

INSTALLING AND USING
THE EXECUTABLE-IMAGE VERSION OF GEMPACK
ON DOS / WINDOWS PCs

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This is part of the documentation of the GEMPACK Software System for solving large economic models, developed by the IMPACT Project, Monash University, Clayton Vic 3168, Australia.

Abstract

80386/80486/Pentium machines with extended memory running DOS, Windows, Windows 95, Windows NT or OS/2 provide excellent platforms for doing serious general equilibrium modelling. This document describes how to install and use the Executable-Image Version of GEMPACK on such machines. It also introduces WinGEM, the Windows version of GEMPACK.

The Executable-Image Version allows the full range of modelling tasks (building new models or modifying existing models). However models are limited to those which can be implemented and solved within 12 megabytes of memory. This is large enough for many medium-sized models but not sufficient for large models. In order to use WinGEM, the Windows version of GEMPACK, a machine with 16 megabytes of memory is needed.

Authors and Earlier Editions

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1. The Executable-Image Version of GEMPACK

GEMPACK runs essentially unchanged on a variety of machines. This document tells you how to install the Executable-Image Version of GEMPACK on an 80386, 80486 or Pentium PC running under DOS, and tells you machine-specific information you may need to know to maximise your use of GEMPACK on such a machine. This document also tells you how you can run this version of GEMPACK under Windows , Windows 95, Windows NT or in a DOS box under OS/2.

This document describes

1. how to use the Executable-Image version of GEMPACK under DOS or in a DOS box, and
2. how to use **WinGEM**, the Windows interface to GEMPACK under Windows, Windows 95 or Windows NT.

The Executable-Image version of GEMPACK runs in DOS or in a DOS box much like it runs on other machines (including unix machines and Macintosh machines). But WinGEM is currently only available under Microsoft Windows, Windows 95 or Windows NT.

This version of GEMPACK can be used to build new models or modify existing models. However models are limited to those which can be implemented and solved within 12 megabytes of memory (even when the computer on which the software is installed has more than 12 megabytes 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 by the different programs are given in section 7.2 below.

The user documentation for GEMPACK can be found in the other GEMPACK documents, of which GPD-1¹ *Introduction to GEMPACK* should be your starting point. You can carry out the installation and testing on a DOS machine as 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 1.1 of GPD-1, while a guide to the models supplied with GEMPACK (including the Executable-Image version) is given in section 1.3 of GPD-1. A guide to the full user documentation for GEMPACK can be found in chapter 9 of GPD-1.

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 one of the authors at the Impact Project.

The numbering of GEMPACK Documents has been re-started with Release 5 of GEMPACK, when the abbreviation "GPD" was first used. Previous editions of these documents did not have the same numbers as the current editions. Pre-Release-5 documents are numbered "GED-xx".

1.1 GEMPACK Programs Supplied with the Executable-Image Version

The GEMPACK 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 data files
SEEHAR	for looking at data files
SLTOHT	for converting simulation results to other forms
MKHAR	for moving data files between different computers
RWHAR	for moving data files between different computers
SUMEQ	for obtaining information about Equations files
SEENV	for obtaining information about Environment files

If you are using Windows or Windows 95, there are also the Windows programs:

VIEWHAR	for viewing your data files
VIEWSQL	for viewing your solution files
WINGEM	the Windows shell for GEMPACK

Other programs can be obtained from the GEMPACK Web site:

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

1.2 Models Supplied with the Executable-Image Version

All the models usually supplied with source-code version of GEMPACK are supplied with the Executable-Image Version of GEMPACK. The models currently supplied are those listed in section 1.3 of GPD-1. (See Appendix B of GPD-1 for more details about the files supplied.)

The models currently supplied include Stylized Johansen, Miniature ORANI, TRADMOT, ORANI-F, GTAP, DMR, TREES, CRTS and 5SECT. These can all be solved in 12 megabytes of memory.

1.3 Current Release

The current version of GEMPACK is Release 5.2-002 (August 1997).

2. System Requirements for the Executable-Image Version

2.1 Summary

1. An 80386 machine with maths coprocessor (80387), or an 80486 DX machine, or an 80486 SX machine with a coprocessor (80487 SX), or a Pentium machine.
2. DOS version 3.3 or higher.
3. Hard disk, requiring at least 25 MB free to install and test GEMPACK.
4. At least 12 MB of memory (RAM). If you have Windows, Windows 95 or Windows NT installed on your PC and wish to use WinGEM, the Windows interface to GEMPACK, the memory required is 16MB.

Below we give more details about each of these. If your computer easily satisfies the above requirements, you can omit this section and go on to section 3.

2.2 Details

2.2.1 DOS version

You can determine which version of DOS you have by turning on your PC and, at the DOS prompt, entering the DOS command:

ver

2.2.2 Disk space free

You can determine how much disk space is free by entering 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 25,000,000 bytes free to install, test and use GEMPACK.)

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

2.2.3 Memory required

The amount of extended 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 12 MB of RAM (although more is required to implement very large models such as ORANI and its extensions, or large intertemporal models).

How to check for the amount of available extended memory

You can determine how much extended memory is available on your PC by turning on your PC and at the DOS prompt entering the command:

mem

If the available extended memory is less than 12 MB then you may be unable to run GEMPACK software on your PC.

3. Installation Instructions

Most of this installation needs to be carried out either in DOS or in a DOS box.

If you are installing under **Windows NT** the installation could be carried out in a DOS box with special options. We have provided a PIF file called NT-RUN.PIF (on the first disk) which sets up these options. Before starting the installation, open Windows Explorer and locate the file called NT-RUN on the first GEMPACK disk. Drag this file onto the desktop. Double click on this file to open a special DOS box with the necessary options for installing GEMPACK. Then follow the normal DOS installation procedure. When you are installing GEMPACK, be sure to use the NT-RUN shortcut to open any DOS box to work in.

[We realise that many Windows users are not familiar with DOS commands, and so we spell out in complete detail the relatively few DOS commands you need to use.]

3.1 *Text Editor*

When installing and using GEMPACK, you will need to be able to edit text files. This is often best done using a text editor (that is, an editor designed for handling text files exclusively). A text editor **EDIT** is supplied with version 5 or later of DOS. There are many other text editors available on DOS machines.

Alternatively, you can use a word processor (such as Microsoft Word or WordPerfect) to edit text files; if so, you must be careful to save the resulting file as a text file.

3.2 *If You Have An Earlier Release of GEMPACK Installed*

If you have an earlier release of GEMPACK installed on your machine, when installing Release 5.2, you can either choose to leave the earlier version on the disk (Release 5.2 goes in a different directory), or first remove the earlier version. Indeed, it is probably best (if you have enough disk space) to leave the earlier version on the disk until you have successfully installed and tested Release 5.2 (in case an unexpected problem occurs).

3.3 *Changes to the DOS Settings*

3.3.1 **DOS PATH and AUTOEXEC.BAT**

You will install GEMPACK in a directory \GP on part of your hard disk.

The directory \GP must be on the DOS path.

To arrange this, you must edit the appropriate file (called AUTOEXEC.BAT in your default directory \) which is executed when you turn on your PC. (If you have no such file, create one.) You should add these directories to the PATH line in that file. (Use a text editor, such as the EDIT which comes with DOS.)

For example, if you find a line

```
PATH = C:\;C:\DOS
```

you should change it to

```
PATH = C:\;C:\DOS;C:\GP
```

If you do not find a PATH line, make a new line

```
PATH = C:\GP
```

(If you plan to install GEMPACK on a disk drive different from C:, specify that drive in the PATH line.)

Note that the file COMMAND.COM (usually found in directory \ on your starting hard disk) and the external DOS commands (often found in directory \DOS on your starting hard disk) must also be on the PATH. If they are not, add them to the PATH line in your AUTOEXEC.BAT, as described above.

If you plan to install the GEMPACK files in directory C:\GP, no other change is required to AUTOEXEC.BAT.

But if you intend to install these files in another directory (not C:\GP), you need to add an extra line to AUTOEXEC.BAT to set the DOS variable called GPDIR. For example, if you intend to install the GEMPACK files in directory D:\PROGRAMS\GP52, add the following line to AUTOEXEC.BAT.

```
SET GPDIR=D:\PROGRAMS\GP52
```

(Change this appropriately to indicate where you actually installed these files.) Note that it is important not to include any spaces in this line, apart from the one between SET and GPDIR.

EXAMPLE

Suppose you have a machine with starting hard disk C:, suppose that COMMAND.COM is in C:\, that your external DOS commands are in C:\DOS, and that you intend to install GEMPACK on drive E in directory \GP52. Then your AUTOEXEC.BAT file should contain at least the following:

```
PATH C:\;C:\DOS;E:\GP52  
SET GPDIR=E:\GP52
```

3.3.2 CONFIG.SYS

Check the file CONFIG.SYS in your default directory \. Look for the lines

```
FILES = xx  
BUFFERS = yy
```

If necessary, change these (use your text editor) so that the number xx is at least 60 and yy is at least 20. If either of these lines is not present, add new lines

```
FILES = 60  
BUFFERS = 20
```

as appropriate. (If you do not have a CONFIG.SYS file, create a new one containing the two lines above.)

3.3.3 Reboot

As you have changed AUTOEXEC.BAT and possibly CONFIG.SYS, reboot your system as follows before proceeding to the rest of the installation:

- (a) If you are running Windows, exit from Windows (choose **File / Exit** from the Windows main menu) to get back to DOS. Then press Ctrl, Alt and Del simultaneously.
- (b) If you are running Windows 95, you will need to restart your computer. To do this, from the **Start** menu of Windows 95, select **Shut down...** Then select the option "Restart your computer?" and click on **Yes**.
- (c) If you are running Windows NT, you will need to restart your computer. To do this, from the **Start** menu of Windows NT, select **Shut down...** Then select the option "Restart your computer?" and click on **Yes**. Open the special DOS box using **NT-RUN** as described in section 3 above and carry out the rest of the installation in this box.

3.4 Pre-installation Check

Before starting the installation of GEMPACK, we suggest you check that the PATH etc is correctly set. To do this, first exit from Windows (if relevant) or go into a DOS box. Then type the command

set

Check that the PATH is as you expect. If you installed GEMPACK in a directory other than C:\GP, also check that the variable GPDIR has its expected value. If either of these is not as required, re-read section 3.3 (and check that you rebooted). Only proceed when everything is as required.

3.5 Copying the GEMPACK Files

Attach to the relevant hard disk. (If this is C:, type in the command

C:

for example.) Then type in the commands below (as given in bold). Note that some of these commands involve your floppy drive (usually A: or B:). Below we refer to this as A:. If yours is different, you should replace A: appropriately.

1. Create the directory \GP and change directory to it, by typing the commands below.

```
mkdir \GP  
cd \GP
```

2. You need to copy your GEMPACK licence file LICEN.GEM from the first GEMPACK disk. [This is necessary even if you had a previous version of GEMPACK since Release 5.2 licence files are different from Release 5.1 licence files.] To do this, insert the first GEMPACK disk into your floppy drive. Type in the next command (replacing A: if necessary).

```
copy A:licen.gem
```

3. Leave GEMPACK disk 1 in your floppy drive. Type in the next commands (replacing A: if necessary).

```
copy A:*.bat  
gem1e A:
```

4. When this has finished, insert GEMPACK disk 2 into your floppy drive. Type in the next command (replacing A: if necessary).

```
gem2e A:
```

5. When this has finished, insert GEMPACK disk 3 into your floppy drive. Type in the next command (replacing A: if necessary).

```
gem3e A:
```

You have now copied all the files from the GEMPACK disks. The files in directory \GP and its subdirectories will occupy about 10-11 Mb of disk at this stage. More precisely, there should be

- at least 12 .EXE files and at least the files LICEN.GEM and PKUNZIP.EXE in directory \GP,
- about 91 files in subdirectory \GP\EXAMPLES (the exact number may be different).

If these are not all there, go through the steps above again.

3.6 A Final Check

If you are intending to run GEMPACK under Windows, Windows 95, Windows NT or in a DOS box under OS/2, return to this operating system and go into a DOS box for the next testing.

To check that the DOS PATH has been set correctly, that the DOS variable GPDIR is set appropriately if required (that is, if you installed GEMPACK in a directory other than C:\GP), and that your GEMPACK licence file is in the correct place, issue the following commands

```
cd \  
gemsim
```

The program GEMSIM should start running, access the licence file, and then present you with its options screen.

If this happens, all is well. Simply type 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). This will interrupt the program and return you to the DOS prompt. (You may have to type Control-C twice to achieve this.)

If GEMSIM does not begin running as described above, something in your setup is not correct.

- First recheck the points in section 3.4 above.
- Check that the licence file LICEN.GEM is in directory \GP via the commands
cd \gp

dir *.gem

- If when you try to run GEMSIM, you get an error message saying there is not enough memory available, you may be able to increase the amount of memory available by removing device drivers and/or caches. (You will probably need to edit your AUTOEXEC.BAT and/or CONFIG.SYS files to do this. You will need to restart your computer for such changes to take effect.)

Once these all appear correct, repeat the test at the start of this section. If all is still not well, you may need to repeat parts of the installation.

3.7 Running GEMPACK Programs

Under DOS, this is done just by typing in the name of the program, as in, for example,

sagem

or

gemsim

4. Testing the Installation

In this section we suggest that you test the main features of the installation by carrying out a simulation with the Stylized Johansen model.²

If either of these simulations does not work, you will need to go back to some of the steps in section 3 above. In particular, re-check the points mentioned in sections 3.4 and 3.6 above.

4.1 Making a Directory for the Stylized Johansen Model

First make a new subdirectory, for example \SJ, and copy the files relevant to Stylized Johansen into it as below.

```
mkdir \sj  
cd \sj  
copy \gp\examples\sj*.*
```

4.2 Simulation with Stylized Johansen

(a) Run TABLO by typing in the command

```
tablo
```

and then give the responses as shown in section 2.2.2 of GPD-1. This should create the GEMSIM Auxiliary files SJ.GSS and SJ.GST.

(b) Run GEMSIM by typing in the command

```
gemsim
```

When prompted, give the responses

```
cmf  
sjlb.cmf
```

These tell the program to take all input from the GEMPACK Command file SJLB.CMF (see section 2.3.1 of GPD-1).

There will be a lot of activity on the screen. When the program finishes running, check that the message

(The program has finished without error.)

is on the screen near the end.

This run should create the Solution file SJLB.SL4 and a Solution Accuracy file SJLB.XAC. You can check that the files SJLB.SL4 and SJLB.XAC have been created via the commands

² If you are going to use GEMPACK under Windows or Windows 95 or in a DOS box under OS/2 or Windows NT, you should do this testing in a DOS box.

```
dir sjlb.sl4  
dir *.xac
```

[You have now carried out Step 2 in section 2.2.1 of GPD-1.]

(c) Run GEMPIE via the command

```
gempie
```

to convert the Solution file SJLB.SL4 to the GEMPIE Print file SJLB.PI5. Check that the results in file SJLB.PI5 are (approximately) as shown in Table 2.2.4 in section 2.2.4 of GPD-1. [You can use the DOS editor "edit" to check the results via the command

```
edit sjlb.pi5
```

Go to the end of the file and check the results against Table 2.2.4 in GPD-1. You can exit from "edit" by typing **Alt-F** (hold down the **Alt** key and hit **F**) and then touching **x** (exit).]

If any of these tests does not work, re-check the steps in the installation in section 3 above.

5. Installing and Testing WinGEM

If you are using Microsoft Windows or Windows 95 or Windows NT, you will want to install WinGEM, the Windows interface to GEMPACK. [If you are using a different operating system, you should skip this section and go on to the next section.]

5.1 Installing WinGEM

This installation must be done under Windows or Windows 95 or NT. To install WinGEM, insert the **WinGEM installation disk** into your floppy disk drive.

- (a) If you are using Windows, select **File / Run** from the Program Manager's main menu.
- (b) If you are using Windows 95 or Windows NT, select **Run...** from the Start menu.

In either case you need to enter

a:install.exe

(where you should change "a:" to "b:" etc as necessary) and then click on **Ok..**

This will carry out the installation of WinGEM, during which you will be asked the following questions.

- (a) When asked about which directory you wish to install WinGEM in (the installation program refers to this as the "Target Directory"), respond with the name (and drive) of the directory in which you installed GEMPACK (usually C:\GP).
- (b) We recommend that you say "yes" when asked if you want to put GEMPACK.INI into C:\GP.
- (c) We recommend that you say "yes" when asked if you would like to use WinGEM's default editor GEMEDIT.
- (d) We recommend that you say "no" when asked at the end of the installation if you would like to start WinGEM running.

5.2 Installing ViewSOL

This installation must also be done under Windows, Windows 95 or Windows NT. To install ViewSOL, insert the **ViewSOL installation disk** into your floppy disk drive.

- (a) If you are using Windows, select **File / Run** from the Program Manager's main menu.
- (b) If you are using Windows 95 or Windows NT, select **Run...** from the Start menu.

In either case you need to enter

a:install.exe

(where you should change "a:" to "b:" etc as necessary) and then click on **Ok.**

You will be asked which directory you wish to install ViewSOL in.

- (a) If you installed GEMPACK in directory C:\GP (the default), you should install ViewSOL in directory C:\GP\WINGEM\VIEWSOL (the default offered by the ViewSOL installation program).

(b) If you installed GEMPACK in a different directory, you should install ViewSOL in a subdirectory VIEWSOL of the subdirectory WINGEM of the directory in which you installed GEMPACK. For example, if you installed GEMPACK in directory D:\GP52-002, you should install ViewSOL in directory D:\GP52-002\WINGEM\VIEWSOL.

Installing ViewSOL as above is necessary for WinGEM to find ViewSOL.³

5.3 Testing WinGEM

We suggest that you carry out Examples 1.1, 1.2, 1.6, 1.7 and 1.8 in Appendix B of GPD-4. This will test that WinGEM (and GEMPACK) are working correctly on your PC. It will also introduce you to the basic features of WinGEM. At the end of Example 1.7, you should see two alternatives *Go to GEMPIE* and *Go to ViewSOL*. If you select *Go to ViewSOL* you will see how ViewSOL lets you look at simulation results.

If you have previously used a version of GEMPACK under DOS (or another operating system), you will probably think initially of WinGEM as providing an interface to this DOS version. If you are new to GEMPACK, you should probably not worry about trying to distinguish between WinGEM and GEMPACK.

If any of these examples do not work, you should check the steps in the installation again. You might also like to check if you can carry out the same examples in the DOS box.

Note that WinGEM comes with its own text editor **GEMEDIT** (which can handle large text files up to about 16 Mb in size). We suggest that you use this editor when required to edit text files (such as Command files, TABLO Input files) for GEMPACK. [However, if you are already familiar with another text editor, you can tell WinGEM to use this alternative editor by selecting *Options / Change editor...* from WinGEM's main menu.]

WinGEM also comes with the Windows programs **ViewHAR**, which allows you to view the data on GEMPACK's Header Array files directly, and **ViewSOL**, which allows you to view Solution files directly. [Those who have used GEMPACK before can think of ViewHAR as an alternative to the GEMPACK program SEEHAR and ViewSOL as an alternative to the GEMPACK program GEMPIE.] ViewHAR and ViewSOL are written by our colleague Mark Horridge (Centre of Policy Studies and Impact Project, Monash University).

ViewHAR and ViewSOL are not documented in the GEMPACK user documentation. However you will find them well documented via their *Help* menus.

5.4 How WinGEM Works

You will see that when you carry out a modelling task using WinGEM, WinGEM starts one of the GEMPACK programs running in a DOS box. The WinGEM program windows are designed to enable you to carry out most modelling tasks simply.

You should be aware that not all modelling tasks are automated via WinGEM. For example, when you use WinGEM to run SEEHAR to look at the data on a Header Array file, you get to look at all the data on the file. If you only want to look at some of the arrays on the file, you will need to run

³ The only alternative to those described above is to install ViewSOL in some directory which is on the DOS PATH. However we strongly recommend that you locate ViewSOL as indicated earlier.

SEEHAR interactively. You could do this by going to a DOS box and running SEEHAR interactively. But you will probably find it easier to do this through WinGEM's *Programs / Run programs interactively...* menu.

WinGEM is really an interface to the DOS version of GEMPACK rather than a separate version of GEMPACK. WinGEM can only function correctly if the GEMPACK programs in the DOS version are also functioning properly. This is why we asked you in section 4 above to test the DOS version of GEMPACK before installing WinGEM. Note that **WinGEM requires Release 5.2** of GEMPACK - it will not function as expected in conjunction with Release 5.1 or earlier of GEMPACK.

6. Familiarising Yourself with the Software

In this section we give suggestions for hands-on computing which will help you to become familiar with many important features of the use of GEMPACK on 80386/80486/pentium machines. These are based on the models supplied with GEMPACK (see Appendix B of GPD-1), especially the Stylized Johansen and Miniature ORANI models.

Follow section 6.1 below if you are going to use WinGEM (that is, if you are running Windows or Windows 95). Follow section 6.2 below otherwise.

Note that the files corresponding to the example models sent with GEMPACK are all in your directory \GP\EXAMPLES. You should be able to carry out simulations with all of these models in 12Mb of memory (if running DOS directly) or in 16Mb (if running under Windows or Windows 95).

6.1 Using WinGEM

Detailed suggestions for hands-on computing using WinGEM can be found in Appendix B “Getting Started with GEMPACK via WinGEM” of GPD-4. This begins with examples based on the Stylized Johansen and goes on to examples based on Miniature ORANI, GTAP and ORANIF.

6.2 Not Using WinGEM

Simulations with Stylized Johansen

We recommend that you begin by carrying out the hands-on computing Examples in sections E.1 and E.5 of Appendix E of GPD-1. You will not need to do Examples 1-3 there since these are the same as the testing you carried out in section 4.2 above.

Simulations with Miniature ORANI

Next we recommend that you carry out the hands-on computing Examples in section E.2 of Appendix E of GPD-1. This will involve simulations with Miniature ORANI.

Other Hands-on Computing

Then we suggest you work through some of the Examples in sections E.3 and E.4 of Appendix E in GPD-1.

Note that the files corresponding to the examples models sent with GEMPACK are all in your directory \GP\EXAMPLES. You should be able to carry out simulations with all of these models.

TABLO-generated Programs Not Available

With the Executable-Image Version of GEMPACK, you must carry out multi-step simulations by running GEMSIM. The alternative of TABLO-generated programs (see, for example, section 2.6 of GPD-1) is not available with this version of GEMPACK. TABLO-generated programs are only an option with a source-code version of GEMPACK.

7. Building Your Own Models

This section contains other information relevant to working with GEMPACK on your DOS or Windows machine. Most of it applies whether you are running WinGEM or not (though most of the changes discussed below need to be made in DOS or in a DOS box).

7.1 *New Model's Directory Location*

We suggest that each new model you build is put in a separate directory on the hard disk, outside of \GP. Note that your PATH command will ensure that the GEMPACK programs are found correctly when, for example, you (or WinGEM) issue the command

tablo

7.2 *If Your Model Becomes Too Large*

The programs supplied with the Executable-Image Version of GEMPACK can only handle models of limited size. If some task you are carrying out requires more memory than that allowed for by these programs, you will receive a message like the following one.

```
You have exceeded the size limits of
this Executable Image version of GEMPACK.
(To complete your current task, you
would need a source-code version of GEMPACK.)
```

```
(ERROR RETURN FROM ROUTINE: INCPAR)
(E-Size exceeded.  MMAX      1234      230)
(ERROR RETURN FROM.....)
```

With the Executable-Image Version, your main alternative is to find another way of carrying out the same task. The only other alternative is to obtain the source-code version of GEMPACK (which allows you to reconfigure programs to take advantage of all the memory in your computer).

The main size constraints with the Executable-Image Version are as follows:

- 1) These versions of TABLO and GEMSIM can only process TABLO Input files containing at most 3000 statements, including no more than 300 EQUATIONS, 800 COEFFICIENTS, 400 VARIABLES, 1200 FORMULAs, 300 READs, 100 WRITEs, 100 DISPLAYs, 100 SETs and 100 SUBSET statements.
- 2) This version of GEMSIM is limited to models with at most 16000 unknowns in the condensed system, of which no more than 10000 can be endogenous. There can be no more than 27000 cumulatively-retained endogenous variables. The number of nonzeros in the Equations file plus the number of nonzeros after LU decomposition is limited to 240000. No variable in the condensed system can have more than 1300 components. At most 8000 shocks can be given. The total data associated with all COEFFICIENTs is limited to 80000 real numbers and 1000 integers. At most 800 set element names are allowed.
- 3) This version of SAGEM can handle all Equations files produced by the version of GEMSIM.
- 4) This version of GEMPIE is limited to at most 200 individual-column results, and at most 20 subtotals results.

- 5) This version of SLTOHT is limited to 100 individual-column results and 30 subtotal results.
- 6) This version of SUMEQ can process any Equations file produced by the version of GEMSIM.

7.3 Using Stored-input Files in a DOS Box

This section does not apply if you are running WinGEM.

You can use Stored-input files under DOS on 80386/80486/Pentium machines either via the GEMPACK **sti** option or using redirection of input as in, for example,

```
gemsim < sjlb.sti
```

If you make your own Stored-input files to use via input redirection, 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 for more about this.)

7.4 Interrupting Programs and Controlling Screen Output

This section only applies when you are running under DOS or in a DOS box.

7.4.1 Interrupting Programs

Sometimes you will start a program running 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.

7.4.2 Controlling Screen Output

Often screen output goes much too quickly for you to read. You can control it using the

Control-S Control-Q

keystrokes. (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).

Use Control-S to stop the screen output and Control-Q to start it again. You can repeat these as needed. However, if you get out of step, say by typing two Control-S in a row, you will lose control of the output and have to wait until the program ends; even Control-C (see section 7.4.1 above) will probably fail then.

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.)

7.5 DOS Batch Files

If you create DOS batch (.BAT) files for carrying out tasks including running GEMPACK programs, you may like to take advantage of the fact 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 ends unsuccessfully, the test of ERRORLEVEL after it aborts the batch job and gives a message saying that the job was unsuccessful.

```
REM Beginning of batch file
REM Run SAGEM
sagem < sag1.sti
REM test ERRORLEVEL to see if this was successful
if errorlevel 1 goto error
REM Run GEMPIE
gempie < gempl.sti
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
```

7.6 Summary of Windows NT changes

GEMPACK needs a DOS box with special options under Windows NT. We supply a special PIF file on the first GEMPACK disk called NT-RUN.PIF.

7.6.1 Installation under Window NT

Open Windows NT Explorer and locate the file called **NT-RUN** on the first install disk. Drag this file onto the desktop. Double-click on this file to open it, then follow the normal DOS installation procedure.

7.6.2 Using GEMPACK in a DOS box for Windows NT

Be sure to use the NT-RUN file to open the DOS box you work in. GEMPACK does not always work properly in ordinary Windows NT DOS boxes.

7.6.3 Using WinGEM with Windows NT

Alternatively use WinGEM to carry out GEMPACK tasks. WinGEM has been designed to work under all Windows platforms.

7.6.4 Creating a Windows NT PIF file for GEMPACK

If the PIF file NT-RUN.PIF is not available, you can create your own as follows:

1. Right click on the desktop
2. Select New | Shortcut
3. Type in command and click next.
4. Type in the file name eg "nt-run" and click finish
5. Right click on the new icon and select Properties
6. Select the Memory tab
7. Set Extended (XMS) memory | Total to 1.
8. Click on OK.

This NT-RUN pif file is used for installing GEMPACK on Windows NT and to run GEMPACK jobs in a DOS-like way under NT.

REFERENCES

GEMPACK DOCUMENTS⁴

GPD-1, An Introduction to GEMPACK, Third Edition, September 1996, pp.250+15.

GPD-2, User's Guide to TABLO and TABLO-Generated Programs, Second edition, April 1994, pp.138+14.

GPD-4, Release 5.2 of GEMPACK - New Features and Changes from Release 5.1, First edition, September 1996, pp.98+9.

⁴ The numbering of GEMPACK Documents has been re-started with Release 5 of GEMPACK, when the abbreviation "GPD" was first used. Previous editions of these documents did not have the same numbers as the current editions. Pre-Release-5 documents are numbered "GED-xx".

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