Operator CALC_MISS

1 Drank

the object of this command is to prepare the data, to carry out the Miss3D software, then post-to treat the results of this one to produce exploitable concepts in *Code_Aster*.

According to the arguments as starter of the command, one obtains the harmonic, temporal response of structure, or the evolutions of displacements, velocities, accelerations in certain places.

This operator can also be used jointly with DYNA_NON_LINE for nonlinear transient computations, by the method TEMPS-Laplace (*cf* benchmark MISS03 and its associated documentation [V1.10.122]).

Advice of implementation of computations of interaction soil-structure is provided in [U2.06.07].

Contents

2 Syntax

```
   resu = CALC_MISS  (

         ♦TYPE_RESU=/           "FICHIER",
                              /"HARM_GENE",
                              /"TRAN_GENE",
                              /"ARRAY",
                              /"TABLE_CONTROL",
                              /"FICHIER_TEMPS",

         ◊PROJET=projet                    ,                    [kN]
         ◊REPERTOIRE=repertoire          ,                  [kN]
         ◊  VERSION=/           "V6.6",                  [DEFAULT]
                              /"V6.5",
         ♦  TABLE_SOL=tabsol       ,                      [array]

   general Data
   /If TYPE_RESU = "FICHIER" or "TABLE_CONTROL":

         ♦/ MACR_ELEM_DYNA=   mael,                    [macr_elem_dyna]
            /BASE_MODALE=     basmo,                       [mode_meca]
               ◊MATR_RIGI=       matrig,
[matr_asse_depl_*]
               ◊MATR_MASS=       matmas,
[matr_asse_depl_r]
         ◊AMOR_REDUIT=        l_amor,                    [l_R]
         ♦GROUP_MA_INTERF=       grma,                   [grma]
         ◊GROUP_MA_FLU_STR=      gr_flustr,                 [l_group_ma]
         ◊GROUP_MA_FLU_SOL=      gr_flusol,                 [l_group_ma]
         ◊GROUP_MA_SOL_SOL=      gr_solsol,                 [l_group_ma]

         ◊  UNITE_IMPR_ASTER=/     uimpast,              [I]
         ◊  UNITE_RESU_IMPE=/      uresimp,              [I]
         ◊  UNITE_RESU_FORC=/      uresfor,              [I]

   /If TYPE_RESU = "HARM_GENE", "TRAN_GENE", or "COUNTS":

         ◊MACR_ELEM_DYNA=     mael,                    [macr_elem_dyna]
         ♦BASE_MODALE=        basmo,                      [mode_meca]
         ♦MATR_RIGI=             matrig,
[matr_asse_depl_*]
         ♦MATR_MASS=             matmas,
[matr_asse_depl_r]
         ♦/AMOR_REDUIT=          l_amor,                       [l_R]
             /MATR_AMOR          = matamo,
[matr_asse_depl_r]
         ♦GROUP_MA_INTERF=       grma,                   [grma]
         ◊GROUP_MA_FLU_STR=      gr_flustr,                 [l_group_ma]
         ◊GROUP_MA_FLU_SOL=      gr_flusol,                 [l_group_ma]
         ◊GROUP_MA_SOL_SOL=      gr_solsol,                 [l_group_ma]

         ◊  UNITE_IMPR_ASTER=uimpast      ,                    [I]
         ◊  UNITE_RESU_IMPE=uresimp    ,                   [I]
         ◊  UNITE_RESU_FORC=uresfor    ,                   [I]
```

```
   /If TYPE_RESU = "FICHIER_TEMPS":

          ♦/ MACR_ELEM_DYNA=   mael,                    [macr_elem_dyna]
             /BASE_MODALE=     basmo,                     [mode_meca]
                ◊MATR_RIGI=       matrig,
[matr_asse_depl_*]
                ◊MATR_MASS=       matmas,
[matr_asse_depl_r]
          ◊AMOR_REDUIT=        l_amor,                    [l_R]
          ♦GROUP_MA_INTERF=       grma,                   [grma]

          ◊  UNITE_IMPR_ASTER=/     uimpast,              [I]
                                  /25,                    [DEFAULT]
          ◊  UNITE_RESU_RIGI=/      uresrig,              [I]
          ◊  UNITE_RESU_AMOR=/      uresamo,              [I]
          ◊  UNITE_RESU_MASS=/      uresmas,              [I]

          ◊INST_FIN=tfin                ,                   [R]
          ◊PAS_INST=pas                 ,                   [R]
          ◊PRECISION=precis                   ,             [R]
                                  /1.E-6,                   [DEFAULT]
          ◊COEF_SURECH=coefsur                ,             [R]
                                  /1. ,                     [DEFAULT]
          ◊  MATR_GENE = _F (
                ◊  DECOMP_IMPE      =       "PRODUCED",     [DEFAULT]
                                        /   "SANS_PRODUIT",
                ♦  AMOR_HYST        =       "DANS_IMPEDANCE",
                                        /   "DANS_MATR_AMOR",
                ◊MATR_MASS=       matma,    [matr_asse_gene_r,
matr_asse_depl_r]
                ◊MATR_RIGI=       matri,    [matr_asse_gene_*,
matr_asse_depl_r]
             /If AMOR_HYST = "DANS_MATR_AMOR" :
                ♦MATR_AMOR=       matam,    [matr_asse_gene_*,
matr_asse_depl_r]
             /If AMOR_HYST = "DANS_IMPEDANCE" :
                ◊MATR_AMOR=       matam,    [matr_asse_gene_*,
matr_asse_depl_r]
                                  ),
          ◊  EXCIT_SOL = _F (
                ♦  UNITE_RESU_FORC=/      uresfor,            [I]
                ◊NOM_CHAM=/               "DEPL"              [DEFAULT]
                                        /"QUICKLY"
                                        /"ACCE"
                ◊CHAM_X                 =fctchx               [function]
                ◊CHAM_Y                 =fctchx               [function]
                ◊CHAM_Z                 =fctchx               [function]
                                  ),
```

```
Parameters of Miss3D computation:

      ♦  PARAMETRE = _F (
         ♦  /♦  FREQ_MIN    =fmin  ,                [R]
                ♦ FREQ_MAX   =fmax  ,                [R]
                ♦ FREQ_PAS=fpas     ,                [R]
            /♦  LIST_FREQ=lfrli     ,                [l_R]
            /♦  FREQ_IMAG=fimag     ,                [R]
         ◊  Z0           =   0. ,                    [DEFAULT]
                           /z0,                      [R]
         ◊SURF=/                "NON",                [DEFAULT]
                           /"OUI',
         ◊RFIC           =   0. ,                    [DEFAULT]
                           /rfic,              [R]
         ◊ALGORITHME=/              "REGU"
                           /"DEPL"

         ◊DREF=dref                 ,                   [R]
         ◊♦OFFSET_MAX=offmax           ,             [R]
            ♦OFFSET_NB=offnb           ,                [I]
         ◊♦SPEC_MAX=spemax                ,           [R]
            ♦SPEC_NB=spenb             ,                [I]
         ◊  ISSF            = /"NON"               [DEFAULT]
                              /"OUI'
         ◊ALLU           =allu  ,                    [R]
         ◊TYPE=/                "BINAIRE",
                           / "ASCII"                 [DEFAULT]
         ),

Parameters of postprocessing
/If TYPE_RESU = "TRAN_GENE":

      ♦MODELE=mo                   ,                      [model]
      ♦/     |         ACCE_X=acce_x,                  [function]
             |         ACCE_Y=acce_y,                  [function]
             |         ACCE_Z=acce_z,                  [function]
          /  |         DEPL_X=depl_x,                  [function]
             |         DEPL_Y=depl_y,                  [function]
             |         DEPL_Z=depl_z,                  [function]
      ♦INST_FIN=l_tfin             ,                  [l_R]
      ♦PAS_INST=l_pas              ,                     [l_R]

/If TYPE_RESU = "HARM_GENE":

      ♦MODELE=mo                   ,                      [model]
       ♦  /  ♦  /  |  ACCE_X=acce_x      ,              [function]
                  |     ACCE_Y=acce_y,                  [function]
                  |     ACCE_Z=acce_z,                  [function]
              /   |     DEPL_X=depl_x,                  [function]
                  |     DEPL_Y=depl_y,                  [function]
                  |  DEPL _Z=depl_z      ,              [function]
          ♦INST_FIN=l_tfin       ,                     [l_R]
          ♦PAS_INST=l_pas        ,                        [l_R]
       /EXCIT_HARMO      =_F    (
             …   identical to the key word EXCIT of DYNA_LINE_HARM
                 (cf [U4.53.11]) except for type expected
                 for VECT_ASSE:
```

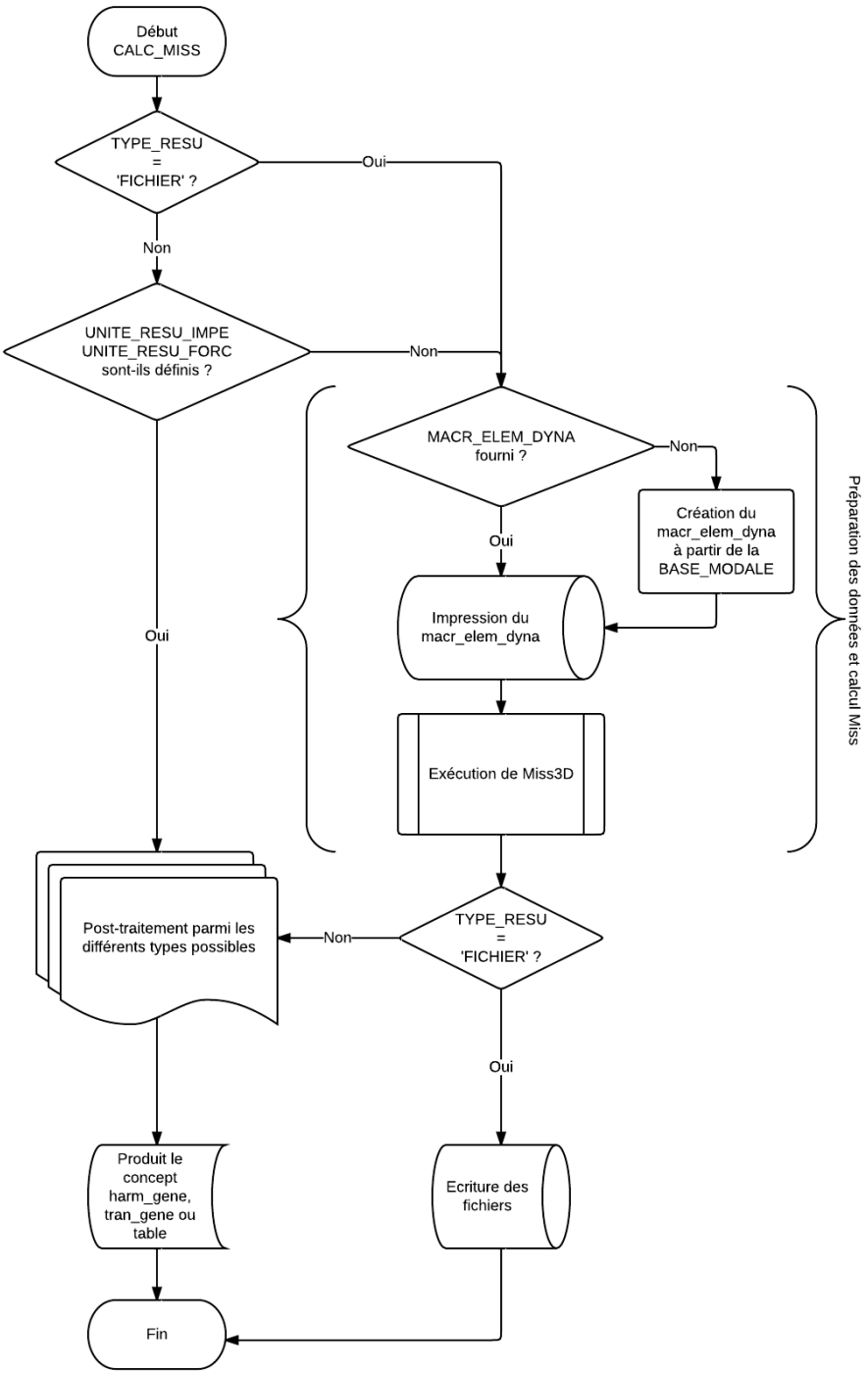
```
                    ◊VECT_ASSE     = chamno,                  [cham_no]
                ),

    /If TYPE_RESU = "ARRAY":

          ♦MODELE=mo                    ,                       [model]
          ♦GROUP_NO=grno                ,                    [l_grno]
          ♦   |             ACCE_X=acce_x,                 [function]
              |             ACCE_Y=acce_y,                 [function]
              |             ACCE_Z=acce_z,                 [function]
          ♦INST_FIN=tfin                ,                       [R]
          ♦PAS_INST=pas              ,                      [R]
          ♦NORME=norm                       ,                  [R]
          ♦AMOR_SPEC_OSCI=l_amor            ,               [l_R]
          ◊LISTE_FREQ_SPEC_OSCI=l_freq        ,                [l_R]

    /If TYPE_RESU = "TABLE_CONTROL":

          ♦GROUP_MA_CONTROL=grma        ,                    [grma]
          ◊/     |             ACCE_X=acce_x,                 [function]
                 |             ACCE_Y=acce_y,                 [function]
                 |             ACCE_Z=acce_z,                 [function]
             ♦INST_FIN=tfin                 ,                   [R]
             ♦PAS_INST=pas               ,                   [R]
             ♦NORME=norm                       ,               [R]
             ♦AMOR_SPEC_OSCI=l_amor            ,               [l_R]
             ◊LISTE_FREQ_SPEC_OSCI=l_freq        ,                [l_R]



    Various
          ◊   INFO=/1           ,                               [DEFAULT]
                       /2  ,                                    [I]
    )
```

If TYPE_RESU=' FICHIER' or "FICHIER_TEMPS", CALC_MISS does not produce a result concept (one generates only files).
If TYPE_RESU=' HARM_GENE', resu is of harm_gene type.
If TYPE_RESU=' TRAN_GENE', resu is of tran_gene type.
If TYPE_RESU=' TABLE' or "TABLE_CONTROL", resu is of type counts.

3 Principle of operation

According to its arguments of entry, CALC_MISS produces a concept whose type varies or does not produce concept.

- If TYPE_RESU is worth "FICHIER" or "FICHIER_TEMPS", no concept is produced. Only the execution of Miss3D is launched. The results (impedance of soil and forces seismic) are then written in the files located by the logical units such as UNITE_RESU_IMPE, UNITE_RESU_FORC, UNITE_RESU_MASS, UNITE_RESU_RIGI or UNITE_RESU_AMOR. There is no postprocessing of the results resulting from Miss3D.
- If TYPE_RESU = "TABLE_CONTROL", Miss3D computation is the same one as for FICHIER. An array is produced containing a specific postprocessing of the results of Miss3D.
- In the contrary case (TYPE_RESU is worth "HARM_GENE", "TRAN_GENE" or "ARRAY"), one carries out Miss3D only if logical units UNITE_RESU_IMPE, UNITE_RESU_FORC are not indicated. If not, the provided files are used. Postprocessing is then carried out and the required concept turned over to the user.



During the execution of Miss3D, if key word MACR_ELEM_DYNA is indicated, one uses it. If not, it is created by CALC_MISS starting from operands BASE_MODALE, MATR_RIGI and MATR_MASS.

4 Definition of the model

4.1 Key word TYPE_RESU

Defines the type of analysis to be carried out. Five values are allowed:

- FICHIER : only the execution of Miss3D is carried out. One directly recovers the files produced by Miss3D in the files located by logical units UNITE_RESU_IMPE and UNITE_RESU_FORC. CALC_MISS does not turn over a concept (nothing on the left the sign "=").
- FICHIER_TEMPS : only the execution of Miss3D is carried out. One directly recovers the files produced by Miss3D in the files located by logical units UNITE_RESU_RIGI, UNITE_RESU_MASS, UNITE_RESU_AMOR and UNITE_RESU_FORC. CALC_MISS does not turn over a concept (nothing on the left the sign "="). That corresponds to the method TEMPS-Laplace.
- HARM_GENE : one calculates the harmonic response of structure (of harm_gene type) after having carried out Miss3D or starting from the files resulting from a preceding resolution.
- TRAN_GENE : one calculates the temporal response of structure (of tran_gene type) after having carried out Miss3D or starting from the files resulting from a preceding resolution.
- COUNT : one calculates the harmonic response of structure with a unit request in certain points, and one turns over a concept of the type counts which contains the functions responses in displacement, velocity, acceleration and oscillator spectrum recombined on the cases of loading.
- TABLE_CONTROL: one recovers Miss3D computation and the transfer transfer functions in certain check-points harmic and temporal responses to a provided acceleration. One produces a concept of the type counts.

4.2 Operands PROJET/REPERTOIRE

the key word directory makes it possible to define a directory (entered by its complete path on the object computer) where will be carried out Miss3D computation. One will be able to find there all the data files and of results Miss3D (for debugging for example). These files will start with a name-radical given by the operand PROJET (which is worth MODELS by default).
If directory is not defined, the execution will take place in a temporary directory which will be destroyed at the end of the computation.

4.3 Operand VERSION

Name of the version of Miss3D. The value by default corresponds to the version of Miss3D in operating.

4.4 Operand TABLE_SOL

the data of description of the stratifications of soil are provided in the form of an array produced by the command DEFI_SOL_MISS (*cf* [U7.02.34]).

4.5 Operand MACR_ELEM_DYNA

It acts of the dynamic macro-element of structure (standard macr_elem_dyna) produced by the command same name (*cf* [U4.65.01]). If this one is not indicated, it will be calculated automatically by CALC_MISS from modal base and of the provided matrixes.

4.6 Operand BASE_MODALE

Bases modes of structure. If MACR_ELEM_DYNA is not indicated, this modal base is used to determine it.
When one carries out only computation Miss3D (TYPE_RESU=' FICHIER'), one provides either MACR_ELEM_DYNA, or BASE_MODALE.
When for postprocessing is asked, it is necessary to inform key word BASE_MODALE (used for harmonic computation). One can despite everything provide a specific macro-element where necessary.

4.7 Operands MATR_RIGI and MATR_MASS

These key words make it possible to provide the stiffness matrixes and of mass of structure.
They will be used during harmonic computation and, if necessary, to create the dynamic macro-element.

4.8 Operand MATR_AMOR

This key word makes it possible to provide a damping matrix of structure used during harmonic computation in alternation with the use of modal damping with key word AMOR_REDUIT.

4.9 Operand UNITE_IMPR_ASTER

logical Number of unit on which one can recover the file produces by the operator IMPR_MACR_ELEM in-house format "MISS_3D" called by CALC_MISS. The value by default is 25.

4.10 Operands UNITE_RESU_IMPE, UNITE_RESU_RIGI, UNITE_RESU_MASS, UNITE_RESU_AMOR, UNITE_RESU_FORC

Numbers of logical unit of the files containing the impedances of soil (or its decomposition in stiffness, mass and damping) and the seismic forces by frequency.
If one asks only for Miss3D computation, UNITE_RESU_IMPE, UNITE_RESU_RIGI, UNITE_RESU_MASS, UNITE_RESU_AMOR and UNITE_RESU_FORC are used according to the cases to store results files.
If for a postprocessing is asked, one should use these arguments only if Miss3D computation were carried out before (the files are then data for CALC_MISS).
Operands UNITE_RESU_RIGI, UNITE_RESU_MASS, UNITE_RESU_AMOR are of a use specific to the method TEMPS-Laplace (case TYPE_RESU = "FICHIER_TEMPS") and the presence of UNITE_RESU_AMOR or UNITE_RESU_MASS makes compulsory factor key word the MATR_GENE.

Note: In the Miss3D execution, the postprocessing of the impedances (respectively of the seismic forces) is carried out only if key word UNITE_RESU_IMPE (respectively UNITE_RESU_FORC) is indicated. This makes it possible to reduce the computing time a little bit.

4.11 Operand GROUP_MA_INTERF

This key word makes it possible to define the list of the surface mesh groups constituting the interface soil-structure (transmitted in-house to operator IMPR_MACR_ELEM [U7.04.33]).

4.12 Operands GROUP_MA_FLU_STR/GROUP_MA_FLU_SOL/GROUP_MA_SOL_SOL

In the case of an interaction soil-fluid-structure, these keywords make it possible to supplement the list of the surface mesh groups respectively made up of the interfaces fluid structure, fluid-soil and free soil (transmitted in-house to operator IMPR_MACR_ELEM [U7.04.33]).

4.13 Operand AMOR_REDUIT

Lists reduced dampings (transmitted in-house to DYNA_LINE_HARM [U4.53.11]).
That is to say $nbmode$ the number of dynamic modes defined in modal base, and $nbamor$ the number of reduced dampings provided.
If $nbamor < nbmode$, then one supplements the list of depreciation until $nbmode$ with the last damping of the list.
One adds then a null damping which will be applied to the static modes present.

4.14 Operand accuracy

Parameter of accuracy of the méthode de calcul TEMPS-Laplace (case TYPE_RESU = "FICHIER_TEMPS"). One strongly advises to leave the value by default.

4.15 Operand COEF_SURECH

Parameter to impose the coefficient of oversampling for the method TEMPS-Laplace. One recommends to keep the value by default. If the user increases this coefficient, the accuracy of computation will be improved, but with a overcost of computation proportional to this value.

4.16 Operand MATR_GENE

This factor key word optional is used for the method TEMPS-Laplace, therefore for TYPE_RESU = "FICHIER_TEMPS". It makes it possible to specify all the options relating to computations of impedance ((*cf* benchmark MISS03 and its associated documentation [V1.10.122]). If this factor key word optional is used, then it is also necessary to define the values of operands UNITE_RESU_AMOR and UNITE_RESU_MASS.

4.16.1 Operand DECOMP_IMPE

This key word makes it possible to specify the method of decomposition of the impedance. One recommends to leave the value by default ("PRODUCED").

4.16.2 Operand AMOR_HYST

This key word makes it possible to specify the way in which will be taken into account hysteretic damping in the soil.
This key word makes it possible to specify the method of decomposition of the impedance. One recommends to leave the value by default ("PRODUCED"). There are two possible choices:

- "DANS_MATR_AMOR" : the damping matrix given by the user (via MATR_AMOR under MATR_GENE) takes account of the hysteretic damping of the soil.
- "DANS_IMPEDANCE" : it is the contrary case of the precedent.

4.16.3 Operands MATR_MASS, MATR_RIGI and MATR_AMOR

These arguments are used to define the mass matrixes, stiffness and damping which can be used by the decomposition of the impedance.
If one has AMOR_HYST = "DANS_MATR_AMOR", then it is obligatorily necessary to inform, at least, MATR_AMOR.
Contrary, AMOR_HYST = "DANS_IMPEDANCE" , then it is enough, at least, to give one of the three matrixes for decomposition.

This key word makes it possible to specify the way in which will be taken into account hysteretic damping in the soil.

This key word makes it possible to specify the method of decomposition of the impedance. One recommends to leave the value by default ("PRODUCED"). There are two possible choices:

- "DANS_MATR_AMOR" : the damping matrix given by the user (via MATR_AMOR under MATR_GENE) takes account of the hysteretic damping of the soil.
- "DANS_IMPEDANCE" : it is the contrary case of the precedent.

4.17 Operand EXCIT_SOL

This factor key word optional is used to characterize the excitation transmitted by the soil: definition of the seismic forces. If one wants to calculate only impedances, this key word is useless.

4.17.1 Operand UNITE_RESU_FORC

Makes it possible to define the logical unit of the generated file which will contain the seismic forces, which will be reusable in DYNA_NON_LINE via a loading of the type EXCIT_SOL in AFFE_CHAR_MECA (*cf* benchmark MISS03C and its associated documentation [V1.10.122]).

4.17.2 Operands NOM_CHAM, CHAM_X, CHAM_Y and CHAM_Z

These arguments are used to specify the input signal. Its nature (signal in displacement, velocity or acceleration) is indicated by the value of NOM_CHAM. By default one expects an imposed displacement.
This signal can have from one to three components, following X, Y and Z for each direction, one can give the corresponding function: CHAM_X, CHAM_Y and CHAM_Z.

5 Miss3D computation – factor key word PARAMETRE

This factor key word makes it possible to enter the parameters of Miss3D computation: type of interface, of foundation, frequencies of computation, discretization spectral and spatial which supplement the data of description of the soil.

These data are necessary as soon as one must carry out Miss3D.

Even if CALC_MISS is used in two times (computation then postprocessing), factor key word the PARAMETRE is always necessary because the frequency range of Miss3D computation can be used during postprocessing. A good practice consists in not modifying key word PARAMETRE between these two stages.

5.1.1 Operands FREQ_MIN, FREQ_MAX, FREQ_PAS

These operands provide the limits and the step of frequency of Miss3D computation of frequential resolution (thus all cases except when TYPE_RESU=' FICHIER_TEMPS').

5.1.2 Operand LIST_FREQ

This operand provides the list of the real frequencies of Miss3D computation. This data is excluded with the FREQ_xxx key words.
The use of LIST_FREQ is possible only if one does the Miss3D calculation alone or if one seeks the response with a harmonic excitation (TYPE_RESU=' HARM_GENE' and d'EXCIT_HARMO presence).
In the other cases, it is necessary by means of to provide a list of frequencies to constant step key words FREQ_MIN, FREQ_MAX, FREQ_PAS.

5.1.3 Operand FREQ_IMAG

This operand is to be used only in mode TYPE_RESU=' FICHIER_TEMPS' (what corresponds to the method TEMPS-Laplace). Indeed this key word is used to define the imaginary part of the complex frequency when one places oneself in the field of Laplace. In all the other types of computation, one is in the frequential field and the frequency is then always purely real. One can use one key word at the same time among FREQ_IMAG, FREQ_MIN and LIST_FREQ.

5.1.4 Operand Z0

This operand gives the dimension of the free face of the soil.

5.1.5 Operand SURF

This operand indicates if one has or not a shallow foundation.

5.1.6 Operand ISSF

This operand indicates if one has or not a field of fluid and thus also of the interfaces fluid-structure, soil-fluid and free soil indicated by operands GROUP_MA_FLU_STR GROUP_MA_FLU_SOL and GROUP_MA_SOL_SOL in the command.

5.1.7 Operand RFIC

This operand indicates the value of the homogeneous parameter to a characteristic distance necessary to eliminate fictitious resonances.

5.1.8 Operand ALGORITHME

This operand indicates for the computation of the impedances if one uses the algorithm of regularization for nonsurface foundations or another algorithm for shallow foundations.

5.1.9 Operand DREF

This operand indicates the value of the homogeneous parameter to a characteristic distance which makes it possible null to eliminate the vertical slope from the impedance for a frequency.

5.1.10 Operand ALUMINUM

This operand indicates the value of the absorption coefficient ranging between 0 and 1 to the interface soil-fluid. Valid if ISSF=' OUI' .

5.1.11 Operands OFFSET_MAX, OFFSET_NB

These operands provide the maximum limit and the spatial discretization division for the computation of the impedances by Miss3D starting from the data of soil.

5.1.12 Operands SPEC_MAX, SPEC_NB

These operands provide the maximum limit and the spectral discretization division for the computation of the impedances by Miss3D starting from the data of soil.
If they are not indicated, a spectral discretization will be calculated automatically by Miss3D.

5.1.13 Operand TYPE

This operand makes it possible to store the impedances calculated in a binary file of format. If one wants to exploit them by the command LIRE_IMPE_MISS [U7.02.32], it will then be necessary to take care to use the same type of file.

6 Postprocessing

If TYPE_RESU is different from "FICHIER", results files of Miss3D are post-treaties by CALC_MISS in order to provide the harmonic or temporal response of structure, or the evolutions of the quantities characteristic (displacement, velocity, acceleration, oscillator spectrum) in certain points of postprocessing.

6.1 Parameters common

6.1.1 Operands ACCE_X, ACCE_Y, ACCE_Z and PAS_INST/INST_FIN

When accelerograms are provided (i.e. in all the cases except if EXCIT_HARMO is used), key words PAS_INST and INST_FIN are compulsory and the accelerograms then are systematically interpolated on the interval [0. , INST_FIN] with step PAS_INST.

6.2 Computation of the harmonic or temporal response of structure

One is in the case TYPE_RESU = "HARM_GENE" (harmonic response) or "TRAN_GENE" (temporal response).
One then calculates the harmonic response of structure with the provided loading (accelerograms or EXCIT_HARMO).
In case "TRAN_GENE", one carries out the temporal restitution by means of operator REST_SPEC_TEMP (option PROL_ZERO).
The frequencies used for harmonic computation depend on the loading and are described in paragraph 6.2.2.

6.2.1 Operand MODELS

It acts of the model of structure (transmitted to DYNA_LINE_HARM).

6.2.2 Operands ACCE_X, ACCE_Y, ACCE_Z, DEPL_X, DEPL_Y, DEPL_Z, EXCIT_HARMO

One provide either EXCIT_HARMO, or an accelerogram in one or more directions (ACCE_X, ACCE_Y, ACCE_Z), or of the displacements imposed in one or more directions (DEPL_X, DEPL_Y, DEPL_Z).

In the presence of EXCIT_HARMO, the frequency range used for harmonic computation is the same one as that used for Miss3D computation: [FREQ_MIN, FREQ_MAX] by step of FREQ_PAS Hz or LIST_FREQ.

If the loading is provided in the form of imposed accelerograms or displacements (interpolated by means of PAS_INST, noted dt and INST_FIN, noted t_{max}, the frequency range used is that of FFT accelerogram, that is to say:

$\left[0, \frac{1}{2\,dt}\right]$ with a step of $df = \frac{1}{npas \times dt}$ where $npas = 2^n$, tq $npas \geq \frac{t_{max}}{dt}$.

6.3 Computation of the evolutions in certain points

One is thus in case TYPE_RESU=' TABLE'.
In this case, one calculates the harmonic response of structure with a unit acceleration (in the directions requested). Then, for each loading, one recombines in each place of postprocessing M the unit frequential contributions:

$$u_M(f)=u_x.FFT(acce_x)+u_y.FFT(acce_y)+u_z.FFT(acce_z)$$

One also calculates FFT this response and the oscillator spectrum provided by CALC_FONCTION/SPEC_OSCI.
One makes in the same way for $\dot{u}_M$ and $\ddot{u}_M$.

All these functions are stored in the produced array:

GROUP_NO	NOM_CHAM	NOM_PARA	FONC_X	FONC_Y	FONC_Z
	ACCE	INST	ACCE1	ACCE2	ACCE3
	ACCE	FREQ	_9003066	_9003068	_9003070
SOMMET	DEPL	INST	_9003129	_9003135	_9003141
SOMMET	DEPL	FREQ	_9003128	_9003134	_9003140
SOMMET	DEPL	SPEC_OSCI	_9003130	_9003136	_9003142
SOMMET	QUICKLY	INST	_9003147	_9003153	_9003159
SOMMET	QUICKLY	FREQ	_9003146	_9003152	_9003158
SOMMET	QUICKLY	SPEC_OSCI	_9003148	_9003154	_9003160
SOMMET	ACCE	INST	_9003165	_9003171	_9003177
SOMMET	ACCE	FREQ	_9003164	_9003170	_9003176
SOMMET	ACCE	SPEC_OSCI	_9003166	_9003172	_9003178

One finds thus for each case of loading (for first NUME_CAS = 0):
- On the first line, the "functions loading", i.e. accelerograms of the excitation (temporal, NOM_PARA=' INST') in the 3 directions: FONC_X, FONC_Y, FONC_Z.
- On the second-row forward, FFT of these signals (NOM_PARA=' FREQ').
- Then for each point (here SOMMET), evolution of displacement, velocity and acceleration. With for each one, the signal, its FFT and the oscillator spectrum.

6.3.1 Operand MODELS

It acts of the model of structure (transmitted to DYNA_LINE_HARM).

6.3.2 Operands ACCE_X, ACCE_Y, ACCE_Z, INST_FIN, PAS_INST

One provide an accelerogram in one or more directions (ACCE_X, ACCE_Y, ACCE_Z), one final moment (INST_FIN) and one time step (PAS_INST).

The frequency range of harmonic computation is given starting from the accelerograms as in paragraph 6.2.2. All the accelerograms must have the same one time step and this one must be constant.

6.3.3 Operand NORMALIZES, AMOR_SPEC_OSCI, LIST_FREQ_SPEC_OSCI

These parameters are transmitted to CALC_FONCTION for the option SPEC_OSCI (*cf* [U4.32.04]) where AMOR_REDUIT was renamed in AMOR_SPEC_OSCI not to confuse with the list of depreciation used for harmonic computation. Of the same LIST_FREQ was also renamed here in LIST_FREQ_SPEC_OSCI with the key word to avoid confusions LIST_FREQ which is used to specify the list of frequencies for harmonic computation and MISS3D (*cf* paragraph 12).

6.4 Postprocessing of the results at the check-points

One is thus in case TYPE_RESU=' TABLE_CONTROL'.

6.4.1 Operand GROUP_MA_CONTROL

It acts of the group of meshes specific locating the check-points (transmitted to IMPR_MACR_ELEM). During postprocessing, of the functions responses are created for each point which is taken in the order of definition of this mesh group.

Thus, in the array, the point indicated PC1 does not correspond in a general way to a node or groups node named PC1. It is the first specific mesh of GROUP_MA_CONTROL.

6.4.2 Operands ACCE_X, ACCE_Y, ACCE_Z, INST_FIN, PAS_INST, NORM, AMOR_SPEC_OSCI, LIST_FREQ_SPEC_OSCI

Identical to paragraphs 15 and 15.

6.4.3 Count produced

the loading applied in Miss3D computation is a unit harmonic acceleration.
The first two lines correspond to the accelerations ACCE_X/Y/Z provided by the user, interpolated with time step provided, and its FFT.
In each check-point, one recovers the transfer function transfer in the three directions to this request. They is the lines with TRANSFERT/FREQ.
Then, there is the combination:
$a_{Mx}(f)=ft_x(f).FFT(acce_x)$ and even thing in there and Z according to the loading applied.
One also calculates FFT of this response and the oscillator spectrum provided by CALC_FONCTION/SPEC_OSCI.

All these functions are stored in the produced array (example with a request only ACCE_Z):

```
GROUP_NO. NOM_CHAM. .NOM_PARA… FONC_X… .FONC_Y… FONC_Z
…… .ACCE…. .INST…. -…… -…. _9000034
…… .ACCE…. .FREQ…. -…… -…. _9000035
PC1…. .TRANSFERT. FREQ…. _9000036. _9000037. _9000038
PC1…. .ACCE…. .INST…. -…… -…. _9000040
PC1…. .ACCE…. .FREQ…. -…… -…. _9000039
PC1…. .ACCE…. .SPEC_OSCI. -…… -…. _9000041
PC2…. .TRANSFERT. FREQ…. _9000042. _9000043. _9000044
PC2…. .ACCE…. .INST…. -…… -…. _9000046
PC2…. .ACCE…. .FREQ…. -…… -…. _9000045
PC2…. .ACCE…. .SPEC_OSCI. -…… -…. _9000047
PC3…. .TRANSFERT. FREQ…. _9000048. _9000049. _9000050
PC3…. .ACCE…. .INST…. -…… -…. _9000052
PC3…. .ACCE…. .FREQ…. -…… -…. _9000051
PC3…. .ACCE…. .SPEC_OSCI. -…… -…. _9000053
```

the parameter of the array indicating the check-point is named GROUP_NO to be homogeneous with the case COUNTS. As one saw higher, it is simply about a number of point in the mesh group of the check-points.

7 Various

7.1.1 Operand INFO

Level of detail of printing of the command.
With INFO=2, many information on the sequence of the stages of computation is displayed.