Operator **DEFI_FIELD_REDUCED**

The goal of the operator is to enrich an existing grid by groups (of meshes 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 meshes positioned in the vicinity of these points of interpolation.

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

1 Syntax .................................................................................................................................................. 3

2 Operands.............................................................................................................................................. 4
   2.1 Operands BASE_PRIMAL and BASE_DUAL ............................................................................. 4
   2.2 Operands GRID .......................................................................................................................... 4
   2.3 Operands NOM_DOMAINE .......................................................................................................... 4
   2.4 Operands GROUP_NO_INTERF .................................................................................................... 4
   2.5 Operands NB_COUCHE_SUPPL .................................................................................................. 4
   2.6 Operands DOMAINE_MINI/DOMAINE_MAXI ............................................................................ 4
   2.7 Operands CORR_COMPLET/GROUP_NO_ENCASTRE/NB_COUCHE_ENCASTRE ............... 5
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 (                     [l_gr_maille]
        ♦ GROUP_MA = lgma1, [l_gr_noeud]
        ♦ GROUP_NO = lgno1,
    ),
    ◊ DOMAINE_MAXIMUM = _F (                     [l_gr_maille]
        ♦ GROUP_MA = lgma1,
    ),
    ◊ 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,
2 Operands

2.1 Operand BASE_PRIMAL and BASE_DUAL

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

Name of structure 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 meshes 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 meshes corresponding to the RID.

2.4 Operand GROUP_NO_INTERF

- GROUP_NO_INTERF = nom_i

One specifies the name of the group of node 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 meshes 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])
- DOMAINE_MINIS = _F (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 meshes.
DE manner symmetrical, it is possible to restrict the size of the field reduces RID by the keyword DOMAINE_MAXIMUM. 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**

```plaintext
◊ 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.