Operator CREA_RESU

1 Drank

To result create or enrich a data structure from fields at nodes or by elements. Possible assignment of the fields for various sequence numbers.

The user must make sure of the coherence of the various fields used to build or enrich data structure result .

The assignment via a cham_no of function produces by CREA_CHAMP [U4.72.04] is carried out by evaluating each function using the parameter representing the time provided under the key keys LIST_INST or INST.

The product concept by this operator is, for the moment, of type evol_elas, evol_noli, evol_ther, mult_elas, fourier_elas, fourier_ther, evol_varc, evol_char, mode_meca, dyna_trans or dyna_harmo.

Moreover, three particular features are accessible in this operator:

- the creation of a concept of the evol_char type by assignment of field or an analytical formula;
- the creation of a result concept simulating the reorganization of the fuel assemblies;
- the projection of a thermal transient 1D on an axisymmetric mesh 3D.

2 Syntax

```
resu [result] = CREA_RESU  (

          ◊reuse  = resu,

          ♦OPERATION=/        "AFFE",
                     /"ECLA_PG",
                     /"PERM_CHAM",
                     /"PROL_RTZ",
                     /"PREP_VRC1",
                     /"PREP_VRC2",
                     /"ASSE",
```

 # Construction of one result by assignments or evaluatings successive
# of cham_no: (OPERATION: "AFFE")

```
                                ♦TYPE_RESU=' MULT_ELAS',
                                ♦NOM_CHAM=' DEPL',
          ♦  AFFE = _F  (
                    ♦CHAM_GD=chno              ,          [cham_no]
                    ◊NOM_CAS=nomc              ,          [kN]
                    ◊MODELE=mo                    ,            [model]
                    ◊CHAM_MATER=chmat             ,         [cham_mater]
                    ◊CARA_ELEM=carac              ,         [cara_elem]
                    ◊CHARGE             = tank          /[char_meca]
                                                        /[char_cine_meca]
                       ),

          ♦  TYPE_RESU=/                     "EVOL_ELAS",
                                            /"EVOL_NOLI",
          ♦                          NOM_CHAM=' DEPL',
          ♦  AFFE = _F  (
                    ♦CHAM_GD=chno       ,              [cham_no]
                    ◊MODELE=mo                    ,            [model]
                    ◊CHAM_MATER=chmat             ,         [cham_mater]
                    ◊CARA_ELEM=carac              ,         [cara_elem]
                    ♦/INST=linst                  ,         [l_R8]
                       /LIST_INST          =litps   ,         [listr8]
                    ◊NUMÉRIQUE_INIT=numi                ,         [I]
                    ◊NUMÉRIQUE_FIN=numf           ,         [I]
                    ◊PRECISION=/prec              ,         [R]
                                            / 0.0,         [DEFAULT]
                    ◊CRITERE=/                 "RELATIF",    [DEFAULT]
                                            /"ABSOLU",
                       ),

                                ♦TYPE_RESU=' FOURIER_ELAS',
                                ♦NOM_CHAM=' DEPL',
          ♦AFFE   = _F (
                    ♦CHAM_GD=chno              ,          [cham_no]
                    ◊MODELE=mo                    ,            [model]
                    ◊CHAM_MATER=chmat             ,         [cham_mater]
                    ◊CARA_ELEM=carac              ,         [cara_elem]
                    ◊NUMÉRIQUE_MODE=num                ,         [I]
                    ◊TYPE_MODE=/               "SYME",       [DEFAULT]
                                            /"ANTI",
                                            /"TOUS",
                    ◊CHARGE             = tank          /[char_meca]
```

```
                                                    /[char_cine_meca]
                ),
                                ♦TYPE_RESU=' FOURIER_THER',
                                ♦NOM_CHAM=' TEMP',
          ♦AFFE   = _F (
                ♦CHAM_GD=chno              ,          [cham_no]
                ◊MODELE=mo                    ,             [model]
                ◊CHAM_MATER=chmat             ,          [cham_mater]
                ◊CARA_ELEM=carac              ,          [cara_elem]
                ◊NUMÉRIQUE_MODE=num                ,          [I]
                ◊TYPE_MODE=/                  "SYME",       [DEFAULT]
                                             /"ANTI",
                                             /"TOUS",
                ),

          ♦TYPE_RESU                    =    ' EVOL_THER',
          ♦NOM_CHAM=/                        "TEMP",
                                             / "HYDR_ELGA",
          ♦AFFE   = _F   (
                ♦CHAM_GD=chno              ,          [cham_no]
                ◊MODELE=mo                    ,             [model]
                ◊CHAM_MATER=chmat             ,          [cham_mater]
                ◊CARA_ELEM=carac              ,          [cara_elem]
                ♦/INST=linst                  ,          [l_R8]
                   /LIST_INST           =litps   ,          [listr8]
                ◊NUMÉRIQUE_INIT=numi               ,          [I]
                ◊NUMÉRIQUE_FIN=numf           ,          [I]
                ◊PRECISION=/                  prec,      [R]
                                             /0.0,       [DEFAULT]
                ◊CRITERE=/                    "RELATIF",    [DEFAULT]
                                             /"ABSOLU",
                ),

          ♦TYPE_RESU                    =    ' EVOL_VARC',
          ♦NOM_CHAM                     =    ' IRRA',
          ♦AFFE   = _F   (
                ♦CHAM_GD=chno              ,          [cham_no]
                ◊MODELE=mo                    ,             [model]
                ◊CHAM_MATER=chmat             ,          [cham_mater]
                ◊CARA_ELEM=carac              ,          [cara_elem]
                ♦/INST=linst                  ,          [l_R8]
                   /LIST_INST           =litps   ,          [listr8]
                ◊NUMÉRIQUE_INIT=numi               ,          [I]
                ◊NUMÉRIQUE_FIN=numf           ,          [I]
                ◊PRECISION=/                  prec,      [R]
                                             /0.0,       [DEFAULT]
                ◊CRITERE=                   /"RELATIF", [DEFAULT]
                                             /"ABSOLU",
                ),

          ♦TYPE_RESU                    =    ' MODE_MECA',
          ♦NOM_CHAM                     =    "DEPL",
                                             /"EPSI",
          ◊MATR_RIGI                    =matr_k   ,       [matr_asse_depl_r]
          ◊MATR_MASS                    =matr_m   ,       [matr_asse_depl_r]
          ♦AFFE   = _F   (
                ♦CHAM_GD=chno              ,          [cham_no]
                ◊MODELE=mo                    ,             [model]
                ◊CHAM_MATER=chmat             ,          [cham_mater]
```

```
                    ◊CARA_ELEM=carac              ,         [cara_elem]
                    ◊   FREQ=freq                 ,         [l_R8]
                    ◊NUMÉRIQUE_MODE=numo                    ,         [I]

                       ),

                 ♦                          TYPE_RESU=' DYNA_TRANS',
                 ♦   NOM_CHAM=/                        "DEPL",
                                                     /"EPSI",
                  ◊  MATR_RIGI                    =matr_k   ,      [matr_asse_depl_r]
                 ◊MATR_MASS                       =matr_m   ,       [matr_asse_depl_r]
              ♦  AFFE = _F  (
                          ♦CHAM_GD=chno                ,          [cham_no]
                          ◊MODELE=mo                      ,             [model]
                          ◊CHAM_MATER=chmat               ,          [cham_mater]
                          ◊CARA_ELEM=carac                ,          [cara_elem]
                          ♦/INST=linst                    ,          [l_R8]
                             /LIST_INST           =litps   ,          [listr8]
                             /NUME_ORDRE       =nuor ,          [I]
                          ◊PRECISION=/prec                ,          [R]
                                                  /0.0,          [DEFAULT]
                          ◊CRITERE=/                 "RELATIF",     [DEFAULT]
                                                  /"ABSOLU",
                             ),

                 ♦                          TYPE_RESU=' DYNA_HARMO',
                 ♦   NOM_CHAM=/                        "DEPL",
                                                     /"EPSI",
                 ◊MATR_RIGI                       =matr_k   ,       [matr_asse_depl_r]
                 ◊MATR_MASS                       =matr_m   ,       [matr_asse_depl_r]
                 ♦   AFFE = _F  (
                          ♦CHAM_GD=chno                ,          [cham_no]
                          ◊MODELE=mo                      ,             [model]
                          ◊CHAM_MATER=chmat               ,          [cham_mater]
                          ◊CARA_ELEM=carac                ,          [cara_elem]
                          ♦/FREQ=lfreq                    ,          [l_R8]
                             /LIST_FREQ           =lifreq  ,          [listr8]
                             /NUME_ORDRE       =nuor ,          [I]
                          ◊PRECISION=/prec                ,          [R]
                                                  /0.0,          [DEFAULT]
                          ◊CRITERE=/                 "RELATIF",     [DEFAULT]
                                                  /"ABSOLU",
                             ),
```

/ # Construction of a concept of the type EVOL_CHAR by assignment or evaluating
# of a cham_no

```
                                   ♦TYPE_RESU=' EVOL_CHAR',
                                   ♦NOM_CHAM=' PRES',
                 ♦AFFE   = _F   (
                          ♦   CHAM_GD=chno             ,          [cham_no]
                          ◊MODELE=mo                      ,             [model]
                          ◊CHAM_MATER=chmat               ,          [cham_mater]
                          ♦/♦       INST=linst            ,          [l_R8]
                             /♦     LIST_INST=litps       ,          [listr8]
                                ◊   NUME_INIT=numi        ,          [I]
                                ◊   NUME_FIN=numf     ,          [I]
                          ◊PRECISION=/                 prec,       [R]
```

```
                                        /0.0,          [DEFAULT]
                    ◊CRITERE=/             "RELATIF",     [DEFAULT]
                                        /"ABSOLU",
                       ),
```

/# Construction of one result on a mesh burst for visualization or
 # postprocessing (OPERATION: "ECLA_PG")

```
                    ♦TYPE_RESU=/                    "EVOL_ELAS",
                                                /   "EVOL_NOLI",
                                                /   "EVOL_THER",

                    ♦ECLA_PG=  _F  (          see [U4.44.14]          ),
```

/ **# Construction of one result dedicated to fuel assemblies**
 # (OPERATION: "PERM_CHAM")

```
                                              ♦TYPE_RESU=' EVOL_NOLI',

                    ♦NOM_CHAM=                    | "DEPl",
                                                | "SIEF_ELGA",
                                                | "VARI_ELGA",
                    ♦RESU_INIT=resu_2                    ,       [evol_noli]
                    ◊INST_INIT                 =tf,             [R]
                    ◊PRECISION                 =   prec,
                                                /1.0E-6,       [DEFAULT]
                    ◊CRITERE                    =  "ABSOLU",
                                                /"RELATIF",
                    ♦MAILLAGE_INIT=ma_1                  ,          [mesh]
                    ♦RESU_FINAL=resu                    ,          [evol_noli]
                    ♦MAILLAGE_FINAL=mo_2                 ,          [mesh]
                    ♦PERM_CHAM    =_F    (
                       ♦GROUP_MA_FINAL=          gma_2,          [gr_ma]
                       ♦GROUP_MA_INIT=             gma_1,          [gr_ma]
                       ♦    TRAN                =   tx, ty, tz),  [l_R]
                       ◊PRECISION               =   prec,
                                                / 1.0E-3,     [DEFAULT]
                                  ),
```

/# Projection of a transient 1D on an axisymmetric mesh
 # (OPERATION = "PROL_RTZ")

```
                     ♦                        TYPE_RESU=' EVOL_THER'
                    ♦PROL_RTZ=_F  (
                       ♦MAILLAGE_FINAL=ma_3D              ,          [mesh]
                       ♦TABLE=post_1D                        ,       [array]
                       ◊/INST=inst                        ,          [R]
                          /LIST_INST                  =linst   ,          [l_R]
                       ◊PRECISION                 =   prec,
                                                /1.0E-6,       [DEFAULT]
                       ◊CRITERE                    =  "ABSOLU",
                                                /"RELATIF",    [DEFAULT]
                       ◊PROL_DROITE                =  "EXCLUDED",  [DEFAULT]
                                                /"LINEAIRE",
                                                /"CONSTANT",
                       ◊PROL_GAUCHE                =  "EXCLUDED",  [DEFAULT]
                                                /"LINEAIRE",
                                                /"CONSTANT",
```

```
                                        ♦REPERE=' CYLINDRIQUE',
                    ♦ORIGINE=                (ori1, ori2, ori3),     [l_R]
                    ♦AXE_Z=                     (axe1, axe2, axe3),     [l_R]
                                ),
```

/# Construction of result of type EVOL_THER to compute:
#température in layers of the shells of the multi-layer type to leave
#d' a field functions of time and space (thickness)
 # (OPERATION: "PREP_VRC1")

```
                     ♦           TYPE_RESU=' EVOL_THER'
                    ♦PREP_VRC1    = _F   (
                       ♦CHAM_GD=chno                ,          [cham_no]
                       ♦MODELE=mo                      ,             [model]
                       ♦CARA_ELEM=carac                ,          [cara_elem]
                       ♦INST=inst                      ,          [l_R8]
                                        ),
```

/# Construction of result of type EVOL_THER to compute:
 # temperature in the layers of the shells multi-layer from one
 # evol_ther "shell" containing TEMP_MIL/TEMP_INF/TEMP_SUP
 # (OPERATION: "PREP_VRC2")

```
                     ♦           TYPE_RESU=' EVOL_THER'
                    ♦PREP_VRC2    = _F   (
                       ♦EVOL_THER=evol                 ,          [evol_ther]
                       ♦MODELE=mo                      ,             [model]
                       ♦CARA_ELEM=carac                ,          [cara_elem]
                                        ),
```

/ # Creation by data structure assembly result evol_ther:
 # (OPERATION: "ASSE")

```
                     ♦                     TYPE_RESU=' EVOL_THER'
                    ♦ASSE   =     _F   (
                       ♦RESULTAT=evol                  ,          [evol_ther]
                       ◊TRANSLATION          =     tr,          [R]
                                                 /  ~~~          [DEFAULT]
                                        ),
      )
```

```
If TYPE_RESU: "Standard     MULT_ELAS'      alorsresude mult_elas
If TYPE_RESU: "Standard  FOURIER_ELAS'      alorsresude fourier_elas
If TYPE_RESU: "Standard  FOURIER_THER'      alorsresude fourier_ther
If TYPE_RESU: "Standard     EVOL_THER'      alorsresude evol_ther
If TYPE_RESU: "Standard     EVOL_VARC'      alorsresude evol_varc
If TYPE_RESU: "Standard     EVOL_ELAS'      alorsresude evol_elas
If TYPE_RESU: "Standard     EVOL_NOLI'      alorsresude evol_noli
If TYPE_RESU: "Standard     EVOL_CHAR'      alorsresude evol_char
If TYPE_RESU: "Standard     MODE_MECA'      alorsresude mode_meca
If TYPE_RESU: "Standard     DYNA_TRANS'     alorsresude dyna_trans
If TYPE_RESU: "Standard     DYNA_HARMO'     alorsresude dyna_harmo
```

3 Operands

3.1 Operand OPERATION

♦OPERATION = defines the type of operation to be carried out with this operator:

" AFFE " : creation of a data structure result from fields. C " is to the user to make sure of the coherence of the fields provided to create data structure and to check that they lean on the same model.
" ECLA_PG " : creation of a data structure on a mesh burst for visualization,
" PERM_CHAM " : reorganization of the fuel assemblies,
" PROL_RTZ " : prolongation of a field 1D on an axisymmetric structure,
"PREP_VRC1" : computation of the temperature in the layers of a shell on the basis of a temperature $TEMP = f(EPAIS, INST)$,
" PREP_VRC2 " : computation of the temperature in the layers of a shell on the basis of a temperature calculated by aster with a model of shells (TEMP_MIL/TEMP_INF/TEMP_SUP),
" ASSE " : creation of a data structure result from several data structures result put end to end.

This key word makes it possible to guide the user during the construction of the command file using the tools eficas.
The data structure result is réentrante and for OPERATION = "AFFE" the existing fields can be replaced according to the values of the variable of access INST by means of the values indicated behind key keys accuracy and CRITERE. When there is replacement of an existing field, the code transmits an alarm message, if not the fields are stored at the end of data structure.

3.2 Operand TYPE_RESU

♦ TYPE_RESU
Standard of data structure result created .
In the case of result of evol_varc TYPE and an evaluating of a field of functions (time and space) *Code_Aster* checks coherence between the nature of the field of functions and the name of the field given under NOM_CHAM . If for example, the field of functions is of the noeu_neut_F TYPE the name of the field must be NEUT .

3.3 Operand NOM_CHAM

♦ NOM_CHAM
Symbolic name of the affected quantity.
In the case of result of evol_varc TYPE and an evaluating of a field of functions (time and space) *Code_Aster* checks coherence between the nature of the field of functions and the name of the field given under NOM_CHAM . If for example, the field of functions is of the noeu_neut_F TYPE the name of the field must be NEUT .

3.4 Key word CHAM_GD

3.4.1 Operand CHAM_GD

♦CHAM_GD = chno
chno is:
1) either A CHAM_NO of function created by the command CREA_CHAMP [U4.72.04] and in this case one evaluates for each node the function and for each time defined behind LIST_INST or INST one creates A CHAM_NO of realities,
2) or a cham_no or or A CHAM_ELEM of realities created by the command CREA_CHAMP (key of AFFE or EXTR) and this field is duplicated as many times as the list of times defined behind LIST_INST or INST requires it.

3.4.2 Operands MODELS, CHAM_MATER, CARA_ELEM, CHARGE

These operands optional are used to allow the filling of data structures result. This filling is essential if command CREA_RESU is called by MACRO_ELAS_MULT to then use the commands of postprocessing which will search this information in data structure.

◊MODELE = Mo,

Name of the model whose elements are the object of computation.

◊CHAM_MATER = chmat,

Name of the material field.

◊CARA_ELEM = carac,

Name of the characteristics of the structural elements (beam, shell, discrete,…) if they are used in the model. When OPERATION takes value PREP_VRC1 or PREP_VRC2, one recovers components EPAIS and COQU_NCOU there.

◊ CHARGE = tank,

Name of a concept of the char_meca type produces by AFFE_CHAR_MECA or AFFE_CHAR_MECA_F [U4.44.01] starting from the model Mo. One can also give the name of a "kinematical load" (standard char_cine_meca) result of operators AFFE_CHAR_CINE or AFFE_CHAR_CINE_F [U4.44.03].

3.4.3 Operands LIST_INST /LIST_FREQ/ NUME_INIT / NUME_FIN

♦LISTE_INST = litps

List of realities produced by DEFI_LIST_REEL [U4.34.01].

♦LISTE_FREQ = lifreq

List of realities produced by DEFI_LIST_REEL [U4.34.01].

◊NUMÉRIQUE_INIT =nuini

◊NUMÉRIQUE_FIN =nufin

times of computation are those defined in the concept litps taken between the nuini and the nufin number of time. In the absence of key word NUME_FIN, it is the size of the list of realities which is taken into account.

3.4.4 Operands INST

♦INST = linst

List of realities: list times for which the cham_no of function will be evaluated, or the cham_no of realities will be affected.

Note:

The sequence number created in the result concept is recovered from the value of the variable of access INST when it is present, that is to say affected with the maximum value immediately above.

3.4.5 Operands FREQ

♦FREQ = lfreq

List of realities: list frequencies for which the cham_no of function will be evaluated, or the cham_no of realities will be affected.

Note:

The sequence number created in the result concept is recovered from the value of the variable of access FREQ when it is present, that is to say affected with the maximum value immediately above.

3.4.6 Operands accuracy / CRITERE

These operands make it possible to refine the access by real variables of access of time or the frequency.

```
I  accuracy =    prec                          [R]
                /0.0 or 1.0D-3 or 1.0D-6       [DEFAULT]
```

This key word makes it possible to indicate that one searches all the fields of which time (respectively the frequency) is in the interval "inst ± prec" (confer CRITERE).

If OPERATION = "AFFE", the default value prec is fixed at 0.0 to avoid crushing a field to which the value of time is close to that one treats. provided time is not used to recover a field in data structure, it is an attribute which it should be associated with the field that one stores. In general, the fields which one stores correspond all to different
times.
In the very rare case or the user would wish to crush one of the fields contained in data structure, it will have to use the key word accuracy. An alarm message then indicates the name of the fields concerned with their times of storage, and the accuracy provided by the user:

```
ICRITERE=/       "RELATIF"            [DEFAULT]
                 /"ABSOLU"
```

"RELATIF" : the interval of search is: [inst (1 - prec), inst (1 + prec)]
"ABSOLU" : the interval of search is: [inst - prec, inst + prec].

3.4.7 Operands NUME_MODE / TYPE_MODE

```
◊NUMÉRIQUE_MODE  = num
```

Whole indicating the number of the harmonic of Fourier of the field stored in a concept of the fourier_elas type.

```
◊TYPE_MODE    =     "SYME"
                /   "ANTI"
                /   "TOUS"
```

Defines the type of the mode of stored Fourier.

"SYME": symmetric harmonic
"ANTI": skew-symmetric harmonic
"TOUS": symmetric harmonic and skew-symmetric

3.4.8 Operand NOM_CAS

```
♦NOM_CAS  = nomc
```

Character string defining the variable of access of the field stored in a concept of the mult_elas type.

3.4.9 Operands NUME_MODE/FREQ

```
◊NUMÉRIQUE_MODE  = num
```

Whole indicating the number of the mode in case TYPE_RESU=' MODE_MECA'.

```
◊FREQ  = freq
```

Value of the frequency.

Note:

the user must indicate NUME_MODE and FREQ for each field

3.4.10 Operands MATR_RIGI/MATR_MASS

If TYPE_RESU=' MODE_MECA', "DYNA_HARMO" or "DYNA_TRANS" :

◊MATR_RIGI = matr_k
Stiffness matrix corresponding to the stored fields.

◊MATR_MASS = matr_m
Mass matrix corresponding to the stored fields.

4 Operands associated with the fields at the points with integration

4.1 Key word ECLA_PG

It is disadvised using directly command CREA_RESU, one will prefer to refer to the macro-command, MACR_ECLA_PG (See [U4.44.14]).

5 Operands associated with the fuel assemblies

5.1 Operands RESU_INIT

♦RESU_INIT = rinit

Name with the SD evol_noli containing the fields to be transferred on the new mesh.

5.2 Operands INST_INIT / PRECISION/CRITERE

♦INST_INIT = iinit

Urgent characterizing in the SD evol_noli indicated under RESU_INIT, the fields to be transferred on the other mesh. By default, last filed time is selected

♦PRECISION = prec

Accuracy used to search the time specified by INST_INIT in the data structure evol_noli associated with RESU_INIT.

♦CRITERE = "RELATIF" [DEFAULT]
/"ABSOLU"

Criterion used to search the time specified by INST_INIT in the data structure evol_noli associated with RESU_INIT.

5.3 Operands MAILLAGE_INIT

♦MAILLAGE_INIT = maillagei

Name of the mesh on which the SD evol_noli was defined indicated under RESU_INIT.

5.4 Operands RESU_FINAL

♦RESU_FINAL = resu

Name of the data structure evol_noli definite on the new mesh on which the fields will be transferred. It is also in this case the name of the concept leaving of the command CREA_RESU. The data structure resu must exist (it will have been created for example by the command STAT_NON_LINE) and must contain one sequence number.

5.5 Operands MAILLAGE_FINAL

♦MAILLAGE_FINAL = mailfin

Name of the data structure mesh created on the new mesh on which the fields will be transferred.

5.6 Key word PERM_CHAM

5.6.1 Operands GROUP_MA_FINAL

♦GROUP_MA_FINAL = gma_2

Name of the mesh group of the MAILLAGE_FINAL, place where the fields are transferred in RESU_FINAL.

5.6.2 Operands GROUP_MA_INIT

♦GROUP_MA_INIT = gma_1

Name of the mesh on which the data structure evol_noli indicated under RESU_INIT was defined.

5.6.3 Operand TRAN

♦TRAN = (tx, ty, tz)

Vector translation allowing to obtain GROUP_MA_FINAL from GROUP_MA_INIT geometrically. It is necessary to provide 3 values exactly.

5.6.4 Operand accuracy

◊PRECISION = prec

absolute Accuracy making it possible to check the good adequacy between meshes initial and the meshes final ones, by default the value is fixed at 10^{-3} .

6 Operands associated with projection on an axisymmetric mesh

6.1 Key word PROL_RTZ

Construction with a thermal transient on an axisymmetric mesh (3D) from the data with a thermal transient calculated on a mesh 1D. The transient 1D is given in the form of a data structure of the command COUNTS resulting POST_RELEVE_T having the following parameters:

- the definition of times ("INST"),
- coordinates of the nodes of the mesh 1D ("COOR_X")
- the value of the temperatures to the nodes ("TEMP").

The coordinates of the array must necessarily have for origin the node of coordinate 0.
The values of the temperatures can possibly be prolonged regularly or interpolated linearly according to coordinate "COOR_X".

6.1.1 Operands MAILLAGE_FINAL

♦MAILLAGE_FINAL = mailfin

Name of the mesh on which one carries out projection, the operator checks that the mesh is three-dimensional .

6.1.2 Operands COUNTS

♦TABLE = array

Name of a data structure of the command COUNTS resulting POST_RELEVE_T containing the thermal transient 1D. The parameters of this array are obligatorily : "INST" , "COOR_X" and "TEMP".

6.1.3 Operands INST / LIST_INST / accuracy / CRITERE

◊INST = litps

List of actual values.

◊LISTE_INST = litps

List of realities produced by DEFI_LIST_REEL [U4.34.01].

◊PRECISION = prec [R]
/ 1-0D-6 [DEFAULT]

Accuracy used to search the time specified in the ARRAY post_1D.

◊CRITERE = "RELATIF",
/ "ABSOLU,"

Criterion used to search the time specified in the ARRAY post_1D.

6.1.4 Operands PROL_DROITE and PROL_GAUCHE

the projection of the transient is carried out according to coordinate COOR_X considered as the coordinate R in the cylindrical coordinate system of the mesh 3D. One can define using these two operands the way of prolonging the field beyond the limits defined by the beach of variation of parameter "COOR_X" in the array.

◊PROL_DROITE and PROL_GAUCHE =

Define the type of prolongation on the right (on the left) of the field of definition of the variable:

- "CONSTANT" for a prolongation with the last (or first) value of the function,
- "LINEAIRE" for a prolongation along the first definite segment (PROL_GAUCHE) or last definite segment (PROL_DROITE),
- "EXCLUDED" if the extrapolation of the values apart from the field of definition of the parameter is prohibited (in this case if a computation requires a value of the function out of field of definition, the code will stop in fatal error).

6.1.5 Operand REPERE/ORIGINE/AXE_Z

♦REPERE = "CYLINDRIQUE"

the reference of work to project the transient is supposed to be cylindrical, the transient 1D being regarded as the radial variation of the field of temperature. The two operands following make it possible to carry out a change of reference.

♦ORIGINE = (ori1, ori2, ori3)

Corresponds to the position of the origin of the mesh 1D compared to the origin of the mesh 3D.

♦AXE_Z = (axe1, axe2, axe3)

Definition of the axis of the cylindrical coordinate system.

7 Operands associated with the preparation with the command variables

7.1 key Keys PREP_VRC1 and PREP_VRC2

the thermal evolution that one can associate with the material field by AFFE_MATERIAU/AFFE_VARC must be ready to be used by the finite elements of the mechanical model. A problem arises for the elements of type shell or pipe which use a temperature varying in the thickness on the various layers. For these elements, it is necessary upstream of the command to prepare the computation of the temperature on layers AFFE_MATERIAU. For that, the user must use command CREA_RESU with one of operations PREP_VRC1 or PREP_VRC2 ("Preparation of the Command variables"):

- OPERATION = "PREP_VRC1" : computation of the temperature in the layers of a shell on the basis of a temperature TEMP= F (EPAIS, INST)
- OPERATION = "PREP_VRC2" : computation of the temperature in the layers of a shell on the basis of a temperature calculated by aster with a model of shells (TEMP_MIL/TEMP_INF/TEMP_SUP).

7.1.1 Operand CHAM_GD

♦CHAM_GD = chgd

chgd is a card of functions of time and thickness.

7.1.2 Operand EVOL_THER

♦EVOL_THER = evol

evo is a data structure EVOL_THER of type "shell", i.e. containing components TEMP_MIL/TEMP_INF/TEMP_SUP.

8 Operands associated with the data structure assembly of the type result

8.1 Key word ASSE

Makes it possible to assemble several data structures evol_ther by putting them end to end by relocating the value of the parameter time.

8.1.1 Operand RESULTAT

♦RESULTAT = resu

resu is a data structure evol_ther.

All the fields present in data structure are treated, that relates to "TEMP", "FLUX_ELGA", "FLUX_ELNO", "FLUX_NOEU", "META_ELNO", "META_NOEU", "DURT_ELNO", "DURT_NOEU", "HYDR_ELNO", "HYDR_NOEU", "DETE_ELNO", "DETE_NOEU", "SOUR_ELGA", "COMPORTHER", "ERTH_ELEM", "ERTH_ELNO", "ERTH_NOEU".

8.1.2 Operand TRANSLATION

◊TRANSLATION = tr, [R]
/0 . [DEFAULT]

tr is the actual value which will be added to the value of the attribute INST for each field of the data structure resu before insertion in data structure result.

9 Example of Construction

use of a thermal transient from a function:

One defined below the principal commands used to build a result concept of the evol_ther type.

Definition of a list of times.

```
lr8=DEFI_LISTE_REEL         ( debut = 0.E0,
                            INTERVALLE= (_F (JUSQU_A=5.e-3, NOMBRE=10),
                                         _F (JUSQU_A=5.e-2, NOMBRE=9    ),
                                         _F (JUSQU_A=4.e-0, NOMBRE=79),
                                         _F (JUSQU_A=6.e-0, NOMBRE=20),)
                          )
```

Definition of a function of the parameter "INST".

```
fct1 = DEFI_FONCTION     ( NOM_PARA = "INST"
                           VALE= (   0.0,       20.0,
                                     0.5,25.0     ,
                                     2.0,54.0     ,
                                     10.0,134.0       ,)
                           PROL_DROIT = "LINEAIRE",
                           PROL_GAUCHE = "LINEAIRE",
                          )
```

Construction of a field to the nodes of function, one assigns the same function fct1 to all the nodes of the mesh.

```
CH = CREA_CHAMP   (   TYPE_CHAM=' NOEU_TEMP_F', OPERATION= "AFFE",
                      MAILLAGE=ma,
                      AFFE=_F (TOUT=' OUI', NOM_CMP=' TEMP',
                      VALE_F=fonction1,),
                  )
```

…

Creation of result concept TEMPE, built starting from the field at nodes of CH function. One at the sequence number limits 20 corresponding to value 0.1. The data structure will comprise 20 sequence numbers from 1 to 20.

```
TEMPE = CREA_RESU     ( OPERATION = "AFFE",
                        TYPE_RESU = "EVOL_THER",  NOM_CHAM = "TEMP",
                        CHAM_GD  = (_F (CHAM_NO   = CH,
                                        LIST_INST = lr8,
                                        NUME_FIN = 20,  ),
                                    )
                      )
…
FIN ()
```