Code_Aster

Titre : Opérateur DEFI_DOMAINE_REDUIT
Responsable : ABBAS Mickaël

Version default

Date : 06/02/2018 Page : 1/5
Clé : U4.67.02 Révision : 2e9587d7cc8f

Operator `DEFI_FIELD_REDUCED`

The goal of the operator is to enrich an existing grid by groups (of meshs or nodes) which define a under-field called reduced field of integration (RID).

The operator rests on one or more sd result of the type `mode_empi` to determine nodes specific, called points of interpolation, by applying the method of discrete empirical interpolation (DEIM). The reduced field of integration is the whole of the meshs positioned in the vicinity of these points of interpolation.

The operator enriches the sd grid by creating two groups:
- UN groups meshs corresponding to the reduced field ;
- a group of nodes corresponding to the interface between the reduced field and the rest of the initial field.

Code_Aster

Version default

Titre : Opérateur DEFI_DOMAINE_REDUIT
Responsable : ABBAS Mickaël

Date : 06/02/2018 *Page : 2/5*
Clé : U4.67.02 *Révision :*
2e9587d7cc8f

Contents

Code_Aster

Version default

Titre : Opérateur DEFI_DOMAINE_REDUIT
Responsable : ABBAS Mickaël

Date : 06/02/2018 Page : 3/5
Clé : U4.67.02   Révision :
2e9587d7cc8f

1   Syntax

```
e-mail = DEFI_FIELD_REDUCED (

        ♦   reuse  =   e-mail ,                    [grid]

        ♦   GRID   = e-mail ,                      [grid]

        ♦   BASE_PRIMAL =base1,                    [mode_empi]

        ♦   BASE_DUAL = base2,                     [mode_empi]

        ♦   NOM_DOMAINE =nom_d,                    [l_Kn]

        ♦   GROUP_NO_INTERF = nom_i,                  [l_Kn]

        ◊   NB_COUCHE_SUPPL =/ 0                   [DEFECT]
                            /nb_couche,            [I]

        ◊   DOMAINE_MINIS = _F (
            ◊   GROUP_MA  =  lgma1,                [l_gr_maille]
            ◊   GROUP_NO  =  lgno1,                [l_gr_noeud]
        ),

        ◊   DOMAINE_MAXIMUM = _F (
            ♦   GROUP_MA  =  lgma1,                [l_gr_maille]
        ),

        ◊    CORR_COMPLET   = /'NOT'               [DEFECT]
                             /'YES'
    If CORR_COMPLET = 'YES'
        {
            ♦   GROUP_NO_ENCASTRE        = grno
            ◊   NB_COUCHE_ENCASTRE   =/ 0              [DEFECT]
                                    / nb_couche,      [ I ]
        }

        ◊   TITLE =  title,                        [l_Kn]

        ◊   INFORMATION =   /1,                        [DEFECT]
                    /2,
    )
```

Code_Aster

Titre : Opérateur DEFI_DOMAINE_REDUIT
Responsable : ABBAS Mickaël

Version
default

Date : 06/02/2018 Page : 4/5
Clé : U4.67.02 Révision :
2e9587d7cc8f

2   Operands

2.1   OperandS `BASE_PRIMAL` and `BASE_DUAL`

- ♦   BASE_PRIMAL   = base1,   [mode_empi]
- ♦   BASE_DUAL   = base2,   [mode_empi]

Name ofS structureS data result of type `mode_empi` to analyze to generate points of interpolation. Two bases `base1` and `base2` are calculated using the operator `DEFI_BASE_REDUITE` [U4.67.01]. The calculation of the base `base1` rest on a field of temperature or a field of displacement. The calculation of the base `base2` rest on a field of flow or a stress field.

2.2   Operand `GRID`

- ♦   GRID   = e-mail,   [grid]

The order will enrich a concept already existing grid with the new groups of nodes and meshs defined by `DOMAINE_INCLUS` , `GROUP_NO_INTERFACE` and `GROUP_NO_EMBED` .
The keyword `GRID` is thus obligatory.

2.3   Operand `NOM_DOMAINE`

- ♦   NOM_DOMAINE   = nom_d

It is specified name of the group of meshs corresponding to the RID.

2.4   Operand `GROUP_NO_INTERF`

- ♦   GROUP_NO_INTERF   = nom_i

One specifies the name of the group of node S contained in the interface between the RID and the rest of the field.

2.5   Operand `NB_COUCHE_SUPPL`

- ◊   NB_COUCHE_SUPPL = nb_couche,   [I]

By default, the order builds group RID by selecting the meshs attached to the magic points (application of the dEIM, to see [R5.01.05]). When the keyword is used `NB_COUCH_SUPPL` , one can increase the RID while taking `nb_couche` additional elements around the initial RID. By default, `nb_couche` =0 .

2.6   Operand `DOMAINE_MINI/DOMAINE_MAXI`

- ◊   DOMAINE_MINIS = _F (
-              ◊   GROUP_MA = lgma1,   [l_gr_maille]
-              ◊   GROUP_NO = lgno1,   [l_gr_noeud]
-          )

CE keyword optional factor makes it possible to put part of the grid in the RID even if L " algorithm of research of the magic points by dEIM (see [R5.01.05]) does not allow it. It is very   useful in particular "to force" the integration of part of the limiting conditions in the RID. One can either add nodes, or to add meshs.

Code_Aster

Version
default

Titre : Opérateur DEFI_DOMAINE_REDUIT
Responsable : ABBAS Mickaël

Date : 06/02/2018 *Page : 5/5*
Clé : U4.67.02 *Révision* *:*
2e9587d7cc8f

```
◊    DOMAINE_MAXIMUM = _F (
     ◊   GROUP_MA  =  lgma1,                    [l_gr_maille]
                      )
```

D E manner symmetrical, it is possible to restrict the size of the field reduces RID by the keyword `DOMAINE_MAXI` . This option is useful at the time of the realization of incrémentaux models like multirun welding or excavation.

2.7   OperandS
CORR_COMPLET/GROUP_NO_ENCASTRE/NB_COUCHE_ENCASTRE

```
◊   CORR_COMPLET   = /'NOT'                         [DEFECT]
                     /'YES'
    If CORR_COMPLET = 'YES'
       {
           ♦   GROUP_NO_ENCASTRE          = grno
           ◊   NB_COUCHE_ENCASTRE    =/ 0            [DEFECT]
                                     / nb_couche,    [ I ]
        }
```

To improve quality of the results in very-reduction, it is possible to make a correction of calculation very-tiny room by a calculation finite element detailed with `CORR_COMPLET=' OUI'`. For that, it is necessary to define a group of nodes being used to make the connection between the RID and the rest of the model with the keyword `GROUP_NO_EMBED`. This group of nodes makes it possible to impose the limiting conditions of Dirichlet necessary so that the problem **corrected** that is to say well defined.

By default (`NB_COUCHE_ENCASTRE=0`), this group of nodes is defined inside the reduced field (keyword `NOM_FIELD`) by taking the first nodes contained in the field and dependent on the nodes defined by `GROUP_NO_INTERF`. It is possible to make the field larger by using the keyword `NB_COUCHE_ENCASTRE` .
From the construction of these groups of nodes, one necessarily has `NB_COUCHE_ENCASTRE` inferior or equal to `NB_COUCHE_ SUPPL` .