

## Operator REST\_SPEC\_PHYS

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### 1 Goal

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To calculate the answer of a structure in the physical base. Calculation is carried out starting from a interspectre of modal answer, in certain selected nodes of the grid.

The operator carries out calculation, with four alternatives, of the spectra of answer in the physical base. The user can choose an answer in displacements, speeds, accelerations and under certain conditions in generalized efforts, nodal constraints or forces. The produced result is a concept of the type `interspectre`.

## 2 Syntax

```
tinsp [interspectre] = REST_SPEC_PHYS (

    ♦ | BASE_ELAS_FLUI = baseflui, [melasflu]
      ♦ VITE_FLUI = vitefl [R]
      ◇ PRECISION = / 1.E-3 [DEFECT]
                / prec [R]

    | MODE_MECA = base, [mode_meca]
◇ / NUME_ORDRE = l_nuor, [l_I]
  / BAND = (f1, f2), [l_R]
◇ / TOUT_ORDRE = / 'NOT', [DEFECT]
                / 'YES',

    ♦ INTE_SPEC_GENE = repmoda, [interspectre]
    ♦ GROUP_NO = l_gr_no_rep, [l_gr_no]
◇ GROUP_MA = l_gr_ma_rep, [l_gr_ma]
    ♦ NOM_CHAM = / 'DEPL'
                / 'QUICKLY'
                / 'ACCE'
                / 'EFGE_ELNO'
                / 'SIPO_ELNO'
                / 'SIGM_ELNO'
                / 'FORC_NODA',

    ♦ NOM_CMP = / 'DX'
                / 'DY'
                / 'DZ'
                / 'SMFY'
                / 'SMFZ',

◇ MODE_STAT = modestat, [mode_meca]
◇ EXCIT = _F (
          ♦ GROUP_NO = l_gr_no, [l_gr_no]
          ♦ NOM_CMP = l_ncmp, [l_TXM]
          )

◇ MOVEMENT = / 'ABSOLUTE', [DEFECT]
              / 'RELATIVE',
              / 'DIFFERENTIAL',

◇ OPTION = / 'DIAG_DIAG', [DEFECT]
            / 'DIAG_TOUT',
            / 'TOUT_DIAG',
            / 'TOUT_TOUT',

◇ TITLE = title, [TXM]

);
```

## 3 Operands

### 3.1 Operand `BASE_ELAS_FLUI`

`BASE_ELAS_FLUI = baseflui`

Concept of the type `melasflu` product by the operator `CALC_FLUI_STRU` [U4.66.02], which defines a set of modal bases associated with the various rates of flow with the fluid. The modal answer of the structure for a rate of flow considered is broken up on the basis corresponding at this speed. One must then specify the speed of the fluid `vitefl` for which one wants to carry out calculation.

#### 3.1.1 Keyword `VITE_FLUI`

The operand `VITE_FLUI` must be well informed if a base of the type is used `melasflu`.

◆ `VITE_FLUI = vitefl`

Rate of flow of the fluid for the calculation of answer.

#### 3.1.2 Keyword `PRECISION`

◇ `PRECISION = prec`

Precision on the rate of flow of the fluid (by default 1.E-3).

### 3.2 Operand `MODE_MECA`

`MODE_MECA = bases`

This operand makes it possible to define the base on which is broken up the modal answer. One accepts concepts of the type `mode_meca` product by the operators `CALC_MODES` [U4.52.02] or `DEFI_BASE_MODALE` [U4.64.02].

#### Note:

*Operands `BASE_ELAS_FLUI` and `MODE_MECA` can be used simultaneously if one wishes to calculate an answer in constraints of a telegraphic structure subjected to the action of a flow.*

*This calculation case is determined by the data of a concept of the type `melasflu` under the operand `BASE_ELAS_FLUI`, defining the modal bases of the structure in the various rates of flow, and the choice of the physical field of answer '`SIPO_ELNO`' under the operand `NOM_CHAM`. The data complementary to a concept of the type `mode_meca` under the operand `MODE_MECA` becomes obligatory then, in order to define the field of the modal constraints in nodes structure.*

*The modal constraints are calculated upstream by the operator `CALC_CHAMP` [U4.81.04], option '`SIPO_ELNO`', using the modal deformations **normalized**. The operator `NORM_MODE` [U4.52.11] allows to carry out the standardisation of the modal deformations beforehand.*

### 3.3 Operands `NUME_ORDRE`, `TOUT_ORDRE` and `BAND`

These operands should be used only if the base on which is broken up the modal answer is defined by a concept of the type `mode_meca`.

◇ / `NUME_ORDRE = l_nuor`

List of the sequence numbers of the modes which are actually taken into account for the calculation of the physical answer.

◇ / TOUT\_ORDRE = / 'NOT', [DEFECT]  
/ 'YES',

If one wishes to take all the fashions of the base for the calculation of the physical answer, one can choose TOUT\_ORDRE = ' YES' instead of giving the list.

/ BAND = (f1, f2)

The modes which are taken into account for the calculation of the physical answer are the modes of the concept of the type `mode_meca` whose frequency is in the band defined by (f1 f2).

## 3.4 Operand INTE\_SPEC\_GENE

◆ INTE\_SPEC\_GENE = `repmoda`

Concept of the type `tinterspectre` product by the operator `DYNA_SPEC_MODAL` [U4.53.23] or `DYNA_ALEA_MODAL` [U4.53.22], which defines the interspectres of modal answer, i.e interspectres of generalized displacements.

## 3.5 Operand GROUP\_NO

◆ GROUP\_NO = `l_gr_no_rep,` [`l_gr_no`]

List of the groups of nodes of the grid where the interspectres of physical answer are calculated.

If the keyword `GROUP_NO` is well informed, the length of the list of nodes must be equal to that of the list of components to restore (keyword `NOM_CMP`).

If several components are to be restored and the keyword `GROUP_NO` is informed, it is imperative to have as many groups nodes components; each group must contain only one node.

If a component is to be restored for several nodes, it is possible to inform under the keyword `GROUP_NO`, one or more groups of as many nodes as necessary; he is thus asked more in this case only the groups contain one node.

## 3.6 Operand GROUP\_MA

◇ GROUP\_MA = `l_gr_ma_rep,` [`l_gr_ma`]

List of the groups of meshes of the grid where the interspectres of physical answer are calculated, if the field of answer is a field with the elements (). The list of meshes must be coherent, in length and order, compared to the list of groups of nodes informed by the user under the keyword `GROUP_NO`.

### Note:

*In the case of a calculation in interaction fluid-structure, i.e. if keyword `BASE_ELAS_FLU` is indicated, the keyword `GROUP_MA` is not taken into account and the sizes restored on a node starting from the fields with the elements (type `ELNO`) are really only the arithmetic averages of the values of fields on the meshes in the vicinity of it node.*

## 3.7 Operand NOM\_CHAM

◆ NOM\_CHAM = 'DEPL' or 'QUICKLY' or 'ACCE' or 'EFGE\_ELNO' or  
'SIPO\_ELNO' or 'SIGM\_ELNO' or 'FORC\_NODA'

Name of the physical field of answer to calculate.

### Note:

*The choice of the physical field of answer 'SIPO\_ELNO' for a telegraphic structure under flow the simultaneous use of the operands requires `BASE_ELAS_FLUI` and `MODE_MECA` (cf [§3.1]).*

## 3.8 Operand NOM\_CMP

◆ NOM\_CMP = 'DX' or 'DY' or 'DZ' or 'SMFY' or 'SMFZ'

Names of the components of the physical field of answer having to be actually calculated.

**Note:**

Components 'DX', 'DY', and 'DZ' are valid for the fields 'DEPL', 'QUICKLY' or 'ACCE'. Components 'SMFY' and 'SMFZ' are valid for the field 'SIPO\_ELNO'.

## 3.9 Operand MODE\_STAT

◇ MODE\_STAT = modestat

Concept of the type mode\_meca product by the operator MODE\_STATIQUE [U4.52.14], which in the case of defines the static modes taken into account a seismic calculation multi-supports where the excitation is done on the DDL.

## 3.10 Keyword EXCIT

◇ EXCIT

Keyword factor allowing to define the DDL to which the excitation is applied, in the case of a seismic calculation multi-supports.

◆ GROUP\_NO = l\_grno

List of the groups of nodes where the excitation is applied.

◆ NOM\_CMP = l\_ncmp

List of the components to which the excitation is applied.

**Note:**

These components must correspond to degrees of freedom of nodes supports. Example: 'CLOSE', 'DRZ', 'PHI', ...  
In all the cases, one needs as many arguments under the operand GROUP\_NO that under the operand NOM\_CMP.  
For the fluid sources, it is the component 'CLOSE' who is excited.

## 3.11 Operand MOVEMENT

◇ MOVEMENT = 'ABSOLUTE' or 'RELATIVE' or 'DIFFERENTIAL'

Indicator characterizing the physical answer to calculate, in the case of a seismic calculation multi-supports: absolute answer ('ABSOLU') by default, dynamic contribution ('RELATIF') or differential ('DIFFERENTIEL') answer.

## 3.12 Operand OPTION

◇ OPTION = 'DIAG\_DIAG' or 'DIAG\_TOUT' or 'TOUT\_DIAG' or 'TOUT\_TOUT'

Indicator specifying the choice of calculation to be realized:

- calculation of the autospectres with nodes by means of the modal autospectres;
- calculation of the autospectres with nodes by means of all modal interspectres;
- calculation of all interspectres with nodes by means of the modal autospectres;
- calculation of all interspectres with nodes by means of all modal interspectres.

**Note:**

*If the modal answer were calculated by DYNAL\_SPEC\_MODAL [U4.53.23], the choice of calculation must be coherent with that retained upstream in this operator. Indeed, options 'DIAG\_TOUT' or 'TOUT\_TOUT' cannot be carried out if one chose 'DIAG' in DYNAL\_SPEC\_MODAL [U4.53.23].*

*The by default choice is thus 'DIAG\_DIAG' , which corresponds to the calculation case simplest realizable whatever the choice selected upstream.*

## 3.13 Operand TITLE

◇ TITLE = title

Argument of type text defining the title attached to the concept interspectre at exit.