

Procedure IMPR_RESU with the format 'MED'

1 Goal

To write the result of a calculation in a file with format MED. One describes the whole of the keywords of order IMPR_RESU [U4.91.01] concerning this format of exit only.

One can write with the choice in a file with format MED:

- a grid,
- fields with the nodes,
- fields with the elements.

At the time of the writing of the fields by elements at the points of Gauss, one also writes the localization of the elements of reference (coordinated and weight of the points of Gauss).

MED (Modeling and Data exchanges) is a neutral format of data developed by EDF R & D and the ECA for the data exchanges between computer codes. The data which one can to exchange according to this format are the grids and the fields of results to the nodes and by elements. Files MED are binary and portable files (being pressed on the library HDF5, Hierarchical Dated Format). The writing of results in a file MED allows any other reading, computer code interfaced with MED the results produced by *Code_Aster* via the order IMPR_RESU.

2 Syntax

```

IMPR_RESU      (
# Syntax of procedure IMPR_RESU to format 'MED'
◇ UNIT = links,
◇ FORMAT = / 'MED', [DEFECT]

◇ PROC0 = / 'YES', [DEFECT]
          / 'NOT',
◇ INFORMATION = / 1, [DEFECT]
                / 2,

If format = 'MED':
{
  ◇ VERSION_MED = / '3.3.1', [DEFECT]
                  / '4.0.0',
}

/ LMBOU = _F (
  ◆ | GRID = my, [grid]
    | / RESULT = resu, [sd_resultat]

    # Extraction of a field of size of resu
    ◇ / TOUT_CHAM = / 'YES',
      / 'NOT',
      / NOM_CHAM = L_NOMSYMB, [l_K16]
    ◇ / TOUT_ORDRE = 'YES', [DEFECT]
      / NUME_ORDRE = LORDRE, [l_I]
      / LIST_ORDRE = LENTI, [listis]
      / NUME_MODE = LMODE, [l_I]
      / NOEUD_CMP = LNOECMP, [l_K16]
      / NOM_CAS = NCAS, [l_K16]
      / / ANGLE = LANGL, [l_R]
      / FREQ = LFREQ, [l_R]
      / LIST_FREQ = LREEL, [listr8]
      / INST = LINST, [l_R]
      / LIST_INST = LREEL, [listr8]
    ◇ | PRECISION = / PREC, [R]
      / 1.0D-3, [DEFECT]
      | CRITERION = / 'RELATIVE', [DEFECT]
                  / 'ABSOLUTE',

    / CHAM_GD = chgd, [cham_gd]

    ◇ / NOM_CHAM_MED = l_nomcham, [l_K64]
      / NOM_RESU_MED = l_nomresu, [K8]

    ◇ CARA_ELEM = carele, [cara_elem]

    ◇ PART = / 'REAL',
             / 'IMAG',
             / 'MODULE',
             / 'PHASE',

# Selection of the components

```

```

    ◇ / TOUT_CMP      = 'YES',
      / NOM_CMP      = L_NOMCMP,          [l_K8]

# Selection of the topological entities
◇ / ALL             = 'YES',
  / | GROUP_NO      = L_GRNO,          [l_gr_noeud]
  / | GROUP_MA      = L_GRMA,          [l_gr_maille]

◇ IMPR_NOM_VARI    = / 'YES',          [DEFECT]
  / 'NOT',

◇ INFO_MAILLAGE = / 'YES'
  / 'NOT'          [DEFECT]
),
)
```

3 Operands `FORMAT`, `UNIT`, `PROC0`, `VERSION_MED` and `INFORMATION`

3.1 Operand `FORMAT`

The operand `FORMAT` allows to specify the format of the file where to write the result.
The format 'MED' mean with the procedure `IMPR_RESU` that the result must be written in a file with format MED. It is the format of writing by default.
During the creation of a new file to the format MED, the impression is made with the format MED 3.3.1. If the file already exists, the level of format MED is preserved.

3.2 Operand `UNIT`

Defines in which unit one writes the file med. By default, `UNIT` = 80 and corresponds to the unit by default of the type `rmed` in `astk`.

3.3 Operand `PROC0`

The operand `PROC0` whose value by default is 'YES', allows to restrict the impression on the processor of row 0. If one affects the value to him 'NOT', the impressions will be carried out on all the processors.

3.4 Operand `INFORMATION`

The keyword `INFORMATION` when it is equal to 2 makes it possible to obtain information on the impressions carried out by the order.

3.5 Operand `VERSION_MED`

◇ `VERSION_MED` = /`3.3.1', [DEFECT]
/`4.0.0',

During the creation of a new file to the format med, the impression is made with the format med 3.3.1. If the file already exists, the level of format med is preserved.
One can change the version of file MED with the keyword `VERSION_MED`.

4 Keyword factor `RESU`

This keyword factor makes it possible to specify the results and fields to print.

4.1 Operand `GRID`

If the result is a grid (operand `grid` [U4.91.01]), the data deferred in the file result to format MED are:

- the list of the nodes number, name, coordinated,
- the list of the meshes number, name, type, name of the nodes,
- the list of the groups of nodes number, name, many nodes, names of the nodes,
- the list of the groups of meshes number, name, many meshes, names of the meshes.

Foot-note:

In a file MED, there is partition of the nodes and the meshes according to the groups. A partition corresponds to a family MED. In a file MED, the groups are distributed within the families: families of nodes and families of elements are thus found there.

4.2 Operand RESULT

The operand `RESULT` allows to print in a file `MED`, fields contained in a concept `result`.

One writes in the file 'MESSAGE' following information:

- operand 'RESULT',
- operand 'NAME_CHAM',
- operand 'NUME_ORDRE',
- name of the field stored in file `MED`: concatenation of the three preceding operands.

If `INFO_MALLAGE = 'YES'`, more detailed information is printed in the file 'MESSAGE' at the time of the writing of the grid `MED`. One will be able for example to obtain the types of printed meshes, the names of the families `MED` which are created, etc.

4.3 Operand CARA_ELEM

The operand `CARA_ELEM` is used for the impression of the fields for under-points. When `CARA_ELEM` is provided, the fields under-points are printed by adding information in file `MED` allowing to position the under-points by taking account of the contained information in `sd_cara_elem` (thickness of a hull, angle of gimlet of a multifibre beam,...).

Note:

It is currently not possible to visualize fields at the under-points on elements PIPE in the module ParaViS of Salomé-Meca. One will be able for the moment to thus use operator IMPR_RESU_SP [U7.05.41] with this intention.

4.4 Operand CHAM_GD

The operand `CHAM_GD` allows to print in the file a structure of data of the type `cham_gd`. Concretely, one can thus print with this keyword a map, a field by elements or a field with the nodes.

4.5 Operand NOM_CHAM_MED

The operand `NOM_CHAM_MED` allows to define the name of field `MED`. It is a chain of 64 characters. This can be useful in particular when one wishes to print certain components of the field like several fields in same file `MED` (for example for the visualization of `SIRO_ELEM`).

4.6 Operand NOM_RESU_MED

The operand `NOM_RESU_MED` is an alternative to `NOM_CHAM_MED` concerning the terminology of fields `MED`. Its use will make it possible not to name fields `MED` explicitly more, which means that all the fields contained in the result will be printed. Each field name `MED` will be built to leave:

- character string provided to `NOM_RESU_MED` (chain of with more the 8 characters),
- reference symbol of the field Aster.

For example:

```
IMPR_RESU = (  
  FORMAT = 'MED',  
  RESU = _F ( RESULT = U,  
             NOM_RESU_MED = 'U_HAUT',  
             GROUP_MA = 'HIGH',  
             NUME_ORDRE = 1, )  
)
```

If the result `U` contains the fields `DEPL` and `SIEF_ELGA`, then the order above will produce fields `MED`:

- 'U_HAUT__DEPL',
- 'U_HAUT__SIEF_ELGA',

This can be useful in particular when one wishes to print in same file MED the same field on different groups of meshes.

4.7 Operand IMPR_NOM_VARI

This keyword is useful in the case of the internal variables. When it is used and that impression of a field **VARI_*** was asked, it is in fact a field **VARI*_NOMME** who will be printed. This field will have components whose name will be based on the catalogue of the laws of behavior used in calculation. If two laws of behavior have common internal variables, those will be amalgamated in a single component.

4.8 Operand PART

It is not possible to write complex fields. This is why it is necessary to choose between the real part (PARTIE=' REEL'), the part complexes (PARTIE=' IMAG'), the module (PARTIE=' MODULE') or the phase (PARTIE=' PHASE').

4.9 Operands

TOUT_ORDRE/NUME_ORDRE/LIST_ORDRE/NUME_MODE/INST/LIST_I
NST/FREQ/LIST_FREQ/NOEUD_CMP/NOM_CAS/ANGLE/PRECISION/C
RITERION

Cf document [U4.91.01].

5 Selection on the components

Another manner of reducing the volume of the impressions is to print only the values of certain components (for example that displacement following the axis X : component DX).

Note: the selection of the components does not function for the fields under-points.

5.1 Operand TOUT_CMP

This keyword makes it possible to indicate that one wishes to print all the components of the field.

5.2 Operand NOM_CMP

This keyword makes it possible to choose the list of the components of `cham_gd` or of all the fields of the concept result which one wishes to print.

Keywords `TOUT_CMP` and `NOM_CMP` cannot be used simultaneously.

These components are described in the specific documentation of the elements.

6 Selection of the topological entities

In order to reduce the volume of the impressions, it is sometimes necessary to print only part of the result. With this intention one can print a field with the nodes only in certain nodes, or a field by element that in certain elements.

Note: the selection of the topological entities does not function for the fields under-points.

6.1 Operand ALL

This keyword indicates that one wishes to print the field on all the structure (all the nodes for a field with the nodes, all elements for a field by element).

6.2 Operand GROUP_NO

This keyword makes it possible to indicate the list of the groups of nodes on which one wishes to print one `cham_no`. If this keyword is used in the case of the impression of one `cham_elem`, he is ignored, and it `cham_elem` is printed in all the meshes, specified in addition.

6.3 Operand GROUP_MA

This keyword makes it possible to indicate the list of the groups of meshes on which one wishes to print one `cham_elem`. For one `cham_no`, it makes it possible to indicate the list of the nodes, tops of the meshes to which one wishes to print it `cham_no`.

7 Example

```
IMPR_RESU = (  
  FORMAT = 'MED',  
  RESU = _F ( RESULT = REMEZERO,  
             NOM_CHAM = 'ERME_ELEM',  
             NUME_ORDRE = 3,)  
)
```

Execution of the order IMPR_RESU following posting in the file will cause 'MESSAGE' :

```
RESULT          : REMEZERO  
FIELD           : ERME_ELEM  
NUME_ORDRE     : 3  
==> NAME MED   : REMEZEROERME_ELEM
```

Example of use of NOM_CHAM_MED for the impression of SIRO_ELEM :

```
IMPR_RESU (FORMAT=' MED',  
          RESU= (  
    _F (RESULTAT=RESUNL,  
        NOM_CHAM= ('SIRO_ELEM',),  
        NOM_CHAM_MED= ('RESUNL_SIRO_ELEM_NORMAL'),  
        NOM_CMP= ('SIG_NX', 'SIG_NY', 'SIG_NZ', 'SIG_N'),  
        GROUP_MA=' PRES',),  
    _F (RESULTAT=RESUNL,  
        NOM_CHAM= ('SIRO_ELEM',),  
        NOM_CHAM_MED= ('RESUNL_SIRO_ELEM_TANGENT'),  
        NOM_CMP= ('SIG_TX', 'SIG_TY', 'SIG_TZ'),  
        GROUP_MA=' PRES',),  
    _F (RESULTAT=RESUNL,  
        NOM_CHAM= ('SIRO_ELEM',),  
        NOM_CHAM_MED= ('RESUNL_SIRO_ELEM_T1'),  
        NOM_CMP= ('SIG_T1X', 'SIG_T1Y', 'SIG_T1Z',  
'SIG_T1'),),  
        GROUP_MA=' PRES',),  
    _F (RESULTAT=RESUNL,  
        NOM_CHAM= ('SIRO_ELEM',),  
        NOM_CHAM_MED= ('RESUNL_SIRO_ELEM_T2'),  
        NOM_CMP= ('SIG_T2X', 'SIG_T2Y', 'SIG_T2Z',  
'SIG_T2'),),  
        GROUP_MA=' PRES',),  
    ),),
```