Operator NUME_DDL_GENE

1 Drank

Order the degrees of freedom of total structure from classification of substructures.

In the frame of a computation using the methods of dynamic substructuring (modal analysis or harmonic), operator NUME_DDL_GENE defines the bijection enters, on the one hand, the numbers of the generalized degrees of freedom of each substructure and the numbers of the degrees of freedom of connection of each connection and, on the other hand, the numbers of the final degrees of freedom (i.e. indices of line or column of the generalized matrixes). The classification being realized, the operator built according to the mode of storage “sky line” tables of addressing necessary to the effective storage of the terms of the generalized matrixes assembled with this classification. A sky line storage full or diagonal is possible to compute: a full added matrix or to solve a transitory problem on modal base resulting from a concept of the mode_meca type.

Product a data structure of the nume_ddl_gene type.

2 Syntax

```
nu_gene [nume_ddl_gene] =NUMÉRIQUE_DDL_GENE        (

# If MODELE_GENE:
          |  ◊MODELE_GENE=mo_gene          ,
[modele_gene]
             ◊STOCKAGE=/                "LIGN_CIEL",            [DEFAULT]
                              /  "PLEIN",
             ◊METHODE=/                 "CLASSIQUE",            [DEFAULT]
                              /  "ELIMINE",
                              /  "INITIAL",

# If BASE:
          |  ◊BASE=base                 ,                   /   [mode_gene]
                                                          /   [mode_meca]
             ◊STOCKAGE=/                "PLEIN",                [DEFAULT]
                              /  "DIAG",
             ◊NB_VECT=/nbvect                ,
                              /9999  ,                    [DEFAULT]

                                     )
```

3 Operands

3.1 Operand MODELE_GENE

◊MODELE_GENE = mo_gene

Name of the concept of the modele_gene type by the operator produces DEFI_MODELE_GENE [U4.65.02] from which classification is carried out.

3.2 Operand METHODE

◊METHODE =

/"CLASSIQUE" Builds a generalized classification allowing the taking into account of the equations of connections by the method of the double Lagrange multipliers [R4.06.02].

/"ELIMINE" Builds a generalized classification allowing the taking into account of the equations of connections by the method of elimination of the stresses [R4.06.02].

/"INITIAL" Initializes classification for the operators generalized in order to allow the construction of a classification of size controllable per python. The matrixes (built with ASSE_MATR_GENE) and the vectors (built with ASSE_VECT_GENE) are of size adapted, but initialized to zero.

3.3 Storage of the matrixes

◊STOCKAGE =

Choice of a mode of storage of the matrixes which one will assemble with this classification. 3 options are available:

/"LIGN_CIEL" storage "sky line" per blocks, the assembled matrix will be stored block of columns per block of columns starting from the 1st term likely to be non-zero for each column.

In the assembled matrix, a term $A(i,j)$ is likely to be non-zero if and only if the degree of freedom i and the degree of freedom j (respectively i ème and j ème modes of total structure) result from same substructure or are connected by at least a degree of freedom of LAGRANGE of two substructures connected by a connection.

/"PLEIN" storage "sky line" of the assembled matrixes generalized per blocks, but with a full profile (one stores all the elements of the higher triangular part of the matrix). This kind of storage must be employed if one wants to calculate the generalized added matrixes (mass, stiffness, damping) which are full, as all the generalized matrixes to which they are added.

For the stiffness matrixes and of damping, the assembly is always done from a nume_ddl_gene resulting from a mode_meca.

/"DIAG" storage "sky line" of the diagonal terms of the matrixes projected on modal base. This kind of storage is to be employed when the base on which one reduces the problem is orthogonal compared to the matrixes used (mass matrixes, stiffness and damping). This storage makes it possible to improve the performances of the operators of computation (DYNA_TRAN_MODAL for example). Attention, that can lead to false results if orthogonality is not checked, for example when one uses a base of modes made up of static modes. Indeed, the static modes are not orthogonal between them.

3.4 Operand BASE

This operand is used to identify the modal base on which one projects the matrixes.

3.5 Operand NB_VECT

Behind this key word, one expects the number of basic vectors of projection, possibly smaller than the number of modes defined in base specified by the key word BASE. By default, this number is equal to number of modes of the base.

4 Stage of execution

No optimization of bandwidth is carried out during classification. The order of appearance of substructures in classification corresponds to the order of their definition in the model generalized (operator DEFI_MODELE_GENE). The user can thus limit the bandwidth by defining in a judicious order substructures of modele generalized.

The degrees of freedom, resulting from the double dualisation, are then assembled on both sides of the generalized degrees of freedom of the second substructure assembled (among the two pennies - structures put concerned by connection).