Code_Aster

Titre : Procédure IMPR_TABLE
Responsable : COURTOIS Mathieu

Version default

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c3cf6e68d040

Procedure `IMPR_TABLE`

1   Goal

To print the contents of one `table` in a file.

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

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2 Syntax

```
IMPR_TABLE    (
    ♦   TABLE =   matable,                              [tabl_*]
    ◊   TITLE       = title,                            [l_Kn]
    ◊   UNIT        =/links,                            [I]
                    / 8 ,

    # 1. choice of the lines to be printed:
    ◊   FILTER = (_F ( ♦ NOM_PARA      = para,          [KN]
                  ◊  /  CRIT_COMP   = /'EQ',            [DEFECT]
                                      /'',
                                      /'LT',
                                      /'WP',
                                      /'IT',
                                      /'GE',

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

                             / /  VALE   = rval,        [R]
                             /  VALE_C    = cval,       [C]
                        ◊   |   PRECISION = / prec,     [R8]
                                            / 1.0D-3,   [DEFECT]
                              |  CRITERION =  / 'RELATIVE', [DEFECT]
                                              / 'ABSOLUTE',

                   /  CRIT_COMP =      /'MAXIMUM',
                                       /'MAXI_ABS',
                                       /'MINI',
                                       /'MINI_ABS',
                                       /'VACUUM',
                                       /'NON_VIDE',
                   /  CRIT_COMP =       'REGEXP',
                        ♦      VALE_K  = kval,          [KN]
                  ),),

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

    # 3. choices about the lines to be printed:
    ◊   SORTING = (_F ( ♦ NOM_PARA =  will lpara,
[l_Kn]
                  ◊   ORDER    =     / 'GROWING'   ,    [l_Kn]
                                     / 'DECREASING',
              ),),

    # 4. choices of the formats of impression:
    ◊   FORMAT =      / 'TABLE',                        [DEFECT]
                      / 'ASTER',
                      / 'NUMPY',
                      / 'XMGRACE',
                      / 'AGRAF',
                      / 'TABLEAU_CROISE',

    ◊   PAGINATION   =     lpagi,                       [l_Kn]
    ◊   FORMAT_R     =  /  'E12.5',                     [DEFECT]
                        /  forms,
    ◊   FORMAT_C     =  /  'MODULE_PHASE',              [DEFECT]
                        /  'REEL_IMAG',
```

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```
◊   IMPR_FONCTION=   /   'NOT',                          [DEFECT]
                     /   'YES',
◊   INFORMATION  =   /   1,                              [DEFECT]
                     /   2,


    # If FORMAT = 'XMGRACE'
◊    PILOT  =         /   'XMGRACE',                     [DEFECT]
                      /   'POSTSCRIPT',                  [KN]
                      /   'EPS',
                      /   'MIF',
                      /   'SVG',
                      /   'PNM',
                      /   'PNG',
                      /   'JPEG',
                      /   'Pdf',
                      /   'INTERACTIVE',
                      /   'INTERACTIF_BG',

    # Page layout if FORMAT = 'TABLE'

◊   DEBUT_TABLE =       text,                            [KN]
◊   FIN_TABLE =         text,                            [KN]
◊   SEPARATOR =      /  separ,                           [DEFECT]
                     /  '',                              [KN]
◊   COMMENT =     /  COM,                                [KN]
                  /  '#',                                [DEFECT]
◊   COMM_PARA =      /  comp,                            [KN]
                     /  '',                              [DEFECT]
◊   DEBUT_LIGNE =    /  deb.,                            [KN]
                     /  '',                              [DEFECT]
◊   FIN_LIGNE =      /  end,                             [KN]
                     /  '\,                              [DEFECT]

    # Put in form if FORMAT = 'XMGRACE'
◊   LEGEND    =  leg,                                    [KN]
◊   STYLE     =  sty,                                    [I]
◊   COLOR     =  coul,                                   [I]
◊   MARKER    =  marq,                                   [I]
◊   FREQ_MARQUEUR=  Fm,                                  [I]
◊   BORNE_X      =  (xmin, xmax),                        [l_R]
◊   BORNE_Y      =  (ymin, ymax),                        [l_R]
◊   ECHELLE_X    =  /  'FLAX',                           [KN]
                    /  'LOG',
◊   ECHELLE_Y    =  /  'FLAX',                           [KN]
                    /  'LOG',
◊   GRILLE_X     =  pasx,                                [R]
◊   GRILLE_Y     =  pasy,                                [R]
◊   LEGENDE_X    =  legx,                                [KN]
◊   LEGENDE_Y    =  legy,                                [KN]


        )
```

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3 Operands

3.1 What one `table` ?

One `table` is a structure of data of data-processing nature allowing to store a set of whole, real, complex values or character strings.

A table 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, which we call **parameter**, and contains similar data of type: `I, R, C, K8, K16, K24` or `K32`.

Example:

NUME_ORDRE	INST	NODE	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 table as a succession of recordings (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	NODE	DX	DY	MESH	SIXX
ENTITLE 1	1	10.	N1	3.	5.		
ENTITLE 1	1	10.	N2	6.	7.		
ENTITLE 1	1	10.	N3	8.	9.		
ENTITLE 1	2	20.	N1	11.	12.		
ENTITLE 1	2	20.	N2	15.	13.		
ENTITLE 1	2	20.	N3	19.	18.		
ENTITLE 2	2	20.				MA1	-12.
ENTITLE 2	2	20.				MA2	-14.

To print the contents of a table, 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 impression of the lines [§3.7]
- to choose the "format" of impression: in lines, tables,… [§3.8]

3.2 Operand TABLE

♦ TABLE = matable
Name of the table which one wants to print

3.3 Operand TITLE

◊ TITLE = title
Character string which will be printed before the table (and before the title possibly attached to the table). This chain can make it possible to better distinguish from the impressions of tables put end to end in the same file.

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3.4 To select what one wants to print: keywords **FILTER** and **NOM_PARA**, **TOUT_PARA**

The user chooses the columns to be printed thanks to the keywords NOM_PARA and TOUT_PARA. It chooses the lines to be printed thanks to the keyword factor (répétable at will) FILTER.

3.4.1 Keyword **FILTER**

The keyword factor FILTER allows to retain in the table only the lines checking certain criteria imposed by the user. **occurrences** keyword are added the ones to the others like **successive filters** (filters "AND"). For each occurrence of this keyword, one specifies the name of the parameter for which one imposes a condition, the type of condition (equality, not-equality, smaller,…) as well as the value associated with the condition.

3.4.1.1 Operand **NOM_PARA**

◊ NOM_PARA = para

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

3.4.1.2 Operand **CRIT_COMP**

◊ CRIT_COMP = crit

crit is the type of the constraint of filtering.

EQ	"equality" for the entireties, the texts, realities or the complexes. For the floating numbers (real or complex), this equality is evaluated with a certain tolerance given by the keywords PRECISION and CRITERION.
	"not-equality"　　　　　(confer EQ)
LT	"smaller than" Relations of order: - natural for the entireties and realities - alphabetical for the texts - **invalid** for **complexes**
WP	"larger than"　　　　(confer LT)
	"smaller or equal to"　　　(confer LT)
GE	"larger or equal to"　　　(confer LT)
VACUUM	blank cell
NON_VIDE	nonempty cell
MAXIMUM	the line selected will be that which will have the maximum value
MAXI_ABS	the line selected will be that which will have the maximum absolute value
MINIS	the line selected will be that which will have the minimal value
MINI_ABS	the line selected will be that which will have the minimal absolute value
REGEXP	check the regular expression provided by VALE_K

Caution

In the orders 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 orders which handle the tables CALC_TABLE/IMPR_TABLE, all the lines checking these criteria are preserved.
The filter by regular expression is available only in CALC_TABLE.

3.4.1.3 Operands **VALE/VALE_I/VALE_C/VALE_K**

These various keywords are used according to the type of the column associated with the parameter to which the constraint relates: entirety, reality, complex or text.

One gives in argument the value associated with the constraint; for example 12 if one is interested only in 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).

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This operand is useless when the types of constraint are used: 'VACUUM', 'NON_VIDE', 'MAXIMUM', 'MINI',...

VALE_K is also used to provide the regular expression to check (CRIT_COMP=' REGEXP'). Example: VALE_K='^N [MP] ' to preserve only the lines where, for the parameter chosen, the cell contains a character string which starts with a NR (capital letter) followed by a M or P, then if required of other characters (See the module Python Re for more details on the regular expressions).

3.4.1.4 Operands CRITERION / PRECISION

When the constrained parameter is of floating type (real or complex) and that the type of constraint is the equality (or not-equality), this equality is evaluated with a certain tolerance.

```
PRECISION = eps,            eps is the tolerance
CRITERE=  /'RELATIVE',      |x-xref| < eps*|xref|
          /'ABSOLUTE'  ,       |x-xref| < eps
```

3.4.1.5 Example of use of the keyword FILTER

If one specifies:

```
FILTRE= (_F (NOM_PARA= 'NODE', VALE_K  = ('N7', 'N12'),),
         _F (NOM_PARA= 'INST', CRIT_COMP= 'WP', VALE= 3.0,),
         _F (NOM_PARA= 'INST', CRIT_COMP= 'LT', VALE= 13.0,),
        ),
```

One thus selects the lines of the table such as the parameter NODE is worth 'N7' or 'N12' and such as the parameter INST that is to say understood enters 3. and 13.

3.4.2 Operand NOM_PARA

If the keyword NOM_PARA is absent, one will print **all** columns of the table.

If the user uses the keyword NOM_PARA = will lpara, one will print only the parameters specified in the list will lpara and in the order of the list.

3.5 To order the lines of a table: the keyword factor SORTING

Only one occurrence is accepted for the keyword factor SORTING.

3.5.1 Operand NOM_PARA = will lpara

This keyword is used to specify the list of the parameters which will be used to order the lines of the table (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 sorting of the parameters which one does not print.*

3.5.2 Operand ORDER

This keyword 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 entireties and realities,
• 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 a table.*

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For the parameters of the type NODE (or MESH), the order is alphabetical because these parameters contain the name of the nodes (or of the meshs).

3.5.3 Example of use of the keyword SORTING

If one specifies:

```
TRI=_F (NOM_PARA= ('NODE', 'INST'), ORDRE= 'GROWING'),
```

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

3.6 Choice of the format of impression: keywords FORMAT, PAGINATION, …

By default the format of impression is the format 'TABLE', i.e. presentation in columns of the various selected parameters (as for the examples of this document). The EXCEL software^MT offer a set of tools allowing to exploit this kind of file: dynamic sorting, filtering, tables,…

3.6.1 FORMAT = 'TABLE' or 'AGRAF'

An example of table printed with the format 'TABLE' :

```
NUME_ORDRE    INST    NODE    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 'TABLE' and the format 'AGRAF' is that for this last, the columns of "text" (for example NODE above) are preceded by a "\".

Note:

With the format AGRAF , no directive (file .digr) is not produced, only the values (file .dogr) are.

3.6.2 Page layout with the format TABLE

One can define here appearance printed table: of a classical table in columns with a compatible format csv or HTML…

◊   DEBUT_TABLE = text

The text printed before each table defines (by default, one prints a line of indents).

◊   FIN_TABLE = text

It defines text printed after each table (nothing by default).

◊   SEPARATOR = separ

The separator used between two columns (a space by default) defines.

◊   COMMENT = COM

Character inserted at the beginning of line to indicate a line in comment (or titrates, # by default).

COMM_PARA = comp

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Character inserted for to put in comment the line of the labels (by default, no character is inserted).

◊ DEBUT_LIGNE = deb.

Chain inserted into the beginning of each line (vacuum by default).

◊ FIN_LIGNE = fine

Chain inserted at the end of the line ('\ by default).

3.6.3 **FORMAT = 'ASTER'**

The difference between the format 'ASTER' and the format 'TABLE' is the heading of the table and its last line. This difference is justified by the fact that a table printed with the format 'ASTER' can be read again by *Code_Aster* (order LIRE_TABLE [U7.02.03]).

Example:

```
#DEBUT_TABLE
#TITRE_ASTER  6.03.11 CONCEPT TAB_REAC CALCULATES THE 7/12/2002
#TITRE TABL_POST_RELE
 ENTITLE    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
```

3.6.4 **FORMAT=' NUMPY'**

Numpy is a module Python of handling of tables.
The impression in this format produces a file which can be read again by the function numpy.load ().
Only the parameters (columns) real and whole (automatically converted into realities) are printed. The other parameters are ignored.
Lastly, the topology of the table is preserved: one finds a table numpy which comprises as much line than the table and as many columns as of real or whole parameters.

Notice

In the case of a parametric calculation, one expects only one line in the printed table. To use CALC_TABLE *to filter the lines if necessary.*

3.6.5 **FORMAT = 'TABLEAU_CROISE'**

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

Example: DX according to NODE and INST :

```
 DX FUNCTION OF NODE 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
```

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NOM_PARA = ('INST', 'NODE', 'DX')

The parameter "filling out" the table is the 3ème list indicated by the simple keyword NOM_PARA.
The parameter "X-coordinate" is the 2ème list indicated by the simple keyword NOM_PARA.
The parameter "ordered" is the 1er list indicated by the simple keyword NOM_PARA.

Note:

> *If the table contains more than 3 parameters, one can use the keyword PAGINATION "to shell" the values taken by the other parameters (see example 3).*

3.6.6 **FORMAT = 'XMGRACE'**

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

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

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

3.6.7 Operand **PAGINATION**

This keyword is used to print a table per pieces (like a set of smaller tables). One gives a parameter list (lpagi) who will be shelled and printed like titles of the small tables.

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 the format 'TABLEAU_CROISE', it is necessary that the list will lpara, once one withdrew the parameters to him of lpagi that is to say formed by 3 residual parameters. These 3 parameters will be used for the presentation in table [§3.4.3].

Example: FORMAT= 'TABLEAU', PAGINATION = 'NODE'

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

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

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

3.6.8 Operand **FORMAT_C**

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

3.6.9 Operand **FORMAT_R**

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This keyword 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).

3.6.10 Operand IMPR_FONCTION

For the tables containing in their cells of the names of function, this keyword makes it possible to indicate that one wants to also print it **contents** functions referred in the table.

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

3.7 Operand INFORMATION

◊   INFORMATION = inf

Print in the file "message" of the additional information if inf=2. Nothing occurs if inf=1.

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4   Examples

Example 1: to discover the structure of a table

```
IMPR_TABLE (TABLE = POST_REL)
```

Example 2: to print some parameters with filter and sorting

```
IMPR_TABLE (TABLE = POST_REL,
    FILTRE=_F (NOM_PARA=' INST', VALE= 0. ,    CRITERION = '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 (TABLE = POST_REL,
    NOM_PARA = ( 'COOR_X', 'TEMP', 'ABSC_CURV', 'INST', 'COOR_Y'),
    PAGINATION= ('INST ' , 'COOR_X'),
    FORMAT = 'TABLEAU_CROISE',
)
```

4.1   Operand UNIT

Allows to choose in which file, one prints the table.
By default, the impression is carried out on the file associated with the logical unit 8..
With the format 'XMGRACE', the value by default is 29, standard dat in astk.