The NOSMAD Macro

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1. INTRODUCTION

The MADETC macro described earlier has been modified in order to make it compatible with the NOS/BE operating system on the CYBER 835 and 875 computers at CERN. Several other modifications were made at the same time. In order to provide a self-contained document, much of the information given in earlier notes [1,2,3] is repeated here. The new macro is called NOSMAD. After a testing period, it may be transferred to ID=LE490LEP. The SCRIPT input for this LEP note is kept in the file $IZ.KE1.MAD(DESCNOS). An up-to-date version can be obtained by submitting it to the IBM system. An up-to-date listing of the macro is kept in the LEP data base [4]. It can be obtained by executing the job shown in Fig. 1.

2. USE OF THE NOSMAD MACRO

The NOSMAD macro is initiated by the following control card sequence:

```
jobnam,T37,STMFx,EC300.
ACCOUNT,user,group,accno.
FIND,NOSMAD,1D=LE490KEIL.
NOSMAD,par,opt1=val1,...,optn=valn.
*End-of-record
< PATCHY commands generating MAD data (see[4]) >
*End-of-record
< PATCHY commands generating "par" data (see[4]) >
*End-of-record
< Data for a private program called inside NOSMAD >
```

On the job card, the station parameter STMFx may be either STMFB or STMFA. The NOSMAD macro runs on either machine, but more slowly on MFA. The EC parameter is necessary because MAD uses extended core memory for LEVEL 2 arrays. On the NOSMAD call, the quantity "par" is called a PARAMETER. It must take one of the forms
shown in Table 1 and initiates the execution of the corresponding ancillary program. A NOSMAD call without a parameter causes only the execution of MAD [5] itself. The available ancillary programs are discussed in Chapter 3. The NOSMAD macro contains two PATCHY steps, the first for MAD and the second for ONE ancillary program. Each needs its own batch of PATCHY commands. If an ancillary program is to be executed after MAD, and if that program needs data from the LEP data base, then the PATCHY commands must be supplied in the second batch. The *End-of-record marker after the second batch of PATCHY commands must be present if data for a private program follows. The PATCHY commands operate on one of two PAM files, stored with permanent file names LEP13PROPAM and LEP13DEVPAM. Which of the two files is used depends on the value of the VERSION option, PRO or DEV. The ID of these permanent files can be controlled by the user with the help of the IDPAM option described in Chapter 4. The default is LE490LEP. The construction of the PATCHY commands depends on the structure and the naming conventions of the data base [4]. This, however, is outside the scope of this note. The NOSMAD macro may also be used without the database, by simply creating patches containing data for MAD and the ancillary program. An example is shown in Fig. 5.

The quantities opt1 to optn are called OPTIONS. They must take one of the forms shown in Table 2, and modify the execution of MAD and of the ancillary program. Their use is further discussed in Chapters 4 and 5.

The version of MAD is selected by the DEV option. DEV=T is the default and selects the development version, while DEV=F selects the production version. Both versions of MAD write TAPE3 in formatted style [6].

3. AVAILABLE ANCILLARY PROGRAMS

A list of the ancillary programs which can be executed within the NOSMAD macro is given in Table 1. Their execution is initiated by including the corresponding parameter in the NOSMAD call. Since the HARMON program [7] is now part of the MAD package, it no longer appears in the list of ancillary programs. All ancillary programs read TAPE3 in formatted style [6].

For most ancillary programs it is possible to specify cycle numbers and file identifiers by options. In this way, several versions of these programs may be manipulated. Users who do not mention any of the options shown in Table 1 will get the NOSMAD macro executed with the default options. Users who do mention them must make sure that the requested file(s) actually exist. The NOSMAD macro assumes that all ancillary programs are stored in the form of LGO files. The use of this facility may become clearer by giving two examples.

A macro call
TABLE 1

List of Programs With User-Defined Options

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Permanent file name</th>
<th>Options</th>
<th>Default</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMP</td>
<td>NOSMBMPRM</td>
<td>CYBMP</td>
<td>IDBMP</td>
<td>LE490GYGI 8</td>
</tr>
<tr>
<td>GDP</td>
<td>NOSMGDP</td>
<td>CYGDP</td>
<td>IDGDP</td>
<td>LE490GYGI 8</td>
</tr>
<tr>
<td>LST</td>
<td>MLST</td>
<td>CYLST</td>
<td>IDLST</td>
<td>LE490KEIL 9</td>
</tr>
<tr>
<td>PAT</td>
<td>NOSMTOPAT</td>
<td>CYPAT</td>
<td>IDPAT</td>
<td>LE490GYGI 8</td>
</tr>
<tr>
<td>PET</td>
<td>MPET</td>
<td>CYPET</td>
<td>IDPET</td>
<td>LE490MART 10</td>
</tr>
<tr>
<td>PLOT</td>
<td>NOSMPLOTS</td>
<td>CYPLOT</td>
<td>IDPLOT</td>
<td>LE490GYGI 8</td>
</tr>
<tr>
<td>TRPT</td>
<td>NOSMTOTPT</td>
<td>CYTRPT</td>
<td>IDTRPT</td>
<td>LE490GYGI 8</td>
</tr>
<tr>
<td>PRIV</td>
<td>private</td>
<td>CYPRIV</td>
<td>IDPRIV</td>
<td></td>
</tr>
</tbody>
</table>

NOSMAD, BMP.

is equivalent to

NOSMAD, BMP, CYBMP=1, IDBMP=LE490GYGI.

A user who wants to load a private version of MBMPRM instead of the standard one, must store it with permanent file name NOSMBMPRM, ID=id, CY=c, and may then call it with the following macro call:

NOSMAD, BMP, CYBMP=c, IDBMP=id, ... .

The PRIV parameter and its associated options CYPRIV, IDPRIV, and NAPRIV allow the user to execute his own private program inside the NOSMAD macro. A NOSMAD call of the form

NOSMAD, PRIV, CYPRIV=c, IDPRIV=id, NAPRIV=n.

executes the following control card sequence after the execution of PATCHY and MAD, but just before leaving the NOSMAD macro:

RETURN, PRIV.
FIND, PRIV, n, CY=c, ID=id.
PRIV.

The private program, which must be written and compiled in FORTRAN 77, disposes of the following libraries: PRDLIB, PMGLIB, NAGLIB. The LGO file must be catalogued by a control card

CATALOG, LGO, n, CY=c, ID=id.
and it must run in the NOSMAD environment with the file names declared on its program card. If it needs data on the \texttt{INPUT} file they have to be supplied after the second batch of \texttt{PATCHY} commands, separated by an \texttt{*EOR} line. The main aim of the \texttt{PRIV} parameter is to provide a hook for private programs unknown to the NOSMAD macro. However, it is possible to invoke one of the standard ancillary programs in this manner. The NOSMAD call

\texttt{NOSMAD, PRIV, NAPRIV=\texttt{NOSMBPRM}, CYPRIV=1, IDPRIV=LE490GYG1.}

will load the MBMPRM program. This method of calling MBMPRM may be advantageous when one wants to read MBMPRM data from the \texttt{INPUT} file, rather extract them from the data base. Another way of bypassing the data base is shown in Fig. 5.

4. LIST OF AVAILABLE OPTIONS

\begin{table}[h]
\centering
\caption{Alphabetic List of Options}
\begin{tabular}{llll}
\hline
Option & Default & Ex. & Action \\
\hline
\texttt{CALLPFN} & \texttt{DUMMY} & 3 & Define pfn of \texttt{CALL} file \\
\texttt{CATDISP} & \texttt{F} & 10 & Catalog \texttt{DISPLY} file(s) (F/T) \\
\texttt{DATA} & \texttt{F} & 1 & List MAD data (F/T) \\
\texttt{DEV} & \texttt{T} & 2 & Select MAD version (F/T) \\
\texttt{ECHO} & \texttt{T} & 1 & List ECHO file (F/T) \\
\texttt{FORMS} & \texttt{NP} & 10 & Select Versatec forms (NP/WP/NV/WV) \\
\texttt{IBMTIME} & 1 & 10 & Time limit for IBM plot jobs in minutes \\
\texttt{ID} & \texttt{NETWORK} & 3 & Define ID of pf’s read and/or written \\
\texttt{IDPAM} & \texttt{LE490lep} & 8 & Define ID of PAM file \\
\texttt{IDUSER} & \texttt{LE490KEIL} & 10 & Define ID of \texttt{USERPLT} \\
\texttt{PL} & \texttt{10000} & 4 & Define print limit \\
\texttt{PLOT} & \texttt{T} & 5 & Plot \texttt{DISPLY} file on line printer (F/T) \\
\texttt{ROOM} & \texttt{X4} & 6 & Define delivery point for plots \\
\texttt{RP} & \texttt{14} & 3 & Define retention period for pf’s \\
\texttt{SAVEPFN} & \texttt{DUMMY} & 3 & Define pfn of \texttt{SAVE} file \\
\texttt{VERSION} & \texttt{PRO} & 7 & Define version of database (DEV/PRO) \\
\texttt{VTX} & \texttt{F} & 10 & Plot \texttt{DISPLY} file on Versatec plotter (F/T) \\
\texttt{XMAX} & \texttt{MM2000} & 10 & Define maximum length of plot \\
\texttt{XR} & \texttt{MM250} & & Define horizontal size of plots \\
\texttt{YR} & \texttt{MM180} & & Define vertical size of plots \\
\hline
\end{tabular}
\end{table}

Table 2 gives an alphabetic list of the options provided in the NOSMAD macro, excluding the options for defining CY and ID.
parameters of the ancillary programs which appear already in Table 1. The default values and the number of the figure which gives an example of their use are also shown.

5. OUTPUT FILES FROM THE NOSMAD MACRO

The local and permanent file names of output files from MAD and its ancillary programs are shown in Table 3. The ID parameter of the permanent files is controlled by the ID option in the NOSMAD call, its default value is NETWORK. The retention period of permanent files is controlled by the RP option. Its default is 14 days. When leaving the NOSMAD macro, only the files marked with an asterisk (*) are still available. All other files are returned earlier. The print limits of MAD, MBMPRM and MPET can be adjusted with the PL option. Its default is 10000 lines.

The output from MTOTPT is now a simple editor file, rather than an UPDATE library. However, the first line still contains the deck name specified in the MTOTPT data.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Program</th>
<th>Local file</th>
<th>Permanent file</th>
<th>Record Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAD</td>
<td>*OUTPUT</td>
<td>*TAPE3</td>
<td>MADDISP</td>
<td>RT=W, BT=I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECHO</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TAPE10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMP</td>
<td>MBMPRM</td>
<td>*OUTPUT</td>
<td>GDPDISP</td>
<td>RT=W, BT=I</td>
</tr>
<tr>
<td>GDP</td>
<td>MGDP</td>
<td>*OUTPUT</td>
<td>GDPDISP</td>
<td>RT=W, BT=I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DISPLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LST</td>
<td>MLST</td>
<td>*OUTPUT</td>
<td>PATDATA</td>
<td>RT=Z, BT=C, FL=80</td>
</tr>
<tr>
<td>PAT</td>
<td>MTOPAT</td>
<td>*OUTPUT</td>
<td>PATDATA</td>
<td>RT=Z, BT=C, FL=80</td>
</tr>
<tr>
<td>PAT</td>
<td>MTOPAT</td>
<td>TAPE5</td>
<td>PETDATA</td>
<td>RT=Z, BT=C, FL=80</td>
</tr>
<tr>
<td>PET</td>
<td>MPET</td>
<td></td>
<td>PLTDISP</td>
<td>RT=W, BT=I</td>
</tr>
<tr>
<td>PLOT</td>
<td>MPLOTS</td>
<td>*OUTPUT</td>
<td>PLTDISP</td>
<td>RT=W, BT=I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DISPLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRPT</td>
<td>MTOTPT</td>
<td>*OUTPUT</td>
<td>TPTDATA</td>
<td>RT=Z, BT=C, FL=80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TAPE5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The processing of graphical output produced by MAD and the ancillary programs MGDP and MPLOTS is controlled by options.
CATDISP=T catalogs the DISPLY file with the permanent file name shown in Table 3 and ID as specified in the NOSMAD call (default NETWORK). The default is CATDISP=F.

PRPLOT=T plots the DISPLY file on the line printer. This is the default. PRPLOT is called such that it expects its input data on a dummy file which does not exist. This helps users who wish to execute a private program inside or after the NOSMAD macro. The sequence of data and *EOR marks in the NOSMAD jobs is always that shown in Chapter 2, and independent of the number of times PRPLOT is called.

VTPLOT=T plots the DISPLY file on the Versatec plotter. The default is VTPLOT=F. The paper type and plot length can be controlled with the options FORMS (default NP) and XMAX (default MM2000). The size of the plots generated by MAD can be controlled with the options XR (default MM250) and YR (default MM180). Their effect is described on page 12 of Computer Newsletter 165. The size of the plots generated by MGDP and MPLOTS and their layout on narrow paper is communicated to GD3VT via a permanent file USERPLT with ID=IDUSER. A standard version is stored with ID=LE490KEIL. It contains the following information:

//P_PLOTPARM DD * 
&PLOT MODEL=1200, YMIN=-2.0, YMAX=24.8, SCALE=1.00, LYNES=1000, 
XMIN=-2.0, XMAX=300.0, MODE=0, UNITS=2.540, MSGSW=1, REGION=600, 
ID=1, LBLK=16000, MSGLVL=1, IOMASK=10000, IOPT=4, SPACE=0.0 &END

The time limit in minutes of the plot job running on the IBM system can be adjusted with the IBMTIME option. Its default is IBMTIME=1, corresponding to 1 minute.

6. EXAMPLES

In the examples given in Figs. 1 to 11, comments are inserted for clarification. All the small print has to be replaced and the PATCHY commands have to be filled in by the user. They depend on the construction of the database [4] and are outside the scope of this note. The NOSMAD macro is used as much as possible even where no MAD execution is asked for, in order to shield the potential user from the details of the data structure. The examples are also stored in the partitioned dataset $SIZ.KEI.EXAMPLES. Lines starting with * are PATCHY command, with comments following the period (.)

- 6 -
jobnam, STMFx, EC300, Tnn.
ACCOUNT, name, group, accno.
COMMENT. EXTRACT THE NOSMAD PATCH FROM THE DATA
COMMENT. BASE AND PRINT IT USING THE DATA=T OPTION
COMMENT. ON THE NOSMAD CALL. PRINTING OF THE
COMMENT. ECHO FILE IS SUPPRESSED BECAUSE IT
COMMENT. WOULD BE FULL OF IRRELEVANT ERROR
COMMENT. MESSAGES SINCE NOSMAD IS ILLEGAL MAD DATA.
FIND, NOSMAD, ID=LE490KEIL.
NOSMAD, DATA=T, ECHO=F.
*EOR
  *USE, NOSMAD.
  EXTRACT NOSMAD FROM DATA BASE
  *EXE.
  *PAM.
  *QUIT.

Figure 1: How to list the NOSMAD macro

jobnam, STMFx, EC300, Tnn.
ACCOUNT, name, group, accno.
COMMENT. EXECUTE THE PRODUCTION VERSION OF MAD
COMMENT. USING DATA IN THE DATA BASE.
FIND, NOSMAD, ID=LE490KEIL.
NOSMAD, DEV=F.
*EOR
< PATCHY commands generating MAD data (see [4])>

Figure 2: Execute production version of MAD
jobnam,STMFx,EC300,Tnn.
ACCOUNT,name,group,accno.
COMMENT: THIS EXAMPLE SHOWS THE USE OF THE CALLPFN
COMMENT AND SAVEPFN OPTIONS WHEN MAD IS USED FOR
COMMENT MATCHING. CALLPFN ATTACHES A MAD LATTICE
COMMENT AND SAVEPFN CATALOGS ONE. THE PERMANENT
COMMENT FILES ARE CATALOGUED WITH ID=id.
FIND,NOSMAD,ID=LE490KEIL.
NOSMAD,CALLPFN=B1T1LA,SAVEPFN=B1T1LB,ID=id,RP=30.
*EOR
< PATCHY commands generating MAD data (see [4])>

Figure 3: Execute MAD with matching and CALLPFN and
SAVEPFN options

jobnam,STMFx,EC300,Tnn.
ACCOUNT,name,group,accno.
COMMENT: IN ORDER TO EXECUTE MBPRM AFTER MAD,
COMMENT THE PARAMETER BMP MUST APPEAR ON THE
COMMENT NOSMAD CALL. THE PRINT LIMIT IS 20000.
FIND,NOSMAD,ID=LE490KEIL.
NOSMAD,BMP,DATA=T,PL=20000.
*EOR
< PATCHY commands generating MAD data (see [4])>
*EOR
< PATCHY commands generating MBPRM data (see [4])>

Figure 4: Execute MAD and MBPRM
Figure 5: Execute MAD and MBMPRM without PAM file

Figure 6: Execute MAD and MDGP
jobnam, STMFx, EC300, Tnn.
ACCOUNT, name, group, accno.
COMMENT. MAD IS EXECUTED WITH THE DEV VERSION OF THE
COMMENT. DATA BASE. IN ORDER TO EXECUTE MLST AFTER
COMMENT. MAD, THE OPTION LST MUST APPEAR ON THE
COMMENT. NOSMAD CALL. SINCE MLST DOES NOT NEED DATA
COMMENT. ON THE ASM FILE, ONLY THE PATCHY COMMANDS
COMMENT. FOR MAD ARE NECESSARY.
FIND, NOSMAD, ID=LE490KEIL.
NOSMAD, LST, VERSION=DEV.
*EOR
< PATCHY commands generating MAD data (see [4])>

Figure 7: Execute MAD and MLST

jobnam, STMFx, EC300, Tnn.
ACCOUNT, name, group, accno.
COMMENT. MAD IS EXECUTED FROM A DEVELOPMENT DATA
COMMENT. BASE STORED WITH PFN LEP13DEVPMAM AND ID=id.
COMMENT. IN ORDER TO EXECUTE MTOPAT AFTER MAD, THE
COMMENT. PARAMETER PAT MUST APPEAR ON THE NOSMAD
COMMENT. CALL.
FIND, NOSMAD, ID=LE490KEIL.
NOSMAD, PAT, VERSION=DEV, IDPAM=id.
*EOR
< PATCHY commands generating MAD data (see [4])>
*EOR
< PATCHY commands generating MTOPAT data (see [4])>

Figure 8: Execute MAD and MTOPAT
jobnam,STMFx,EC300,Tnn.
ACCOUNT,name,group,accno.
COMMENT. IN ORDER TO EXECUTE MPET AFTER MAD, THE
COMMENT. OPTION PET MUST APPEAR ON THE NOSMAD CALL.
COMMENT. SINCE MPET DOES NOT NEED BCD DATA ON
COMMENT. THE ASM FILE. ONLY THE PATCHY COMMANDS FOR
COMMENT. MAD ARE NECESSARY.
FIND,NOSMAD,ID=LE490KEIL.
NOSMAD,PET.
*EOR
< PATCHY commands generating MAD data (see [4])>

Figure 9: Execute MAD and MPET

jobnam,STMFx,EC300,Tnn.
ACCOUNT,name,group,accno.
COMMENT. IN ORDER TO EXECUTE MPLOTS AFTER MAD, THE
COMMENT. PARAMETER PLOT MUST APPEAR ON THE NOSMAD
COMMENT. CALL. THE DISPLAY FILE IS CATALOGUED WITH ID=id,
COMMENT. THE PLOT ON THE LINE PRINTER IS SUPPRESSED,
COMMENT. A VERSATEC PLOT ON NARROW VELLUM PAPER IS
COMMENT. PRODUCED. THE USERPLT FILE WITH ID=id IS USED.
FIND,NOSMAD,ID=LE490KEIL.
NOSMAD,PLOT,CATDISP=T,VTPLT=T,FORMS=NV,PRPLOT=F,
ID=id,XMAX=MM3000,IBMTIME=5,1DUSER=id.
*EOR
< PATCHY commands generating MAD data (see [4])>
*EOR
< PATCHY commands generating MPLOTS data (see [4])>

Figure 10: Execute MAD and MPLOTS
jobnam,STMFx,EC300,Tnn.
ACCOUNT,name,group,accno.
COMMENT: IN ORDER TO EXECUTE MTOTPT AFTER MAD,
COMMENT: THE PARAMETER TRPT MUST APPEAR ON THE
COMMENT: NOSMAD CALL.
FIND,NOSMAD,ID=LE490KEIL.
NOSMAD,TRPT,DATA=T.
*EOR
< PATCHY commands generating MAD data (see [4])>
*EOR
< PATCHY commands generating MTOTPT data (see [4])>

Figure 11: Execute MAD and MTOTPT

7. REFERENCES

2. E. Keil, LEP Theory Note 17 (1983)
10. B. Zotter, LEP note 37 (1978)