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## Data-processing description of IMPR\_RESU

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### Summarized :

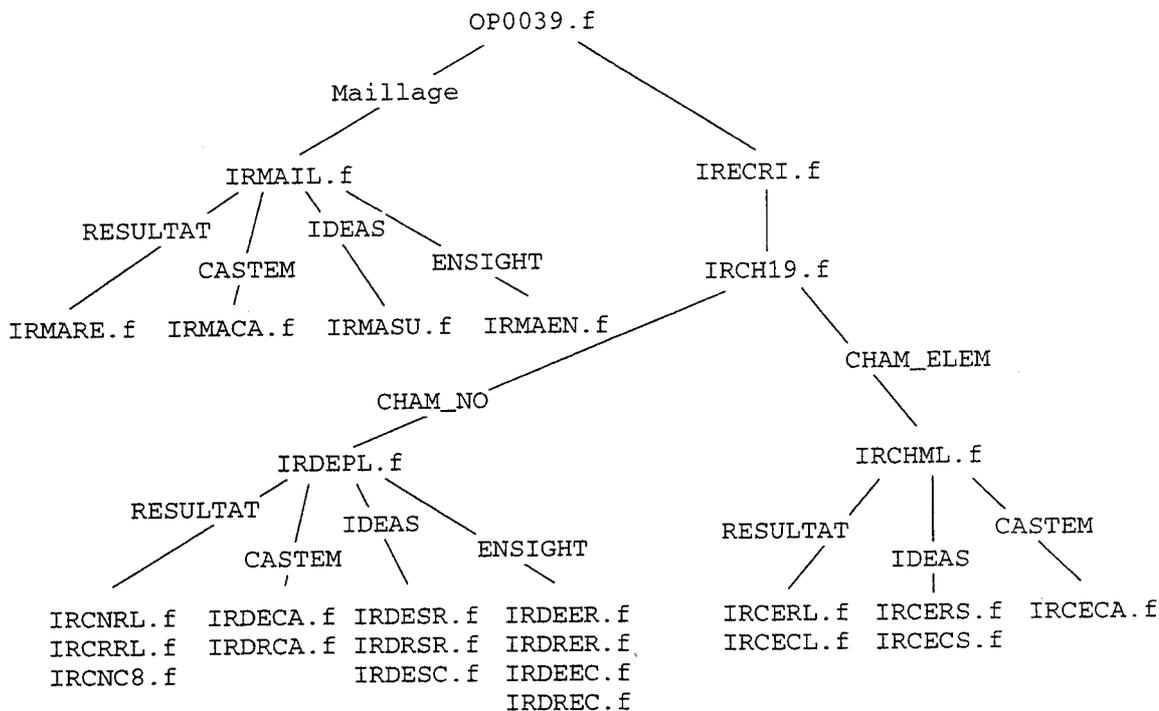
This document is a data-processing description of the command `IMPR_RESU`, whose role is to print the results of *Code\_Aster* to format "RESULTAT", "IDEAS", "CASTEM" or "ENSIGHT".

One finds the list of the principal routines used by the command, as well as short abstract of their features.

One describes the characteristics of the printing of the results to the format I-DEAS, as well as the format of the "datasets" constituting the universal file IDEAS.

For format `CASTEM`, one describes the format of the file used by code `CASTEM2000`.

## 1 Shaft of call of the principal routines of IMPR\_RESU



### 1.1 Description of the routines appearing in the shaft of call

|                          |  |
|--------------------------|--|
| OP0039.f                 | Program main associate to command IMPR_RESU. It is in this routine that all operands of the command IMPR_RESU are read.  |
| IRECRI.f Writing         | of a field of variables or a result concept. This routine can be called by other routines for the printing of an Aster concept . It is to some extent a routine "hat" for the printing of results Aster , deprived of any dependency to command IMPR_RESU (not of calls to routines supervisor). It is in this routine that one finds the loops on the sequence numbers of a result concept and the list of symbolic names. IRCH |
| 19.f Routine<br>Printing | of printing of a cham_no or a cham_elem. IRCHML.f  |
| Printing                 | of a cham_elem to real or complex components with result format , IDEAS or CASTEM . IRDEPL.f   |
| Printing                 | of a cham_no with real or complex components with result format , IDEAS, CASTEM or ENSIGHT . IRCNRL.f Printing   |
| Printing                 | of a cham_no with actual values with result format (on listing ) . This routine also allows the search and the minimal note printing and maximum value of the field at nodes. This processing can be carried out on all the field or only on the values belonging to an interval defined by the user. IRCRRL.f Printing  |

of a cham\_no with constant representation and actual values with result format. Search and printing of the values minimal and maximum. Processing carried out on all the field or only on one interval defined by the user. IRCNC8.f Printing of a cham\_no with complex values with result format. Search and printing of the values minimal and maximum. Processing carried out on all the field or only on one interval defined by the user. IRDECA.f Printing of a cham\_no to actual values with format CASTEM (writing of the stack number 2, to see description of structure of file CASTEM 2000 [§2]). IRDRCA.f Printing of a cham\_no to constant representation and actual values with format CASTEM (writing crushes number 2, to see description of structure of file CASTEM 2000 [§2]). IRDESR.f Printing of a cham\_no with actual values with the format of the universal file IDEAS (dataset 55, to see description of structure of the universal file IDEAS [§3]). IRDRSR.f Printing of a cham\_no to constant representation and actual values with the format of the universal file IDEAS (dataset 55, to see description of structure of the universal file IDEAS [§3]). IRDESC.f Printing of a cham\_no to complex values with the format of the universal file IDEAS (dataset 55, to see description of structure of the universal file IDEAS [§3]). IRDEER.f Printing of a cham\_no with actual values constant with insight format. IRDRER.f Printing of a cham\_no with constant representation and actual values with insight format. IRDEEC.f Printing of a cham\_no with complex values with insight format. IRDREC.f Printing of a cham\_no with constant representation and complex values with insight format. IRCERL.f Printing of a cham\_elem to the nodes or Gauss points and actual values with result format. Search and printing of the values minimal and maximum. Processing carried out on all the field or only on one interval defined by the user. IRCECL.f Printing of a cham\_elem to the nodes or Gauss points and complex values with result format. Search and printing of the values minimal and maximum. Processing carried out on all the field or only on one interval defined by the user. IRCERS.f Printing of a cham\_elem to the nodes or Gauss points and actual values with the format of the universal file IDEAS (datasets 56 and 57, to see description of structure of the universal file IDEAS). Note: the cham\_elem with Gauss points **are written as** constant fields by element, while realising on Gauss points). IRCECS.f Printing of a cham\_elem to the nodes or

Gauss points and complex values with the format of the universal file IDEAS (datasets 56 and 57, to see description of structure of the universal file IDEAS). Note: the cham\_elem with Gauss points are written as constant fields by element, while realising on Gauss points). IRCECA.f Printing of a cham\_elem to the nodes and actual values with format CASTEM (writing of structure of file CASTEM 2000). IRMARE.f Printing of the mesh to the Aster format (being able to be read again by the command LIRE\_MALLAGE). IRMACA.f Printing of the mesh to format CASTEM (printing of the stacks number 0 (coordinates of the nodes) and number 1 (connectivities of the elements), to see description of structure of file CASTEM 2000). IRMASU.f Printing of the mesh to the format universal file IDEAS (datasets 15 (coordinates of the nodes single precision), 781 (coordinates of the nodes double precision), 71 or 780 (connectivities of meshes) and 752 (nodes groups or of meshes), to see description of the universal file IDEAS). IRMAEN.f Printing of the mesh on ENSIGHT geometry file. Other routines ECRTES.f Writing of the heading of the datasets 55,56 and

## 1.2 57 at the time of the writing

of a field of variables Aster to the format IDEAS. This routine is called by the routines IRDESR.f , IRDRSR.f , IRDESC.f, IRCERS.f and IRCECS.f. IRGAGS.f Searches datasets IDEAS necessary to the writing of a field of variables

Aster. This routine is called by the routines IRDESR.f, IRDRSR.f, IRDESC.f, IRCERS.f and IRCECS.f. IRADHS.f Processing of the "dependancies IDEAS" at the time of the writing of a mesh to the format IDEAS. This routine

is called by the routines IRMAIL.f and IRCHML.f. INISTB.f Initializations necessary to the writing

of a mesh to the format IDEAS. This routine is called by the routine. IRPACA.f Printing of the values of the variables of access Aster to the format

of files CASTEM 2000 (stacks 25,26 and 27). This routine is called by the IRECRI.f routine. IRPARA.f Printing of the values of the parameters and the variables of access to result format. This routine is called by

the IRECRI.f routine . RSINFO.f Printing of the list of symbolic names and the sequence numbers available

in IMPR\_RESU for a result concept (key word INFO\_RESU ). This routine is called by OP0039.f. Structure of file CASTEM 2000 This structure of file corresponds to level 3 of CASTEM 2000. Each information contained in

## 2 the file is preceded by a descriptor

RECORD OF TYPE followed by an integer (I4). This one indicates

the type of information which follows: general 4 Informations on the mesh general 7 Informations CASTEM 2000  
2 Description of a stack 5 Fin of file Record

```
of the type 4: general information mesh
general Information on
the mesh . Two lines follow
the descriptor
```

### 2.1 . NIVEAU niv NIVEAU ERREUR ierr DIMENSION ndim DENSITY

dens niv: number of version CASTEM 2000 (niv = 3, I4) ierr: level of

```
error (ierr = 0, I4) ndim: dimension of the problem (ndim = 2
or 3,
```

```
I4) dens : density of the mesh (dens = 0.D0 , E 12.5) Record
of the type 7 : general
information CASTEM 2000 general Information
```

```
CASTEM 2000. Two lines follow the descriptor
```

### 2.2 . NOMBRE INFO CASTEM 2000 ninfo IFOUR ifour NIFOUR nifour

IFOMOD ifomod IECHO iecho IIMPI iimpi IOSPI iospi ISOTYP isotyp

```
ninfo: number of information being reproduced
on line following (ninfo =7, I4) the ifour : computation
options ( - 1: plane strains
(if dimension
```

```
2), I4 2: three-dimensional (if dimension 3), I4) nifour: harmonic
```

```
of Fourier (0: no the harmonic , I4) ifomod: type of mode (- 1:
plane (if
```

```
dimension 2), I4 2: three-dimensional
(if dimension
```

```
3) , I4) iecho: echo of the data to the screen (iecho
```

```
=1, I4) iimpi: level of printing (iimpi=0, I4) iospi
: trace operators (iospi=0 not
```

```
trace, I4 ) isotyp: type of layout of isovaleurs (isotyp
=1, I4 ) Record of the type 2: description
of a stack Description of a stack. This line
is always followed by line following: CRUSH
```

## 2.3 NUMERO npile NBRE OBJECTS NAME iobno NBRE OBJECTS

iob npile: described the type of elements contained in the stack (I4) (npile

```
=0coordonnées of the nodes =1connectivity of the elements
=2champs

to the nodes =10description of an array =25pile of realities =26pile
of integers =27pile of type key
=39champs by elements) iobno
: many named objects
(I5) iob: total number of
objects (I5) Crushes
0: coordinated
nodes CRUSHES NUMERO
0 NBRE OBJECTS NAME

iobno NBRE iob OBJECTS the named
objects are the Aster
```

### 2.3.1 nodes groups with only one node. If

the number of named objects is not null, there is two information

; •the list of the names of Aster nodes groups to only one node

(8 (1X, A8)), •the position of each node in the stack (16I5). Then

the coordinates and the density of the points *follow* : X (I), I = 1, iob\* (ndim +1) (3 (1X, D21.14)). Crush 1: connectivities of the elements

CRUSHES NUMERO 1 NBRE OBJECTS NAME iobno NBRE iob OBJECTS If iobno is not null, there are two lines

### 2.3.2 , one describing the names of

the objects (8 (1X, A8) and the other their position ( 16I5). The named

objects are the Aster nodes groups with more than one node, the Aster mesh groups and the meshes of the model Aster

(if required by the user by the key word *MODELS* ). In the objects, one finds: •all the nodes of the mesh in the form of meshes of type POI1. This object is essential during

the reading of fields at nodes

. This object is not named and is always the first object written in this stack, •an object CASTEM 2000 for each Aster nodes group with more than one node. It is of the meshes containing meshes of type POI 1, •an object CASTEM 2000 for each Aster *mesh group* . The object is called after the mesh group in Aster, •Aster mesh

: object named with same name as the Aster mesh , •the model Aster (if it were stipulated in *command* IMPR\_RESU by the key word *MODELS*): object named with same name as *the model*

Aster. *Note*: In Aster, a nodes group and a mesh group can have even name. The interface writes the two objects *with format*

## CASTEM

2000 pennies the same name but in two distinct forms (meshes of type POI1 for the nodes group and meshes of the mesh group). Taking into account about writing in file CASTEM 2000, it is the object associated with the mesh group which is accessible. Then

, for each mesh object, line described this object: --> itype nbsd nbref nbnoe nbelem itype: number of the type of element

mesh (I5) 1: POI1 2: SEG2 3: SEG3 4: TRI3 6: TRI6 8: QUA

410: QUA814 : CUB8 15: CU 2016: PRI617:

PR1523: TET4 24: TE1025: PYR526: PY13 0: if the object

is composed of under nbsd objects  
: number of under objects (I5) For  
the interface , the number of under  
objects is the number of

the types of meshes composing the mesh object

. (A mesh group made up

of triangles and quadrangles will be written in the form of three objects CASTEM 2000: •under object containing the triangles, •under object containing the quadrangles, •a named object pointing on the two other objects ) nbref: many references (=0

, I5 ) nbnoe: many nodes per element

(I5 ) (=0 if object pointing on under objects) nbelem

: many elements (I5) (=0 if object

pointing on under objects) Note:: Under object of a given object is standard

all the elements in the same way being able to be extracted. If the object consists

of only one

type of elements, there is not under objects. If nbsd  $\neq$  0, the list of the rows of under objects is registered at line according to (16I5). If itype=0, then necessarily nbsd  $\neq$  0.

That means that object is with a grid with elements of the different types. If nbsd=0,

One finds then the list of the numbers of the colors of each element ICOLOR (I), I=1, nbelem (16I5) Then the list of the numbers

of

the nodes "tops" of elements (NUM (I, J) I=1, nbnoe), j=1, nbelem (16I5)

Stack 2: field at nodes CRUSHES

NUMERO 2 NBRE OBJECTS NAME iobno NBRE iob OBJECTS This

stack makes it possible to write cham\_no Aster.

## 2.3.3 The cham\_no can be

named fields of variables or fields of variables resulting

from a result concept (in which case *they* are not expressly named). iobno = 1si cham\_no Aster named 0si associated with a symbolic name of a result concept iob = 1 --> If iobno = 0, the two following lines

```
appear in the file
with format CASTEM 2000: •name of the CHAM_NO Aster (
1X, A8 ), •
```

number of occurrence of the field at nodes in file CASTEM 2000 (I5). --> nbsch nbcmp ifour

( 3I5) nbsch: number of "under  
fields at nodes " = 1 (one considers that all the nodes have the same number

of degrees of freedom ; the envelope

of the degrees of freedom present). nbcmp: number of components present at the nodes: wrap of the  
components. ifour: 2 = three-dimensional type of computation --> ipgeo

nbpoint nbcmp (3I5) ipgeo: pointer in the stack of connectivities of the elements

= 1 (the object made up of the elements

of the type POI1 associated with all

the nodes with the mesh is always written at the beginning of the stack of connectivities). nbpoint: many points  
of the mesh. nbcmp: number of components (idem that on the line preceding one). --> NOMCMP (I) (1:4), I=1,  
nbcmp

16 (1X, A4) list of the names of the components

. They are the first four characters of the name of the components

Aster, except for displacements (DX

becomes UX, DY becomes UY, DZ becomes UZ, DRX becomes X-ray, DRY becomes RY and DRZ becomes  
RZ). -- > NOHARM (I), I=1, nbcmp (16I5) corresponds to the numbers of the harmonics of Fourier. These  
parameters are identically null in the case

of the interface Aster - CASTEM

2000. --> Name of the quantity (1X, A71). --> 1 line white --> (Value of the field (I, J), I=1, nbpoint), j=1, nbcmp)  
(3 (1X, E21.14)). Crush 39: field

```
by element CRUSHES NUMERO 39
NBRE OBJECTS NAME
```

```
iobno NBRE iob OBJECTS This stack makes it possible to write cham_elem
```

## 2.3.4 with the nodes Aster. The cham\_elem

with the nodes can be named fields of variables or

fields of variables resulting from a result concept ( *in which* case, they are not expressly named). iobno = 1si  
cham\_elem with the nodes named in Aster 0si associated with a symbolic name of a result concept iob = 1 -->  
If iobno = 0,

the two following lines appear in the file  
with format CASTEM 2000: \*name of the CHAM\_ELEM Aster

(1X, A8),

\*number of occurrence of the cham\_elem to the nodes in file CASTEM 2000 (I5). --> nzone ifour

lcomp nbcarr (4I5) nzone : number  
of under zones. It is equal to the number of the type of elements present, in the model

. A model made up of triangles

and quadrangles are composed of two pennies zones. ifour: three-dimensional type of computation = 2 lcomp:  
4

nbcarr: number of characters composing the type of the cham\_elem = 16 --> title of the cham

\_elem: name of the quantity Aster (1X, A

71) (saufCONTRAINTESpour

quantities SIEF\* or SIGM\* DEFORMATIONSpour quantities

EPSI\*) --> (n1 N2 n3 n4 n5 n6 n7) X nzone (16

I5) n1 : pointer in the stack of connectivities  
of the elements . Number of occurrence of

the model Aster ( or of its under objects if nzone =

0) in the stack of connectivities N2: 0 n3: number of components of under zone n4: 0 n5: 0 n6: 0 n7: 0  
(cham\_elem defined in the nodes. Documentation available

does not indicate  
the value for cham\_elem to

Ga  
uss  
poi  
nts

). -- >

For each component of under zone, number of the harmonic (16I5). n3 X (0.) X nzone  
--> Name of the components (NOMCMP (I) (1:8),

I=1, n3) X nzone (8 (1X, A8)) The names of components are composed of the first 2  
characters

concaténés with the last 2 characters of the name of the component

Aster. For the local variables, there are VAR1, VAR2,... For the stress components, SiXX becomes SMXX,..., SiYZ becomes SMYZ . -->

Standard of the components ("REAL\*8") X n3 X nzone 4 (1X , A16) --> Value of the field by element to the nodes in each under zone --> n1 N2  
0 0 (16I5) --> (VAL (I, J), i=1, n1) (j=1, N2) (1P, 3 E22.14) n1

: number of nodes defining meshes under zone considered

```
. N2 : many  
elements of under zone considered . Writing
```

of a result concept Aster to format CASTEM the 2000 concepts Aster  
results are written with format CASTEM 2000, in

## 2.4 the shape of arrays. The stacks necessary to the writing of

an array are (in the order *and for* each sequence number): •Crush 27: crush of standard key

, allows to have the list of the "concepts" available for the array: variables of access, sequence number

, fields at nodes , fields per element. That gives the indices "character" of the array, and makes it possible to extract from the array, a reality, an integer, a field at nodes, or a field by element. U = Array. 1. DEPL It is the key DEPL which appears in stack 27. •Crush 26: crush integers; allows to write the value of

the sequence number and

the value of the variables of access of the whole type.

Stack 26 appears for each variable of access and the sequence number, and this for all the sequence numbers. •Crush 25: crush realities, allows to write the value of the variables of access of the real type. This stack appears for each variable

of access and each sequence number. •Crush 2: field at nodes (format describes previously), •Crush 39: field by elements (format describes previously), •

Crush 10: description of the array. Give the occurrence of each object constituting the array in the file to format CASTEM 2000.

For example , the field at nodes at the sequence number 10 is the 50ème object of type field at nodes stored in the file. Crush 27: Crush standard key CRUSHES NUMERO 27 NBRE OBJECTS NAME 0 NBRE OBJECTS iob iob = number "of objects" constituting array CASTEM

### 2.4.1 2000 for a given

```
sequence number. These objects are identified by a character  
string
```

of 4 characters. The objects present are: •ORDR, whole value of the sequence number, •the first 4 characters of the variables of access (for example

: INST,...), •the first 4

characters of the name of the quantity associated

with the fields at nodes and/or the fields by element (for example: DEPL, SIGM

, ...). It is thus supposed that the number of variables of access and fields is identical for all the sequence numbers, and that they are in the same way

standard. The following records are then present in the file: --> ncar nmot (2I5) ncar: nombre total of characters = iob

\*4 nmot: number of words = iob. --> character string (A72) for example

```
ORDRINSTDEPLSIGM
```

for a result concept which has  
time for variable of access,

```
a field at nodes of type displacement
```

and a field by element of type forced. --> (npos) X iob (12I5) pointer on the preceding character string. Crush  
26: Crush integers CRUSHES NUMERO 26 NBRE OBJECTS

```
NAME 0 NBRE iob
```

OBJECTS •If writing of the value of sequence number:

## 2.4.2 iob = 2 \* NBORDR where NBORDR

```
= many sequence numbers present in the result concept
```

Then follow 2 records; the first

```
is an integer
```

which is equal to 2\*NBORDR (I5), the second is a list of integers (I, value

of the ième sequence number), I = 1, NBORDR (7I11). •If writing of a variable of access of the whole type: iob  
= 1 Then follows 2 records ; the first is 1 (I5) and the second

the value of the variable of access (2I11). Crush 25: Crush

```
realities
```

CRUSHES NUMERO 25 NBRE OBJECTS NAME 0 NBRE iob OBJECTS This stack allows to write the actual  
values of

## 2.4.3 the variables of access of the concepts

```
results , and is written for each variable of
```

access and each sequence number: iob = 1 Then follows 2 records; the first is 1 (I5) and the second the value  
of the variable of access (1X, 1P21.14). Crush 10

```
: descriptor
```

of the array CRUSHES NUMERO 10 NBRE OBJECTS NAME 1 NBRE OBJECTS 2 This stack makes it  
possible to define structure of

## 2.4.4 the array (which is in fact an array

of arrays) by giving the position of the stacks constituting

the array (order of appearance in the file with format CASTEM 2000). The records necessary to the description of the array are: --> name of the array which is not other than the name of the result concept

Aster (1X, A8) --> nbobj (I5) It is the number of words constituting

the stack of the type mot. --> ncar (I5) It is the nombre total of characters *indicated*

in the stack of

the type mot. --> (27 posmot numpile position) X nbobj (16

I5) 27: crush

of type mot. posmot: integer indicating the occurrence in the character string

appearing in the stack of the type mot. numpile

: number of the stack

containing the relative information with the occurrence posmot (26, 25,2 or 39). position: occurrence of the stack in the file with format CASTEM 2000. For example: Let us suppose that in the stack of type key, one has

ORDRINSTDEPLSIGM. The array consists of four objects: •an object

**of the whole type** (associate with character string ORDR), which is stored in a stack of

number 26, which contains the value of the sequence number

, and which for the sequence number considered is the ème array of this type, •an object of the real type (associate with the character string INST) which is stored in a stack of number 25, which contains  $i$  the value of the time

and which for the sequence number considered is the ème array of this type, •an object of type field at nodes (associate with character string DEPL) which is stored in a stack of number 2,  $j$  which contains the values of the field of displacement in all the nodes of the mesh, and which for the sequence number considered is the ème array of this type, •an object of type field by elements (associate with character string SIGM) which is stored in a stack of number  $k$  <sup>39</sup>, which contains the values

of the stress field, and which for the sequence number considered is the ème array of this type. 27 1 26 I 27 2 25 J 27 3 2 K 27 4 39 L --> 4 X sequence number (I5) --> 26 numéroordre 10 numérotable Structure  $l$  of the universal file

IDEAS the total structure of a universal

file IDEAS is presented

in the form of datasets characterized

## 3 by their number. Each dataset

is framed by line "- 1": - 1 n° dataset - - - - 1 - 1 n° dataset - - - - 1 Each dataset contains a particular type of information (coordinated nodes

, connectivities

of

meshes

, results

to

the nodes

,...), and is characterized by a number and a clean data-processing structure. However, the numbers of dataset and their data-processing structure are not solidified and can vary from a version to another.

Command IMPR\_RESU makes it possible to print meshes, and results with the nodes or by elements, and this, with the choices of the user

, in version 4 or 5 of IDEAS. So the number of datasets written by the command IMPR\_RESU is reduced:  
Version 4 Version 5.151.151 Contains 775.775 Properties

of the beams meshes 15 Coordinates of the nodes in single precision 781 Coordinates

of the nodes in double precision

71.780  
752

) 57

151

Connectivity of the 752  
Nodes groups and meshes 55 55 Results  
with the nodes (cham\_no) 56 56 Results by  
elements  
(cham\_elem at the Gauss point  
57 Results with the nodes by elements  
(cham\_elem with the nodes) Dataset  
: Titrage - 1 151% Title Vxx.xx.xx Aster of the  
date result  
of the date-stamp (A80) 1st line of the title  
Aster (A80) 2nd line

## 3.1 of the title Aster (A80)

```
line
white (A80)
4th line of the title Aster ( A80) 5th line of the
title
Aster (A80) 6th line of the title
Aster (A80) - 1 This dataset is
always the first
dataset written in the universal
files IDEAS generated by the command
IMPR_RESU. Dataset
775
```

: Properties of the beams This dataset is compulsory when the mesh comprises elements of type beam , and appears

## 3.2 then just after the dataset 151. -

1 775% Properties can section beams 100 (3I10) BEAM1 0.0.0.0 .0.0. (6 (1PE13.6)) 0.0.0.0. (4 (1PE13.6)) 0.0.0.0 .0.0. (6 (1PE13.6))

```
0.0.0.0
.0 .0. "0.0.0.0 .0.0. "0.0.0.0 .0.0. "0.0.0.0
.0.0
"0.0.0.0
.0.0 . " 0.0.0.0
.0.0." 117814110
(6I10 )
0451111. (
4I10,1PE13.6 )
- 1 Dataset
15 : Coordinated
nodes
in single precision
If
the user requests
the writing
of a mesh
from the format
universal file
```

## 3.3 IDEAS version 4, the coordinates of the nodes are written

in single precision, in the form of this dataset. - 1 15% Nodes n0011XYZ (4I10,3E13.6) ..... - 1: number of the node (it is the number Aster except

```
if
the mesh
by
were generated
```

IDEAS , in which case it  
is the number IDEAS )  
.

$n$  Following information relates to the definition of the coordinate system which in Aster is always the cartesian coordinate system, from where

value 0. The fourth information indicates the color affected during the display of the node. , are the three coordinates of the node. A each

node of the mesh corresponds one line in the dataset 15. Dataset 781: Coordinated

$X Y Z$  nodes in double precision If

the user requests the writing of a mesh from the format universal file

### 3.4 IDEAS version 5, the coordinates of the nodes are written

in double precision, in the form of this dataset. - 1 781% Nodes Real\*8 n0011 (4110) for each node XYZ (3E25.17) .... - 1 N: number of the node (it is the number

```
Aster
except if the mesh
generated
by IDEAS
, in
it is the number
IDEAS
).
were
which case
```

Following information relates to the definition of the coordinate system which in Aster is always the cartesian coordinate system, from where

value 0. The fourth information indicates the color affected during the display of the node. X, Y, Z are the three coordinates of the node. A

each node of the mesh correspond two lines in the dataset 781. Dataset 71: Connectivities

of meshes If the user requests

the writing of a mesh from the format universal file IDEAS version

### 3.5 4, connectivities of meshes are written

in the form of this dataset. - 1 71% Elements IMAS ICOD1 ICOD2 IPHY IMAT 7 NNOE (7110) NODSUP (J), J=1, NNOE (8110) • • • • • - 1 the two lines

```
of information indicated
are written for each element
of the mesh. IMAS: Number
of the mesh . It is
the number
```

Aster except if the mesh were generated by IDEAS, in which case it is the number

*Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.*

IDEAS. ICOD1: Code graphic element. Code *graphic* Mesh Nodes Linear Type 1 2 Linear 2 Linear Triangle 3 3  
Quadratic Triangle

6 4 Cubic Triangle 9 5 Linear

|                 |                      |             |                       |
|-----------------|----------------------|-------------|-----------------------|
| Quadrilateral 4 | 6                    | Quadratic   |                       |
|                 | Quadrilateral 8      |             | 7 Cubic               |
|                 | Quadrilateral        | 12          | 14                    |
| Linear          |                      | Tetrahedron | 4 15                  |
|                 | Quadratic            |             | Tetrahedron 10        |
|                 | 16 Linear            |             | Pentahedron 6         |
|                 | 17 Quadratic         |             | Pentahedron 15        |
|                 | 18 Cubic             |             | Pentahedron 24        |
|                 | 19 Linear            | Hexahedron  | 8                     |
| 20              | Quadratic Hexahedron | 20          | 21                    |
| Hexahedron      | 32                   | Cubic       | ICOD                  |
| 2               | : Descriptor         |             | of the finite element |
|                 | By default           |             | ,                     |
| a value         | of the descriptor    |             |                       |
| is assigned     | to                   | each        | type of               |
| mesh            | . That               |             | is done               |

when the user did not specify

of model Aster and that one thus does not have the knowledge of the type of the finite element. Type of mesh Descriptor POI1 161 (lumped farmhouse) SEG2 21 (*linear* beam) SEG3 24 (parabolic beam) TRIA3 74 (membrane linear triangle) SORTED

|                                    |                |  |
|------------------------------------|----------------|--|
| 6 72 (membrane triangle)           | parabolic      | ) TRIA9 73 (membrane triangle)   |
| QUAD4 quadrilateral parabolic      | cubic 71       | (membrane linear ) QUAD8 75 (membrane quadrilateral) QUAD12 76 (membrane quadrilateral) TETRA4 111 |
| (solid (solid linear               | cubic          | linear tetrahedron) TETRA10 118  |
| brig) HEXA                         | parabolic      | tetrahedron) PENTA6 112 (solid wedge) PENTA15 113 (solid parabolic                                 |
| When a name of by default the type | wedge 20.116   | ) HEXA8 115 (solid linear (solid parabolic brig)   |
|                                    | the user model | provided   |
|                                    | of             | , one refines these values by taking account of the finite element.                                |

The elements concerned are: MEAXQU4/THAXQU4 --> 84 (quadrilateral Axi linear) MEAXQU8/THAXQU8 --> 85 (quadrilateral Axi parabolic) MEAXTR3/THAXTR3 --> 81 (Axi linear

|                                |                      |                                     |
|--------------------------------|----------------------|-------------------------------------|
| triangle) MEAXTR               | 6/THAXTR             | 6 --> 82 (Axi parabolic             |
| triangle) MEDPQU               | 4/THDPQU             | 4 --> 54 (strain linear Planes      |
| quadrilateral parabolic Planes | ) MEDPQU             | 8/THDPQU8 --> 55 (strain            |
| 3 --> 51 (strain               | quadrilateral linear | ) MEDPTR3/THDPTR                    |
| > 52 (strain parabolic         | triangle             | triangle Planes) MEDPTR6/THDPTR6 -- |
| (Planes quadrilateral stress   | linear               | Planes) MECPQU4/THCPQU4 --> 44      |
| 8/THCPQU8 --                   | > 45 (Planes         | ) MEPLQU4/THPLQU4 MECPQU            |
|                                |                      | quadrilateral stress parabolic      |

|   |   |  |
|---|---|--|
| ) MEPLQU8/THPLQU<br>Planes) MEPLTR<br>3/THPLTR3 MECPTR<br>) MEPLTR6<br>/THPLTR6 MEAXSE2<br>MEPLSE2 THAXSE2/<br>THCPSE2 THDPSE2/<br>thin shell: Quadrilateral<br>TN linear<br>3 --> 91 (thin<br>shell: TN linear<br>triangle) IPHY<br>: number of the array of | 8 MECPTR<br>6/THCPTR<br>/MECPSE<br>THPLSE2<br>) | 3/THCPTR3 --> 41 (stress linear triangle<br>6 --> 42 (stress parabolic triangle<br>2 --> 21 (Linear beam) MEDPSE2/<br>MEDKQU4/MEDSQU4 MEQ4QU4 --> 94 (<br>MEDKTR3/MEDSTR |
|---|---|--|

the physical = number Aster associated  
properties  
mesh or the number Aster associated with the type

with the type of

with the finite element if a model were specified by the user . IMAT: number of the array of the characteristics material = 1 except for meshes reduced to a point in which case IMAT is worth 2

. The following record indicates the color of the element during its display in IDEAS (by default 7 green color).  
NNOE: number

of nodes defining the mesh. NODSUP (J), J=1, NNOE: list numbers of nodes composing the mesh. Note:

Meshes the Aster not existing in IDEAS

are ignored by interface (QUAD9, HEXA27). Dataset 780: Connectivities

of meshes

If the user requests the writing of a mesh from the format universal file IDEAS version

## 3.6 5, connectivities of meshes are written

in the form of this dataset. - 1 780% Elements IMASICOD21IPHY1IMAT7NNOE (8I10) NODSUP (J), J=1, NNOE (8I10) % so meshes linear IMASICOD21IPHY1IMAT7NNOE (8I10) 01111

```
(5I10 ) NODSUP (J)
, J=1 , NNOE (8I10 ) - 1 IMAS :
```

number of the mesh. It is

the number Aster except if

the mesh were generated

by IDEAS

, in which case it is

the number

IDEAS. ICOD2: descriptor of the finite element (see description dataset 71). IPHY: number of the array of the physical properties (see description

dataset 71). IMAT: number of the array of the characteristics

material (see description dataset 71). The following record indicates the color of the element during its display in IDEAS (by default 7 green color). NNOE: number

of nodes defining the mesh. Note: To write a beam element, there is line additional in

the dataset 780. This line defines the characteristics

of

*the beam, inter alia, the number of the node being useful for the directional sense of the principal directions of the beam. Values written by the command IMPR\_RESU are values can. Meshes the Aster not existing in IDEAS are ignored (QUAD9, HEXA27). Dataset 752: Nodes groups and of meshes - 1 752%*

*Groups NUM0000NBRE (6I10) NOM (20A2) ( ICOD, MUMENT) I=1, NBRE (8I10) ...*

## 3.7 ... - 1 For each nodes group

```
or of meshes
Aster , one
writes
the
instructions
indicated previously
. NUM : Number
of
the group .
It is
```

sequential; one starts with the nodes groups in the order of their appearance in Aster. NBRE

: Many nodes or of meshes composing the group. NOM: Name of the group. It is the name Aster. ICOD: It is a code indicating

the type of the entity the following. 7 indicates that the number which

follows it is that of a node, 8 indicates

that the number which follows it is that of a mesh. NUMENT: Number of the entity (number of a node or a mesh). Note: The back-row forward is repeated as many times as

necessary to write all the numbers of nodes or meshes composing

the group. Writing of the Aster results: CHAM\_GD or Result concept the three datasets being used to write the Aster results are

## 3.8 the datasets 55 (for fields at nodes ) , 56 (for fields by

elements with Gauss points) and 57 (for fields by elements with the nodes). Dataset 55: Values with nodes  
MODTYP: type of the model MODTYP = 1 Structural MODTYP = 2 Heat transfer command IMPR\_RESU takes  
MODTYP

### 3.8.1 = 1 except when the quantity

```

- 1
55 % Valeurs aux noeuds
TEXT1
TEXT2
TEXT3
TEXT4
TEXT5
MODTYP      ANATYP      DATCAR      DATTYP      TYPE      NBRE      (6I10)
si ANATYP=0      1      1      NUMOR      (8I10)
0.0 DO

ENTETE
si ANATYP=1      1      1      1      (8I10)
0.0 DO      (6D13.5)

si ANATYP=2      2      4      NUMOR      IMODE      (8I10)
FREQ MASGEN AMOR1      AMOR2      (6D13.5)

si ANATYP=4      2      1      1      NUMOR      (8I10)
INST      (6D13.5)

si ANATYP=5      2      1      1      NUMOR
FREQ

NUMNOE % Noeud (Nom du nœud dans Aster)      (I10,A)
VALE(I), I=1, NBRE      (6(1PE13.5))

- 1
    
```

associated with the field

to be printed is TEMP or  
FLUX, in which case MODTYP

= 2. ANATYP: type of analysis ANATYP =0 UNKNOW Value taken by default by the command IMPR\_RESU  
=1 STATIC Value taken during the printing

of fields of variables

|       |    |                     |  |
|-------|----|---------------------|--|
| named | in | Aster               | =2 NORMAL MODE Value taken during the printing   |
|       | of | a result concept    | having for variable of access NUME_MODE =4 TRANSIENT Value taken   |
|       |    | during the printing | of a result concept having for variable of access INST =5 FREQUENCY RESPONSE Value taken                     |
|       |    | during              | the printing of a result concept having for variable of access FREQ and not NUME_MODE DATCAR                 |
|       |    | = characteristic    | of the data =1 scalar =3 vector to 6 degrees of freedom (3 translations and 3 rotations) =4 tensor symmetric |

DATTYP = standard of the forced data

=0 unknown  
=2 =3 strains =5 temperature =6 flux =8 displacement =  
11 velocity =12 acceleration

=15 pressure TYPE =

2 for  
actual values  
, 5 for complex  
values  
. NBRE =  
many values  
by to be printed  
= sequence number node. NUMOR

Aster for the concepts results. IMODE = value of the variable

of access NUME\_MODE for the sequence number

considered (for the result concepts having this variable

of access ). FREQ = value of the variable of access FREQ for the sequence number considered (for the result concepts having FREQ for variable

of access ). MASGEN = value of parameter MASSE \_GENE for the sequence number considered (for the concepts results having NUME\_MODE for variable

of access). AMOR1 = value of parameter AMOR\_REDUIT for the sequence number considered (for the result concepts having NUME\_MODE for variable

of access). AMOR2 = 0.D0 INST = value of the variable of access INST for the sequence number considered (for the result concepts having INST

for variable

of access ). NBRE = many values of result per node. NUMNOE = number of the node. VALE = values of result (cham\_no) with the node considered

. Dataset 56: Values by elements the heading of  
this dataset is identical  
to that of the dataset 55. NUMMAI = number of the mesh. NBVAL

## 3.8.2 = many values on the mesh.

```

- 1
56 % Valeurs moyennes par élément
Text1
Text2
Text3
Text4
Text5
MODTYP      ANATYP      DATCAR      DATTYP      TYPE      NBRE      (6I10)
si ANATYP=0      1      1      NUMOR      (8I10)
0.0 DO      (6D13.5)
si ANATYP=1      1      1      1      (8I10)
0.0 DO      (6D13.5)
si ANATYP=2      2      4      NUMOR      IMODE      (8I10)
FREQ MASGEN AMOR1      AMOR2      (6D13.5)
si ANATYP=4      2      1      1      NUMOR      (8I10)
INST      (6D13.5)
si ANATYP=5      2      1      1      NUMOR      (8I10)
FREQ      (6D13.5)

NUMMAI % Maille (Nom de la maille Aster) , NBVAL      (2I10)
VALE(I), I=1, NBVAL      (6(1PE13.5))

- 1

```

ENTETE

VALE = values of result (cham\_elem to Gauss points) on

the mesh considered.

The cham\_elem with Gauss points the Aster

are written with the format IDEAS in the form of constant fields by element (average of the values to Gauss points). Dataset 57 : Values with the nodes by element the heading of this dataset is identical to that of the dataset 55 and 56. NUMMAI = number of the mesh

### 3.8.3 . NBNOE = many nodes of the mesh

```

- 1
57 % Valeurs aux noeuds des éléments
Text1
Text2
Text3
Text4
Text5
MODTYP      ANATYP      DATCAR      DATTYP      TYPE      NBRE      (6I10)

ENTETE
si ANATYP=0      1      1      NUMOR      (8I10)
0.0 DO          (6D13.5)

si ANATYP=1      1      1      1      (8I10)
0.0 DO          (6D13.5)

si ANATYP=2      2      4      NUMOR      IMODE      (8I10)
FREQ MASGEN AMOR1 AMOR2      (6D13.5)

si ANATYP=4      2      1      1      NUMOR      (8I10)
INST          (6D13.5)

si ANATYP=5      2      1      1      NUMOR      (8I10)
FREQ          (6D13.5)

NUMMAI      1      NBNOE      NBVAL      (8I10)
VALE1(I), I=1, NBVAL      (61PE13.5)
VALE2(I), I=1, NBVAL
. . .
VALE NBNOE (I), I=1, NBVAL
    
```

. NBVAL = many values per node. VALEJ = values of result

(cham\_elem with the nodes) on  
the node of the mesh considered. Writing rule  
of a dataset of results  
In Code\_Aster, the fields of variables are fields at nodes *J* or fields by element

### 3.9 with Gauss points or the nodes.

The fields at nodes are written in the form of datasets number 55, the fields by elements with Gauss points in the form of datasets number 56 and the fields per element with the nodes in the form of datasets 57. For the result concepts, one treats sequence number by sequence number and symbolic name by symbolic name, the various fields of variables

composing the result concept. The only difference in the writing of the datasets 55,56 and 57 is the value of the code corresponds to the type of analysis (ANATYP) which are worth 1

for the fields of variables named in Aster, and 2,4 or 5 for the concepts results (see description dataset 55). In Code\_Aster, a field of variables is associated with a *quantity* whose list of the components possible is defined in a catalog

. The various components can be vectors, tensors or scalars. In IDEAS, a dataset understands to the maximum 6 components, and these components are typified: •vectors with 6 components of type displacement

, velocity, acceleration, flux or unknown, •symmetric tensors of type forced

or strains, •scalars of type temperature or pressure. Also, one associates with a quantity Aster a finished number of datasets IDEAS likely to be written (if the components really exist

on the model). It is the *IRGAGS.f* routine which carries out this work. Let us consider for example the quantity DEPL\_R whose components are DX, DY, DZ, DRX, DRY, DRZ, GRX, DDZDN, NEAR, PHI. A field at nodes

associated with this quantity corresponds to the maximum three datasets IDEAS (all three of number 55): •a dataset

of type vector with 6 components for the writing of DX, DY,... DRZ, •a dataset of the scalar type for the writing of

PRES , •a dataset of the unknown type for writing of the components GRX, DDZDN, PHI

. These datasets can then exist or not according to the presence

or not of the components. The dataset exists as soon as one of the components

the component is defined on a node of the mesh (in which case the value of the components absent is 0.). With regard to the local variables, one generates one or more (a dataset understands to the maximum 6 components) datasets of number

55 and type "UNKNOWN". Structure of file ENSIGHT the description of ensight format will be integrated into a forthcoming version of this document. Bibliography [1] R.

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