PC-OMNITAB: An Interactive System for Statistical and Numerical Data Analysis

Sally T. Peavy
Ruth N. Varner

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards
and Technology
Computing & Applied Mathematics Laboratory
Statistical Engineering Division
Gaithersburg, MD 20899

NIST

PC-OMNITAB: An Interactive System for Statistical and Numerical Data Analysis

Sally T. Peavy
Ruth N. Varner

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Institute of Standards
and Technology
Computing & Applied Mathematics Laboratory
Statistical Engineering Division
Gaithersburg, MD 20899

October 1992

TABLE OF CONTENTS

page

TABLE OF CONTENTS

page

I.   ABSTRACT AND KEY WORDS

PC-OMNITAB, an interactive system for statistical and numerical data analysis, is an extension of OMNITAB 80 as described in NBS Special Publication 701. The system can be implemented on a 386/486 personal computer which has a math co-processor and at least 4 MBytes of RAM. PC-OMNITAB responds to simple instructions to obtain accurate results since reliable, varied and sophisticated algorithms for data analysis and manipulation are referenced.

Key words: Array and matrix operations; Bessel functions; data analysis and manipulation; interactive; linear least squares fit; mathematical and statistical software system; numerical analysis; PC-OMNITAB; personal computer; plotting; probability functions; software; statistical analysis; tabulation; thermodynamic properties.

II.   INTRODUCTION

PC-OMNITAB is a high-level, free-format English like syntax language to perform simple arithmetic, complex arithmetic, trigonometric calculations, data manipulation, special function calculations, statistical analysis and matrix and array operations. PC-OMNITAB is an extension of OMNITAB 80 as documented in NBS Special Publication 701 [1].
OMNITAB 80 was modified to make the system more adaptable to personal computers. The Addendum describes PC-OMNITAB, Version 7.0 and document changes and additions made to OMNITAB 80, Version 6.0.

III.   SOFTWARE DESCRIPTION

PC-OMNITAB is an executable module (2.6 MBytes) for a 386 or 486 personal computer with a math co-processor and at least 4 MBytes of RAM. It requires MS DOS 3.3 or above, the OTG DBOS (DOS operating system extension) and the OTG FTN77 run time library. The OTG products are available from OTG SYSTEMS INC. (717-222-9100).

IV.   SOFTWARE AVAILABILITY and IMPLEMENTATION

PC-OMNITAB is available for purchase through NTIS (National Technical Information Service), Springfield, VA 22161. The package consists of executable PC-OMNITAB, an INSTALL.BAT and a README.BAT file. Please read the README.BAT file before installing PC-OMNITAB.

V.   SOFTWARE VALIDATION

Sufficient testing of computer software is essential. The published test problems [2] have been used to validate the PC-OMNITAB computer software and the results agree with the published results except in some cases where the differences are due to differences in computer accuracy.

VI. ACKNOWLEDGMENTS

The authors would like to thank Shirley Bremer of the Statistical Engineering Division for her assistance in testing the PC-OMNITAB software package and for assisting in the composition of the README.BAT and INSTALL.BAT files.

VII. REFERENCES

[1]   Peavy, S.T.; Bremer, S.G.; Varner, R.N.; and Hogben, D., "OMNITAB 80: An Interactive System for Statistical and Numerical Data Analysis," NBS Special Publication 701, November 1986.

[2]   Peavy, S.T.and Bremer, S.G., "Test Problems and Results for OMNITAB 80," NBS Technical Note 1147, November 1981.

VIII. DISCLAIMER

The specific software products identified in this document do not imply either approval or endorsement by the authors or by the National Institute of Standards and Technology.

IX. ADDENDUM TO NBS SPECIAL PUBLICATION 701

Addition to Table of Contents

Changes PART C: Section 1.1.

OMNITAB instruction.

Replace the 4th sentence in the first paragraph with the following sentence.

The amount of information printed varies if the WIDTH instruction (sec. C1.5) has been invoked.

Replace conditions (15) and (16) as shown below.

(15) WIDTH or number of characters printed per line is set to 72.
(16) LENGTH or maximum number of lines printed per page is set to 18.

Add the following condition.

(18) The BRIEF mode is on for automatic printing (sec. C1.6).

1.4 *Use of OMNITAB With Terminals*

CONTENTS, CRT, DESCRIBE, FILE, INTERACTIVE, LOCAL, REMOTE, TERMINAL

CRT instruction.

> *The second and third sentences in paragraph one should be replaced with the following sentences.*
>
> The following message ... HIT CARRIAGE RETURN TO CONTINUE ... is printed at the end of each page. Printing will continue when the enter key is depressed. CRT is the default option.
>
> *The second paragraph is obsolete.*

FILE instruction.

<div style="border:1px solid">

FILE   filename.ext

</div>

The file instruction causes all subsequent instructions and/or data to be read from the named file instead from the keyboard. The maximum number of named files that may be nested is 10. If a fatal error occurs, the rest of the instructions will be scanned for other errors but not executed. Error messages are displayed on the screen. Control returns to the terminal when the end of the named file is reached. The maximum number of characters for filename.ext is 73. If the filename.ext is not in the OMNITAB directory, the filename.ext must be proceeded by the path as described in MS DOS.

INTERACTIVE instruction.

> Since the default option is the INTERACTIVE mode this instruction is obsolete and should not be used. Therefore the information in the description of the INTERACTIVE instruction form should be ignored. The optional form of the INTERACTIVE instruction is equivalent to the WIDTH instruction.

LOCAL instruction.

> *Add the following sentence to the description of the LOCAL instruction.*

> Upon use of this instruction the defaults become BRIEF and CRT.

REMOTE instruction.

> *Add the following information to the description of the remote instruction.*

> The name of the output file is OMNITAB.OUT in the OMNITAB directory.

> LENGTH is reset to 50 lines per page and WIDTH is 72 characters per line unless LENGTH and/or WIDTH have been redefined by the user. FULL becomes the default instruction. If any errors occur, the appropriate message is shown on the screen. Output will be appended to the OMNITAB.OUT file upon subsequent use of the REMOTE instruction.

REMOTE filename.ext

This instruction is the same as the above except it allows the user to specify the output file. The maximum number of characters permitted for filename.ext is 73. The filename.ext must be proceeded by the path as described in MS DOS if the user wishes

the named file to be in a directory other then the OMNITAB
directory.

TERMINAL instruction.

*Replace the description of the TERMINAL instruction with the
following information.*

A TERMINAL instruction is equivalent to a LOCAL instruction
and in addition suppresses the printing of the LIST OF DATA,
INSTRUCTIONS AND DIAGNOSTICS and the MESSAGE after
the complete set of instructions has been executed.

Changes PART C: Section 1.5

LENGTH instruction.

*The following sentence should be added to the first paragraph in
the description of the LENGTH instruction.*

The default option is 18 lines per page unless the REMOTE
instruction is used or the LENGTH instruction has been invoked.

WIDTH instruction.

*Replace the first 5 paragraphs in the description of the WIDTH
instruction with the following text.*

The maximum number of characters (including blanks) which is
printed on a line is c. It is used to adjust the maximum number of
columns printed on a page and the size of plots. The OMNITAB
instruction sets $c = 72$.

A WIDTH c instruction determines the maximum number of columns printed on a page by the PRINT instruction as follows:

c	Number of columns
15 to 29	1
30 to 44	2
45 to 59	3
60 to 74	4
75 to 89	5
90 to 104	6
105 to 119	7
120	8

Thus, if c is 72, up to four columns per page will be printed.

The instruction has no effect on print instructions which have a formal qualifier such as PRINT "L", ABRIDGE "L", ETC., nor does it control the line width for any of the WRITE TAPE or WRITE UNIT instructions. Also, it has no effect on the printing of error messages or the LIST OF DATA, INSTRUCTIONS AND DIAGNOSTICS. CalComp and Tektronix plots are not affected by the use of a WIDTH or LENGTH instruction since the size of plots is determined directly by the instructions used.

The minimum value of c is 15 and the maximum 120. If a value of c is outside of this range, the informative diagnostic

THE INSTRUCTION WAS IGNORED BECAUSE ...
WIDTH = (n) IS TOO SMALL OR TOO LARGE.

is printed and c is set to 72.

Changes PART C: Section 1.6

BRIEF instruction.

Include the following sentence in the description of the BRIEF instruction.

BRIEF is the default option. This command also affects the automatic output of the ONEWAY command. Box plots are not displayed.

Changes PART C: Section 2.8

Replace the first paragraph in the general description on the Use of Peripheral Devices with the following text.

The peripheral device is a file in the directory the user is in at the time OMNITAB is executed. The file name is UNITX.DAT where X is the letter according to the qualifier "L". The word TAPE is synonyms with UNIT.

Note concerning PART C: Sections 3.7 and 3.10

The commands described in these sections are not available to users of OMNITAB 80, Version 7.0, since TEKTRONIX and CALCOMP commands require graphics hardware and proprietary software.

8

Addition to PART C: Section 6.4

6.4 Regression

FIT, POLYFIT, SFIT, SPOLYFIT, LARFIT, VFIT, VPOLYFIT

Two new instructions have been added to OMNITAB 80, Version 7.0. These two instructions are VFIT and VPOLYFIT. The number of arguments and results of these instructions are the same as the FIT and POLYFIT instructions except one or two extra plots are displayed at the end of the automatic printout. If the degree of the polynomial is one (for VPOLYFIT), only the first plot is displayed. In the VFIT instruction only the first plot is displayed if the first independent variable is a column of ones or the number of independent variables is one. The two plots are "ABSOLUTE STANDARDIZED RESIDUALS VS PREDICTED RESPONSE" *and* "ABSOLUTE STANDARDIZED RESIDUALS VS LINEAR PREDICTOR OF ABSOLUTE STANDARDIZED RESIDUALS".

BIBLIOGRAPHIC DATA SHEET

4. TITLE AND SUBTITLE

PC-OMNITAB: An Interactive System for Statistical and Numerical Data Analysis

5. AUTHOR(S)

Sally T. Peavy and Ruth N. Varner

6. PERFORMING ORGANIZATION (IF JOINT OR OTHER THAN NIST, SEE INSTRUCTIONS)

U.S. DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
GAITHERSBURG, MD 20899

7. CONTRACT/GRANT NUMBER

8. TYPE OF REPORT AND PERIOD COVERED

9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (STREET, CITY, STATE, ZIP)

10. SUPPLEMENTARY NOTES

11. ABSTRACT (A 200-WORD OR LESS FACTUAL SUMMARY OF MOST SIGNIFICANT INFORMATION. IF DOCUMENT INCLUDES A SIGNIFICANT BIBLIOGRAPHY OR LITERATURE SURVEY, MENTION IT HERE.)

PC-OMNITAB, an interactive system for statistical and numerical data analysis, is an extension of OMNITAB 80 as described in NBS Special Publication 701. The system can be implemented on a 386/486 personal computer which has a math coprocessor and at least 4 MBytes of RAM. PC-OMNITAB responds to simple instructions to obtain accurate results since reliable, varied and sophisticated algorithms for data analysis and manipulation are referenced.

12. KEY WORDS (6 TO 12 ENTRIES; ALPHABETICAL ORDER; CAPITALIZE ONLY PROPER NAMES; AND SEPARATE KEY WORDS BY SEMICOLONS)

array and matrix operations; Bessel functions; data analysis and manipulation; interactive; linear least squares fit; mathematical and statistical software system; numerical analysis; PC-OMNITAB; personal computer; plotting; probability functions; software; statistical analysis; tabulation; thermodynamic properties.

13. AVAILABILITY

X	UNLIMITED
	FOR OFFICIAL DISTRIBUTION. DO NOT RELEASE TO NATIONAL TECHNICAL INFORMATION SERVICE (NTIS).
	ORDER FROM SUPERINTENDENT OF DOCUMENTS, U.S. GOVERNMENT PRINTING OFFICE, WASHINGTON, DC 20402.
X	ORDER FROM NATIONAL TECHNICAL INFORMATION SERVICE (NTIS), SPRINGFIELD, VA 22161.

14. NUMBER OF PRINTED PAGES

13

15. PRICE

A02

ELECTRONIC FORM