Procedure IMPR_TABLE

1 Drank

To print the contents of an array in a file.

The command makes it possible to print a subset of the array under various formats. The format by default (TABLEAU) is practical for an examination by software of type spreadsheet, other formats allow a direct visualization with a graph plotter (for example xmgrace or agraf).

2 Syntax

```
IMPR_TABLE    (
      ♦TABLE  =matable ,                                          [tabl_*]
      ◊TITER=titer
[l_Kn]
      ◊UNITE=/           8,
[DEFAULT]
                        /links,                                    [I]

      # 1. choice of the lines to be printed:
      ◊FILTRE    = (_F (  ♦NOM_PARA          = para,                 [kN]
                        ◊/CRIT_COMP=             /"EQ",
[DEFAULT]
                                                  /"NE",
                                                 /"LT",
                                                 /"GT",
                                                  /"LE",
                                                 /"GE",

                              ♦/      VALE_I  = ival,              [I]
                                 /    VALE_K  = kval,              [kN]

                                 //      VALE   = rval,            [R]
                                    /    VALE_C    = cval,            [C]
                                 ◊   |    accuracy =   prec,     [R8]
                                                      /1.0D-3,
[DEFAULT]
                                     |  CRITERE=/    "RELATIF",
[DEFAULT]
                                                      /"ABSOLU",

                           /CRIT_COMP        =     /"MAX I",
                                                 /"MAXI_ABS",
                                                 /"MINI",
                                                 /"MINI_ABS",
                                                 /"VIDE",
                                                 /"NON_VIDE",
                     ),),

      # 2. choices of the columns to be printed:
      will ◊NOM_PARA=lpara             ,
    [l_Kn]

      # 3. choices about the lines to be printed:
      ◊TRI    = (_F (  will ♦NOM_PARA=lpara          ,
       [l_Kn]
                  ◊ORDRE    =       "CROISSANT" ,                  [l_Kn]
                                      /"DECREASING",
                ),),

      # 4. choices of the formats of printing:
      ◊FORMAT=/          "TABLEAU",
[DEFAULT]
                        /"ASTER",
                        /"XMGRACE",
                        /"AGRAF",
                        /"TABLEAU_CROISE",

      ◊PAGINATION=lpagi             ,                            [l_Kn]
      ◊   FORMAT_R=/             "E12.5",                        [DEFAULT]
```

```
                        /form  ,
    ◊FORMAT_C=/                 "MODULE_PHASE",                 [DEFAULT]
                        /   "REEL_IMAG",
    ◊IMPR_FONCTION=/            "NON",                          [DEFAULT]
                        /   "OUI',
    ◊INFO=/1            ,                                       [DEFAULT]
                 /2  ,

    # If FORMAT = "XMGRACE"
    ◊PILOTE=/           "XMGRACE",                              [DEFAULT]
                      /"POSTSCRIPT",                          [kN]
                      /"EPS",
                      /"MIF",
                      /"SVG",
                      /"PNM",
                      /"PNG",
                      /"JPEG",
                      /"PDF",
                      /"INTERACTIF",

# Put on page if FORMAT = "TABLEAU"

    ◊SEPARATEUR   =/separ         ,                             [DEFAULT]
                        /   "",                           [kN]
    ◊COMMENTAIRE  =/com           ,                             [kN]
                        /   "#",                                [DEFAULT]
    ◊COMM_PARA    =/comp          ,                                [kN]
                        /   "",                                 [DEFAULT]
    ◊DEBUT_LIGNE  =/deb           ,                             [kN]
                        /   "",                                 [DEFAULT]
    ◊FIN_LIGNE    =/fin           ,                             [kN]
                        /   " \,                                [DEFAULT]

# Formatted if FORMAT = "XMGRACE"
    ◊LEGENDE=leg              ,                                 [kN]
    ◊STYLE=sty                    ,                                [I]
    ◊COULEUR=coul             ,                                 [I]
    ◊MARQUEUR=marq                ,                                [I]
    ◊FREQ_MARQUEUR=fm             ,                                   [I]
    ◊BORNE_X=                (xmin, xmax),                        [l_R]
    ◊BORNE_Y=                (ymin, ymax),                        [l_R]
    ◊ECHELLE_X=/                 "LIN",                          [kN]
                        /   "LOG",
    ◊ECHELLE_Y=/                 "LIN",                          [kN]
                        /   "LOG",
    ◊GRILL_X=pasx             ,                                 [R]
    ◊GRILL_Y=pasy             ,                                 [R]
    ◊LEGENDE_X=legx               ,                                [kN]
    ◊LEGENDE_Y=legy               ,                                [kN]

          )
```

3 Operands

3.1 What an array ?

An array is a data structure of character data-processing making it possible to store a set of whole, real, complex values or character strings.

An array is comparable to the worksheet of a spreadsheet, i.e. one can see it like a list of **columns** in opposite. Each column has a field name, that we call **parameter**, and contains of the similar data of type: I, R, C, K8, K16, K24 or K32.

Example:

NUME_ORDRE	INST	NOEUD	G
1	10.	N1	5.
1	10.	N2	6.
1	10.	N3	7.
1	10.	N4	8.
2	20.	N1	9.
2	20.	N2	9.
2	20.	N3	8.
2	20.	N4	8.
3	30.	N1	7.
3	30.	N2	6.
3	30.	N3	5.

One can also see the array as a succession of records (which we will call **lines**). All the lines do not have inevitably the same structure (i.e. same parameters). For example:

ACTION	NUME_ORDRE	INST	NOEUD	DX	DY	MESH	SIXX
INTITULE 1	1	10.	N1	3.	5.		
INTITULE 1	1	10.	N2	6.	7.		
INTITULE 1	1	10.	N3	8.	9.		
INTITULE 1	2	20.	N1	11.	12.		
INTITULE 1	2	20.	N2	15.	13.		
INTITULE 1	2	20.	N3	19.	18.		
INTITULE 2	2	20.				MA1	-12.
INTITULE 2	2	20.				MA2	-14.

To print the contents of an array, the user will be able:

- to select the columns and the lines which he wants to print [§3.6]
- to choose a criterion of order of printing of the lines [§3.7]
- to choose the “format” of printing: in lines, in tables,… [§3.8]

3.2 Operand COUNTS

♦TABLE = matable

Name of the array which one wants to print

3.3 Operand TITER

◊TITER = title

Character string which will be printed before the array (and before the title possibly attached to the array). This character string can make it possible to better distinguish from the printings of arrays put end to end in the same file.

3.4 Operand UNITE

Makes it possible to choose in which file, one prints the array.
By default, UNITE = 8 what corresponds to the file .resu.
With format "XMGRACE", the default value is 29, standard dat in astk.

3.5 To select what one wants to print: key keys FILTRE and NOM_PARA, TOUT_PARA

the user chooses the columns to be printed thanks to key keys NOM_PARA and TOUT_PARA. It chooses the lines to be printed thanks to the key word factor (répétable at will) FILTRE.

3.5.1 Key word FILTRE

the key word factor FILTRE makes it possible to retain in the array only the lines checking certain criteria imposed by the user. **The occurrences** of the key word are added the ones to the others like **successive filters** (filters "AND"). For each occurrence of this key word, one specifies the name of the parameter for which one imposes a condition, the type of condition (equality, NON-equality, smaller, …) as well as the value associated with the condition.

3.5.1.1 Operand NOM_PARA

◊NOM_PARA = para

para is the name of the parameter to which the stress of filtering relates.

3.5.1.2 Operand CRIT_COMP

◊CRIT_COMP = crit

crit is the type of the stress of filtering.

EQ	"equality" for the integers, the texts, realities or the complexes. For the floating numbers (real or complex), this equality is evaluated with a certain tolerance given by key keys accuracy and CRITERE.
NE	"NON-equality" (confer EQ)
LT	"smaller than" Relations of order: - natural for the integers and the real - alphabetical for the texts - **invalid** for **the complexes**
GT	"larger than" (confer LT)
LE	"smaller or equal to" (confer LT)
GE	"larger or equal to" (confer LT)
VIDE	blank cell
NON_VIDE	cell nonempty
MAXI	line retained will be that which will have maximum value
MAXI_ABS	line selected will be that which will have maximum absolute value
MINI	line selected will be that which will have minimal value
MINI_ABS	line selected will be that which will have the minimal absolute value

Attention

In the commands of extraction EXTR_TABLE/RECU_FONCTION, criteria MINI/MAXI (and MINI_ABS/MAXI_ABS) select only one line checking the criterion, the last.
Whereas in the commands which handle arrays CALC_TABLE/IMPR_TABLE, all the lines checking these criteria are preserved.

3.5.1.3 Operands VALE/VALE_I/VALE_C/VALE_K

These various keys key are used according to the type of the column associated with the parameter to which the stress relates: integer, reality, complex or text.

One gives in argument the value associated with the stress; for example 12 if one is interested only at the sequence number 12. One can provide several values (valid for the tests of equality or inequality) to apply a filter “OR” (cf lower example).

This operand is useless when the types of stress are used: "VIDE", "NON_VIDE", "MAXI", "MINI", …

3.5.1.4 Operands CRITERE /accuracy

When the constrained parameter is of floating type (real or complex) and that the type of stress is the equality (or NON-equality), this equality is evaluated with a certain tolerance.

```
accuracy = eps,              eps is tolerance
CRITERE=/ "RELATIF",        |x-xref| < eps*|xref|
          /"ABSOLU"  ,      |x-xref| < eps
```

3.5.1.5 Example of use of key word FILTRE

If one specifies:

```
FILTRE= (_F (NOM_PARA= "NOEUD", VALE_K  = ("N7", "N12"),),
           _F (NOM_PARA= "INST", CRIT_COMP= "GT", VALE= 3.0,),
           _F (NOM_PARA= "INST", CRIT_COMP= "LT", VALE= 13.0,),
         ),
```

One thus selects the lines of the array such as the parameter NOEUD is worth "N7" or "N12" and such as the parameter INST lies between 3. and 13.

3.5.2 Operand NOM_PARA

If key word NOM_PARA is absent, one will print **all** the columns of the array.

If the user uses the key word NOM_PARA = will lpara, one will not print that the parameters specified in the list will lpara and in the order of the list.

3.6 To order the lines of an array: the key word TRI factor

Only one occurrence is accepted for the key word TRI factor.

3.6.1 Operand NOM_PARA = will lpara

This key word is used to specify the list of the parameters which will be used to order the lines of the array (there can be need for several parameters). In the event of equality on the first parameter, one uses the following…

Note:

One can use for the sort of the parameters which one does not print.

3.6.2 Operand ORDRE

This key word is used to specify if one must use an order ascending or decreasing. By default, one sorts by ascending order.

The relations of order used are:

- the natural order for the integers and the real,
- the alphabetical order for the texts and the names of concepts.

Note:

One cannot make use of a parameter complexes to classify the lines of an array.

For the parameters of the type NOEUD (or NETS), the order is alphabetical because these parameters contain the name of the nodes (or of meshes).

3.6.3 Example of use of the TRI key word

If one specifies:

```
TRI=_F (NOM_PARA= ("NOEUD", "INST"), ORDRE= "CROISSANT"),
```

One will print the lines of the array in the alphabetical order of the nodes. If there exist several lines corresponding to a given node, **the second** sort criterion (INST) will be used to classify these lines.

3.7 Choice of the format of printing: key keys FORMAT, PAGINATION,...

By default the format of printing is format "TABLEAU", i.e. presentation in columns of the various selected parameters (as for the examples of this document). Software EXCELTM offers a set of tools making it possible to exploit this kind of file: dynamic sort, filtering, tables,…

3.7.1 FORMAT = "TABLEAU" or "AGRAF"

an example of array printed with format "TABLEAU" :

NUME_ORDRE	INST	NOEUD	DX	DY
1	4.	N7	3.4.	
			3.8	
1	4.	N4	2.4.	
			2.8	
1	4.	N2	1.4.	
			1.8	
4	8.	N7	3.4.	
			3.8	
4	8.	N4	2.4.	
			2.8	
4	8.	N2	1.4.	
			1.8	
7	20.	N7	3.4.	
			3.8	
7	20.	N4	2.4.	
			2.8	
7	20.	N2	1.4.	
			1.8	

the only difference between the format "TABLEAU" and format "AGRAF" is that for this last, the columns of "text" (for example NOEUD above) are preceded by a "\".

Keywords of working of the table: to see IMPR_FONCTION [U4.33.01].

Note:

With format AGRAF , any directive (file .digr) is not produced, only the values (file .dogr) are it.

3.7.2 FORMAT = "ASTER"

the difference between the format "ASTER" and format "TABLEAU" is the heading of the array and its last line. This difference is justified by fact qu `an array printed with format "ASTER" can be read again by *Code_Aster* (command LIRE_TABLE [U7.02.03]).

Example:

```
#DEBUT_TABLE
#TITER ASTER  6.03.11 CONCEPT TAB_REAC LE CALCULATES 7/12/2002
```

```
#TITER TABL_POST_RELE
 INTITULE   RESU    NOM_CHAM      NUME_ORD    INST         DY
 K8         K8      K16           I           R            R
 MESSAGE    RESU    REAC_NODA              1  2.50000E-01 -2.25146E+00
 MESSAGE    RESU    REAC_NODA              2  5.00000E-01 -4.44089E+00
 MESSAGE    RESU    REAC_NODA              3  7.50000E-01 -6.59515E+00
 MESSAGE    RESU    REAC_NODA              4  1.00000E+00 -8.65972E+00
 MESSAGE    RESU    REAC_NODA              5  1.25000E+00 -1.06742E+01
 MESSAGE    RESU    REAC_NODA              6  1.50000E+00 -1.26438E+01
 MESSAGE    RESU    REAC_NODA              7  1.75000E+00 -1.45569E+01
#FIN_TABLE
```

3.7.3 FORMAT = "TABLEAU_CROISE"

format "TABLEAU_CROISE" is reserved for the arrays at double entry. The printing is done in the shape of a table which one documented the names of columns and the names of lines. This printing relates to the arrays having 3 parameters. One represents the values of the one of the 3 parameters according to the 2 others.

Example: DX according to NOEUD and INST:

```
 DX FONCTION OF NOEUD AND INST        4.      8.     20.
 NOEUD/INST                        N7  3.4.3
                                       .4.3.
                                       4
                                   N4  2.4.2
                                       .4.2.
                                       4
                                   N2  1.4.1
                                       .4.1.
                                       4
```

```
NOM_PARA = ("INST", "NOEUD",  "DX")
```

the parameter "filling out" the table is 3rd list indicated by key word simple NOM_PARA.
The parameter "X-coordinate" is 2nd list indicated by key word simple NOM_PARA.
The parameter "ordered" is 1st list indicated by key word simple NOM_PARA.

Note:

If the array contains more than 3 parameters, one can use key word PAGINATION "to shell" the values taken by the other parameters (see example 3).

3.7.4 FORMAT = "XMGRACE"

This format makes it possible to produce a directly displayable file in xmgrace in the form of curve. One has the same functionalities of working as in IMPR_FONCTION.

If PILOTE is not specified, one produces a data file for xmgrace ; if PILOTE is indicated and if the selected pilot is indeed available on the machine, one can directly produce a file postscript, png,…

key Keys of working of the graph: to see IMPR_FONCTION [U4.33.01].

3.7.5 Operand PAGINATION

This key word is used to print an array per pieces (like a set of smaller arrays). One gives a parameter list (lpagi) which will be shelled and printed like titles of the small arrays.

The list of the parameters of pagination (lpagi) must be included in the complete listing of the parameters which one wants to print (will lpara).

If one wants to use the pagination and format "TABLEAU_CROISE", it is necessary that the list will lpara, once one withdrew the parameters of lpagi to him is made of 3 residual parameters. These 3 parameters will be used for the presentation in table [§3.4.3].

Example: FORMAT= `TABLEAU', PAGINATION = "NOEUD"

```
THE NODE IS OUTSIDE THE FIELD OF DEFINITION WITH A RIGHT PROFILE OF THE
EXCLU TYPE NODE: N7

 NUME_ORDRE   INST     DX      DY
 1            4.       3.4.3
                       .8
 4            8.       3.4.3
                       .8
 7            20.      3.4.3
                       .8

THE NODE IS OUTSIDE THE FIELD OF DEFINITION WITH A RIGHT PROFILE OF THE
EXCLU TYPE NODE: N4

 NUME_ORDRE   INST     DX      DY
 1            4.       2.4.2
                       .8
 4            8.       2.4.2
                       .8
 7            20.      2.4.2
                       .8

THE NODE IS OUTSIDE THE FIELD OF DEFINITION WITH A RIGHT PROFILE OF THE
EXCLU TYPE NODE: N2

 NUME_ORDRE   INST     DX      DY
 1            4.       1.4.1
                       .8
 4            8.1.4.1
              .8
 7            20.      1.4.1
                       .8
```

3.7.6 Operand FORMAT_C

For the complexes, two formats of printing are available (modulus/phase by default or real/left part imaginary).

3.7.7 Operand FORMAT_R

This key word makes it possible to choose the number of decimals printed for each floating number: (reality or complex).

One uses for that the syntax of FORTRAN.

For example, for the value by default: "E12.5", one will print each floating number on 12 characters, with 5 decimals and in scientific notation (with an exhibitor).

3.7.8 Operand IMPR_FONCTION

For the arrays containing in their cells of the names of function, this key word makes it possible to indicate that one wants to also print **the contents** of the functions referred in the array.

One prints initially the array (as he was seen above) then one "buckles" on all the functions contained in the printed part of the array and one prints these functions (like command IMPR_FONCTION does it).

3.8 Operand INFO

◊INFO = inf

Prints in the file “message” of additional information if inf=2. Nothing occurs if inf=1.

4 Examples

Example 1: to discover structure of an array

```
IMPR_TABLE (ARRAY = POST_REL)
```

Example 2: to print some parameters with filter and tri

```
IMPR_TABLE (ARRAY = POST_REL,
   FILTRE=_F (NOM_PARA=' INST', VALE= 0. ,     CRITERE = "ABSOLUTE"),
   TRI=_F (NOM_PARA= ("ABSC_CURV " , "COOR_X"), ORDRE= ("GROWING"),
   NOM_PARA = ( "COOR_X", "TEMP"),
)
```

Example 3: to use the pagination and the format TABLEAU_CROISE

```
IMPR_TABLE (ARRAY = POST_REL,
   NOM_PARA = ( "COOR_X", "TEMP", "ABSC_CURV", "INST", "COOR_Y"),
   PAGINATION= ("INST " , "COOR_X"),
   FORMAT = "TABLEAU_CROISE",
)
```