailto* links have been preserved, but will only function if you are connected to the Internet.

6.8 Using GEMPACK in a teaching situation

You may be interested in using GEMPACK for teaching GE modelling in a computer laboratory.

We use the Limited Executable-Image Version of GEMPACK in our courses (for example, the Practical GE Modelling course – see http://www.monash.edu.au/policy/pgemc.htm). This does not require a Fortran compiler. We have found it ideal for teaching.

6.9 Using GEMPACK in a DOS Box

Many experienced GEMPACK users prefer to work from a DOS box; you can open one from WinGEM via the Menu option:

File | Shell to DOS

New command line options for some programs were introduced in Release 9.0 – see section 10.1 of GPD-5 for details. If you like working at the DOS prompt, or if you use DOS batch files (see section 6.10), you will probably make considerable use of these command line options.

Example 1

The command

tablo -pgs sj –log sj.log

provides complete user input for running TABLO to produce output for GEMSIM (-pgs) and the log file SJ.LOG.

Example 2

You can use Stored-input files under DOS by using the command line **-sti** feature (see section 5.5 of GPD-1), as in, for example,

modhar -sti modsj.sti

If you make your own Stored-input files using a text editor, it is a good idea to include the line

bat

at the start of these files. This means that, if the program encounters invalid input, it will stop. (See section 5.3 of GPD-1.)

6.9.1 Interrupting programs

Sometimes you will start a program running from DOS and then realise that it is not doing what you intend. You can interrupt the program and return to the DOS prompt by typing Control-C (that is, hold down the Control key, which is usually on the left of your keyboard and may be labelled "Ctrl",

and, while holding it down, type C). Sometimes you may have to type Control-C twice to achieve this.

6.9.2 Controlling and logging screen output

Often screen output goes by much too quickly for you to read. Old-timers will pause it by using the **Control-S** keystroke[10]. Use **Control-Q** to resume. On some machines the Scroll Lock key works in a similar way. (It first stops screen output, then starts it, then stops it, and so on.)

You can "scroll back" the DOS box a certain number of lines to recover missed output. To increase this capacity, right-click on the title bar of the DOS box, and choose Properties...Layout. Set the "screen Buffer size" to Width 90, Height 2000. Press OK. If asked whether you wish to "apply properties to current window only" or "modify shortcut" choose the second option.

But the most powerful approach is to save the screen output in a text file which you can examine at leisure. See section 5.5 of GPD-1. For example,

modhar -sti modsj.sti -log modsj.log

saves a log file called MODSJ.LOG which you can look at in your text editor.

6.10 DOS batch files

If you create DOS batch (.BAT) files for carrying out tasks including running GEMPACK programs, you should know that if any GEMPACK program ends with a fatal error, it sets the value of the DOS parameter ERRORLEVEL value to 1. You can test for this in .BAT files to stop the batch job early in such a case.

For example, the .BAT file below runs SAGEM and then GEMPIE. If the SAGEM run at line 4 ends unsuccessfully, the line 6 test of ERRORLEVEL aborts the batch job and gives a message saying that the job was unsuccessful.

```
REM Beginning of batch file
REM  Run SAGEM
REM Next uses the –sti option (see section 5.5 of GPD-1)
sagem  -sti sag1.sti  -log sag1.log
REM test ERRORLEVEL to see if this was successful
if errorlevel 1 goto error
REM  Run GEMPIE
gempie -sti gemp1.sti -log gemp1.log
if errorlevel 1 goto error
echo off
echo BATCH JOB SUCCESSFUL
goto endbat
:error
echo off
echo *** ERROR: BATCH JOB FAILED ***
:endbat
REM End of batch file
```

As an alternative to ERRORLEVEL tests, all GEMPACK programs have options dro and dre which can also be used in BAT files to check whether or not a program has run successfully. See section 5.4.1 of GPD-1 for more details.

[10] For Control-S, hold down the Control key, which is usually on the left of your keyboard and may be labelled "Ctrl", and, while holding it down, type S.

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8 Index

A

Administrator
  Privileges, 5
Allocating memory, 17
Asian characters, 8

B

Batch files, 20

C

Characters
  Non-English, 8
CMD.EXE
  Required, 5
Contacting GEMPACK, 2
Control-C, 19
Courses
  Exe-Image may be best, 19

D

Diagnostic information, 11
Disk space, 3
DOS batch files, 20
DOS box, 19

E

Environment variables
  GPDIR, 7
  GPTEMP and GPKEEP, 18
  Setting, 8
  TMP, 8, 18
Executable images
  Made with Intel compiler, 2
Executable-image licence limits, 15

F

Fortran compiler
  Intel, 2
  LF95, 2

G

GemEdit
  Text editor, 17
GEMPACK
  Contacting, 2
GEMPACK directory, 5, 6
GEMPACK licence, 7, 9, 18
  Executable-Image licence limits, 15
GEMSIM
  Used for simulations with Exe-Image GEMPACK, 13
GPKEEP, 18
GPTEMP, 18

I

Intel Fortran compiler, 2
Interrupting programs, 19
Introductory licence, 16
  When required, 16
IT support
  Notes for, 5

K

Keep directory, 18

L

Large-simulations licence, 16
  When required, 16
Left Hand Side Matrix, 15, 16
LICEN.GEM, 7, 9, 11
Licence
  Executable-Image licence limits, 15
  Introductory, 16
  Large-simulations, 16
  Limited Executable-image, 1
  Unlimited Executable-image, 1
Licence file, 7, 9, 18
LOG files, 20

M

Machine requirements, 3
Memory, 3
  Allocating, 17
  Insufficient, 17

N

Non-English characters, 8

O

Options
  GEMPACK - DRE, 20
  GEMPACK - DRO, 20

P

PATH
  Privileges, 5

S

SAGEM
  May require GEMPACK licence, 18
Screen output, 20
Setting Environment variables, 8
  TMP, 8
Simulations with Exe-Image GEMPACK
  Use GEMSIM, 13
Space character, 8
Stored-input files, 19

Using, 19

T

TABmate
Text editor, 17
Teaching courses
Exe-Image may be best, 19
Temporary directory, 18
Temporary files, 8, 18
Testing
Diagnostic information, 11
Stylized Johansen, 11, 12
Text editor
Choosing, 17
TMP
Environment variable, 8, 18

V

Vista operating system, 3

W

Web pages
CoPS, 19
Windows programs
Downloading, 18
Windows Vista, 1, 3
Windows XP, 1, 3
User Accounts, 5
Write error, 5
Working directory, 15
Write error
Windows XP, 5