Code_Aster

Version default

Titre : Procédure IMPR_RESU au format 'IDEAS'
Responsable : SELLENET Nicolas

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Clé : U7.05.01 Révision :
1fe128010000

Organization (S) : EDF-R&D/AMA

Procedure `IMPR_RESU` with the format 'IDEAS'

1 Goal

To write a grid and/or results of a calculation on a file with the format 'IDEAS'. The use of this format is disadvised because it treats only simple cases,

Currently this procedure makes it possible to write with the choice:

- a grid,
- fields with the nodes (of displacements, temperatures, clean modes, static modes,…),
- fields by elements with the nodes or the points of GAUSS (of constraints, generalized efforts, internal variables…), if these fields by elements do not have under points.

For the concepts of the type RESULT, one can print only part of information, by selecting the fields and the sequence numbers which one wishes to exploit.

It is possible to select the topological entities (nodes, meshs, groups of nodes and groups of meshs) on which one wants to print the results. The selection is not possible for the impression of the grid.

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2   Syntax

```
IMPR_RESU  (
◊  MODEL   =   MO,                                    [model]
◊  FORMAT  =  /   'IDEAS',
♦  VERSION =  /   4,
           /   5,                                     [DEFECT]
♦  UNIT    =   30,                                    [DEFECT]
◊  RESU = _F(
   ♦  |  GRID        =   MY, /                    [grid]
                          /                       [skeleton]

      |  /  CHAM_GD     =   CH_GD,
         /  RESULT      =   RESU,

      #  Extraction of a field of size of resu
      ◊  /  TOUT_CHAM           =   /'YES',       [DEFECT]
                                    /'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_K16]
         /  /  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',

      #  Selection of the components
      ◊  /  TOUT_CMP   =   'YES',                  [DEFECT]
         /  NOM_CMP    =   L_NOMCMP,               [l_K8]

      #  Selection of the topological entities
      ◊  /        ALL       =   'YES',             [DEFECT]
         /  |   NODE      =   L_NOEU,              [l_noeud]
            |   GROUP_NO     =   L_GRNO,           [l_gr_noeud]
            |  MESH   =   L_MAILLE,    [l_maille]
            |  GROUP_MA    =   L_GRMA,             [l_gr_maille]

   ◊  SOUS_TITRE      =   L_ST,                    [l_Kn]
   )
```

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3   Formats of writing

Procedure `IMPR_RESU` allows to write values in a file with the format I-DEAS™, software marketed by company EDS/UGS, for a graphic visualization.

3.1   Operands `FORMAT`/`VERSION`

The operand `FORMAT` allows to specify the format of impression and is obligatory in the case of an impression with format I-DEAS™.

The operand `FORMAT` allows to ask for the creation of a file ASCII, known as "universal file" (of type `.unv` or `.msup`), which could be read again by I - DEAS™.

The universal file used by software I-DEAS™, has a data-processing structure different according to the version from software I-DEAS™. The operand `VERSION` allows to specify the version of I-DEAS™ which one wishes to use. This operand is thus licit only when the operand `FORMAT` is worth 'IDEAS'. The authorized versions are version 4 and version 5 of I-DEAS™.

By default, the impression is done in version 5.

Example: `IMPR_RESU (RESU= (_F (FORMAT= 'IDEAS',`
        `VERSION= 4,   .........)))`

The upward compatibility of the versions of I-DEAS™ is ensured starting from version 5. One can thus use the versions higher than version 5 of I-DEAS™ with files written in version 5 (because any version NR of I-DEAS™ can read again the files created by the N-1 version).

3.2   Operand `UNIT`

Logical unit of the file written (30 by defaults, which corresponds to the number by default of the files of grid of the type `.unv` in ASTK).

4   Keyword `RESU`

This keyword factor makes it possible to specify the results to print and the format according to which one wants to print them.

5   Impression of the grid: operands `GRID` / `MODEL`

The operand 'GRID' allows to print the grid with format I-DEAS™. L' impression of the grid can be required only once and before any other result. By default one prints all the grid.

One can however reduce the impression of the grid to the only meshs of the grid supporting a finite element by defining the operand `MODEL`. So the concept of the type `model` is optional in the majority of the impressions. However, it can be used to print only the part of the grid whose meshs are affected in the model.

In addition, with the format 'IDEAS' when the keyword `MODEL` one is provided seeks the type of finite element I - DEAS™ nearest to that of *Code_Aster*, if not a kind of finite element by default is affected in universal file I-DEAS™.

With the format 'IDEAS', the classification of the nodes is that of *Code_Aster* except when the grid is resulting from software I-DEAS™ (one checks the presence of the character string `AUTEUR=INTERFACE_IDEAS` in the first line of the title of the grid and starting from the tenth position); in this case one restores classification I-DEAS™.

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Note:

1) *The meshs 3D of the type PYRAM5 and PYRAM13 are not available under I-DEAS. These meshs are thus not written in the universal file created by the order IMPR_RESU with the format IDEAS.*
2) *The mesh 3D of the type HEXA27 is not available under I-DEAS. The meshs Aster of this type are converted into meshs of the type HEXA20 in the universal file created by the order IMPR_RESU with the format IDEAS.*

6 Operands CHAM_GD and RESULT

The values of the computed fields are stored in structures of data called fields of size. These fields of size can be directly accessible (concept CHAM_GD) where to be in a structure of data gathering several fields of size (concept result).

- A field of size is a structure of data which makes it possible to store fields defined in the nodes (cham_no_*) or of the fields defined by elements (cham_elem_*). For the fields by elements, one distinguishes the fields defined in the nodes from the elements and the fields defined in the points of GAUSS of the elements.
- A concept result is composed of one or more fields of size. For example, with each step of calculation one stores in the structure of data result, the field of size displacement. This structure is thus a matric structure of order 2, whose index is, for example, the list of the moments of calculation and the other the whole of the computed fields (displacements, constraints, deformations,…).

One reaches in this case a field of size by specifying a value of a variable of access (sequence number, moment, frequency, number of mode,…) and a field name ('DEPL','SIGM_ELNO',…). There exist several types of concept result : evol_elas, evol_noli, mode_meca,…. With each one corresponds a list of fields and a list of licit variables of access.

Taking into account the structure of data result, one understands easily that the possibilities of impression which one lays out are those of the fields of size, supplemented by specific possibilities.

Note:

1) *The meshs 3D of the type PYRAM5 and PYRAM13 are not available under I-DEAS. The values of the fields Aster associated with these meshs are thus not written in the universal file created by the order IMPR_RESU with the format IDEAS.*
2) *The mesh 3D of the type HEXA27 is not available under I-DEAS. The values of the fields Aster calculated on this kind of mesh are written on meshs of the type HEXA20; it is - with - to say that one transfers only the values from the fields Aster on the first 20 nodes.*

6.1 Operand CHAM_GD

The values of the fields of size are written in one or more datasets of the universal file:

- dataset 55   for the fields with the nodes,
- dataset 57   for the fields by element with the nodes,
- dataset 56   for the fields by elements at the points of GAUSS (in fact, one writes constant fields by element while realising on the points of GAUSS).

In I-DEAS™, some datasets is typified: displacements, constraints, deformations, temperature, pressure. One thus gathers the components in order to write the typified datasets, then one writes the other components in datasets of the type "UNKNOWN".

The datasets of the type "UNKNOWN" contain to the maximum six components; for a field of size of N components one thus writes n/6 datasets.

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6.2   Operand RESULT

The operand RESULT allows to print the fields contained in a concept result. One can for example choose to print only certain fields (cf the keyword: NOM_CHAM).
The concept result field of size by field of size in datasets 55.56 or 57 is written.

7   Extraction of a field of size

7.1   Operands TOUT_CHAM/NOM_CHAM

C F. document [U4.71.00].

7.2   Operands TOUT_ORDRE/NUME_ORDRE/LIST_ORDRE/NUME_MODE/INST/LIST_INST/FREQ/LIST_FREQ/NOEUD_CMP/NOM_CAS/ANGLE/PRECISION/CRITERION

Cf document [U4.71.00].

8   Selection on the components

In order to reduce the volume of the impressions and the size of "universal" file I-DEAS™, the user can print only the values of certain components (for example that displacement following axis X: component DX or that constraint XX: component SIXX).

8.1   Operand TOUT_CMP

This keyword makes it possible to indicate that one wishes to print all the components of the field. It is the value by default.

8.2   Operand NOM_CMP

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

Keywords TOUT_CMP and NOM_CMP cannot be used simultaneously.

When the user specifies the keyword NOM_CMP, the datasets create in the universal file are typified UNKNOWN, which will prohibit the user from tracing deformed (even if the dataset contains components DX, DY, DZ, DRX, DRY MARTINI, DRZ) and of the calculation of the criteria of Von Mises and/or Tresca (even if the dataset contains components SIXX, SIYY,… SIXZ).

This functionality makes it possible to choose the components, as well for cham_no that cham_elem with actual values.

The operand NOM_CMP is not programmed for cham_no and cham_elem with complex values.

9   Selection of the topological entities

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In order to reduce the volume of the impressions and the size of "universal" file I-DEAS™, it is sometimes necessary to print only part of the result. With this intention one can wish to print a field with the nodes only in certain nodes, or a field by element that in certain elements.

This selection which one will note "selection on topological entities" is possible with the format 'IDEAS'.

9.1 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).

9.2 Operand NODE

This keyword makes it possible to indicate the list of the 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 meshs specified in addition.

9.3 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 meshs, specified in addition.

9.4 Operand MESH

This keyword makes it possible to indicate the list of the meshs 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 meshs to which one wishes to print it cham_no.

9.5 Operand GROUP_MA

This keyword makes it possible to indicate the list of the groups of meshs 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 meshs to which one wishes to print it cham_no.

10 Operand SOUS_TITRE

This argument makes it possible to print under title of comment, for more details to consult the document [U4.03.01].

SOUS_TITRE by default is:

- for one cham_gd
  - for one cham_no
    SOUS_TITRE = ('FIELD WITH THE NODES')
  - for one cham_elem
    SOUS_TITRE = ('FIELD BY ELEMENT &LOC (cham_elem)')

    Example:
        FIELD BY ELEMENT AT THE POINTS OF GAUSS

- for one result
  - for one cham_no
    SOUS_TITRE = ('FIELD WITH THE NODES',
            'OF REFERENCE SYMBOL &NOM_SYMB (cham_no Result) &RL',

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```
'NUMBER D '' ORDER &NUM_ORDRE (cham_no Result)',
'&ACCES (cham_no Result)')
```

Example of impression:

```
FIELD WITH THE NODES OF REFERENCE SYMBOL DEPL
SEQUENCE NUMBER: 2 NUME_MODE: 3
FREQ: 5.52739E+00
```

- for one cham_elem

```
SOUS_TITRE = (   'FIELD BY ELEMENT &LOC (cham_elem Result)',
        'OF REFERENCE SYMBOL &NOM_SYMB (cham_elem Result) &RL',
        'NUMBER D '' ORDER &NUM_ORDRE (cham_elem Result)',
        '&ACCES (cham_elem Result)')
```

Example of impression:

```
FIELD BY ELEMENT WITH THE NODES OF REFERENCE SYMBOL
EPSI_ELNO SEQUENCE NUMBER: 1
INST: 0.00000E+00
```

11   Notice

In Aster, there exist fields by elements with under points (as well for fields by elements with the nodes as for fields by elements at the points of Gauss).

With the format 'IDEAS', IMPR_RESU the impression of these fields by elements with under points does not allow.