Operator DEFI_INTE_SPEC

1 Drank

To define a matrix of spectral concentration (one also says: interspectral matrix).
The terms of the matrix are defined by:

- existing constants (white vibration)
- , complex functions,
- the analytical formula of KANAI-TAJIMI.

Product a data structure of type `interspectrum`.

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

2 Syntax

```
intsp   [interspectrum] = DEFI_INTE_SPEC

(      ◊DIMENSION    =/1                                   [DEFAULT]
                                      /n             [I]

       ◊PAR_FONCTION =_F    (
                          ♦  /NUME_ORDRE_I     =i           [I]
                                NUME_ORDRE_J=j                  [I]
                             /NOEUD_I      =nd_i           [node]
                                NOEUD_J=nd_j              [node]
                                NOM_CMP_I=ncmp_i              [kN]
                                NOM_CMP_J=ncmp_j              [kN]
                          ♦FONCTION=fonct                  [fonction_c]
                              )
       ◊KANAI_TAJIMI =_F    (
                          ♦  /NUME_ORDRE_I     =i           [I]
                                NUME_ORDRE_J=j                  [I]
                             /NOEUD_I      =nd_i           [node]
                                NOEUD_J=nd_j              [node]
                                NOM_CMP_I=ncmp_i              [kN]
                                NOM_CMP_J=ncmp_j              [kN]

                          ◊  FREQ_MIN=/0          .            [DEFAULT]
                                         /fmin              [R]
                          ◊  FREQ_MAX=/100        .         [DEFAULT]
                                         /fmax              [R]
                          ◊PAS=/1                   .             [DEFAULT]
                                         /pas                  [R]

                          ◊/VALE_R=valr                       [R]
                             /VALE_C          =valc            [C]
                          ◊AMOR_REDUIT=/0.60                  [DEFAULT]
                                         /amor              [R]
                          ◊FREQ_MOY=/5            .            [DEFAULT]
                                         /fmoy              [R]

                          ◊  INTERPOL=     | "LIN"          [DEFAULT]
                                           | "LOG"
                                           | "NON"
                          "        EXCLUDED" ◊PROL_GAUCHE=/      [DEFAULT]
                                         /  "CONSTANT"
                                         /  "EXCLUDED"
                          "        LINEAIRE" ◊PROL_DROITE=/      [DEFAULT]
                                         /  "CONSTANT"
                                         /  "LINEAIRE"
                             )
```

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

```
          ◊CONSTANT  =_F (
                              ♦  /NUME_ORDRE_I     =i            [I]
                                    NUME_ORDRE_J=j                [I]
                                 /NOEUD_I       =nd_i           [node]
                                    NOEUD_J=nd_j                [node]
                                    NOM_CMP_I=ncmp_i               [kN]
                                    NOM_CMP_J=ncmp_j               [kN]

                              ◊   FREQ_MIN=/0          .          [DEFAULT]
                                               /fmin             [R]
                              ◊   FREQ_MAX=/100        .        [DEFAULT]
                                               /fmax             [R]
                              ◊PAS          =/1        .        [DEFAULT]
                                               /pas                 [R]

                              ◊/VALE_R=/1                  .          [DEFAULT]
                                                  /valr          [R]
                                 /VALE_C           =VALC            [C]

                              ◊   INTERPOL=          | "LIN"      [DEFAULT]
                                                     | "LOG"
                                                     | "NON"
                              ◊PROL_GAUCHE=/            "EXCLUDED"
     [DEFAULT]
                                                  /   "CONSTANT"
                                                  /   "LINEAIRE"
                              ◊PROL_DROITE=/            "EXCLUDED"
     [DEFAULT]
                                                  /   "CONSTANT"
                                                  /   "LINEAIRE"
                              )

          ◊TITER=titer                                          [l_Kn]
          ◊INFO=/1                                              [DEFAULT]
                                 /2
    )
```

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

3 Operands

3.1 Operand DIMENSION

◊DIMENSION =n

Dimension from the matrix from spectral concentration, stored in an array of interspectrums (tabl_intsp).

3.2 Key word PAR_FONCTION

♦ ~ PAR_FONCTION =

Key word factor, makes it possible to define a term (I, J) of the interspectral matrix from already definite concepts of the fonction_c type.

3.2.1 Operands NUME_ORDRE_I, NUME_ORDRE_J

NUME_ORDRE_I =i
NUME_ORDRE_J =j

Couple of indices (line, column) of the matrix on which one will affect a function.

These operands are excluded with operands NOEUD_I NOEUD_J NOM_CMP_I NOM_CMP_J.

3.2.2 Operands NOEUD_I, NOEUD_J, NOM_CMP_I, NOM_CMP_J

NOEUD_I=nd_i [node]
NOEUD_J=nd_j [node]
NOM_CMP_I=ncmp_i [kN]
NOM_CMP_J=ncmp_j [kN]

These operands correspond to the names of the nodes and of the components (line, column) of the matrix where one will affect a function.

These operands are excluded with operands NUME_ORDRE_I NUME_ORDRE_J.

3.2.3 Operand FONCTION

♦FONCTION : fonct

fonct is a concept of the fonction_c type.

3.3 Key word KANAI_KAJIMI

~ KANAI_TAJIMI =

Key word factor, makes it possible to define by means of a function spectral concentration the model of Kanai and Tajimi. This function of spectral concentration corresponds to that of a filtered white vibration [bib2].

One gives the three parameters of the spectral concentration of the model of KANAI_TAJIMI: damping, frequency and level.

3.3.1 Operands NUME_ORDRE_I, NUME_ORDRE_J

NUME_ORDRE_I =i
NUME_ORDRE_J =j

Couple of indices (line, column) of the interspectral matrix. Not having model of spectral coherence, the model of Kanai-Tajimi only allows to create auto--spectrums. I thus should be chosen = J (in general, one will choose n=1 and i=j=1 here).

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

These operands are excluded with operands NOEUD_I NOEUD_J NOM_CMP_I NOM_CMP_J.

3.3.2 Operands NOEUD_I, NOEUD_J, NOM_CMP_I, NOM_CMP_J

```
NOEUD_I=nd_i                [node]
NOEUD_J=nd_j                [node]
NOM_CMP_I=ncmp_i               [kN]
NOM_CMP_J=ncmp_j               [kN]
```

These operands correspond to the names of the nodes and of the components (line, column) of the matrix where one will affect a function. In the case of the model of Kanai-Tajimi, one chooses NOEUD_I = NOEUD_J and NOM_CMP_I = NOM_CMP_J.

These operands are excluded with operands NUME_ORDRE_I NUME_ORDRE_J.

3.3.3 Operands AMOR_REDUIT/FREQ_MOY/VALE_R/VALE_C

```
◊  AMOR_REDUIT=amor
◊  FREQ_MOY=fmoy
◊/VALE_R=valr
   /VALE_C          =valc
```

fmoy and amor are the eigenfrequency and the reduced damping of the filter. The level can be given in the complex or real form.

3.3.4 Operands INTERPOL/PROL_GAUCHE/PROL_DROITE

One gives for each function the classical parameters which condition the interpolation and the extrapolation of the produced function. The possibilities as well as the values by default are recalled on page 2.

```
◊INTERPOL
◊PROL_GAUCHE
◊PROL_DROITE
```

For more details to see them [§3.4] and [§3.5].

3.3.5 Operands FREQ_MIN/FREQ_MAX/PAS

One gives the parameters of the frequential discretization.

```
◊FREQ_MIN=fmin
◊FREQ_MAX=fmax
◊PAS=pas
```

3.3.6 Operands PROL_DROITE and PROL_GAUCHE

◊PROL_DROITE and PROL_GAUCHE =

Defines the type of prolongation on the right (on the left) of the field of definition of the variable:

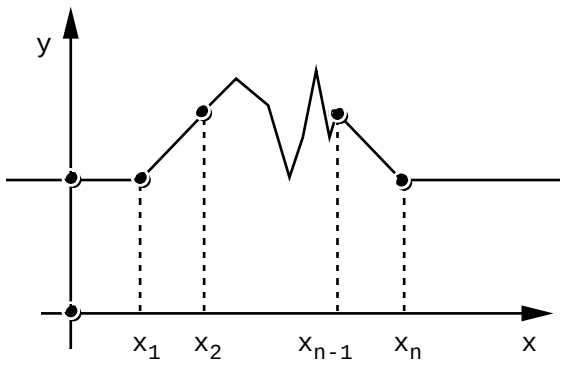
- "CONSTANT" for a prolongation with the last (or first) value of the function,
- "LINEAIRE" for a prolongation along the first definite segment (PROL_GAUCHE) or last definite segment (PROL_DROITE),
- "EXCLUDED" if the extrapolation of the values apart from the field of definition of the parameter is prohibited (in this case if a computation requires a value of the function out of field of definition, the code will stop in fatal error).

For example:

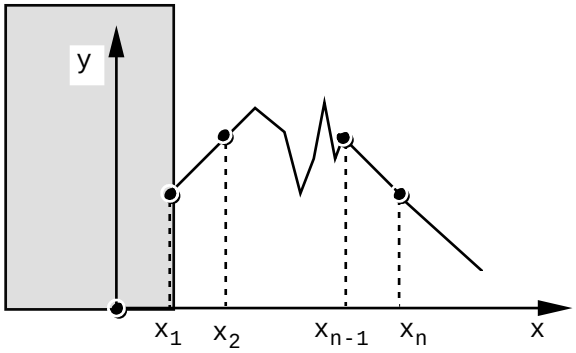
Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

- PROL_DROITE = "CONSTANT", PROL_GAUCHE = "CONSTANT"



- PROL_DROITE = "LINEAIRE", PROL_GAUCHE = "EXCLUDED"



Note::

The type of prolongation and interpolation are independent one of the other.

3.3.7 Operand INTERPOL

◊INTERPOL =

Standard of interpolation of the function enters the values of the field of definition of the function: a type for the interpolation of the parameter and for the interpolation of the function. This is obtained by providing a list of texts among:

INTERPOL = ("LIN", "LOG")

"LIN" : linear,

"LOG" : logarithmic curve,

"NON" : one does not interpolate (and thus the program will stop if one asks for the value of the function for a value of the parameter where it was not defined).

Note:

If only one value is specified, she is taken into account at the same time by the interpolation of the parameter and the function. INTERPOL = "LOG" is equivalent to ("LOG", "LOG") .

3.4 Key word CONSTANT

◊CONSTANT =

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

Key word factor which makes it possible to define a function of spectral concentration corresponding to a white vibration with tape (constant spectral concentration on the bande de fréquences considered).

All the key keys under this key word factor have the same meaning as for the key word factor KANAI_TAJIMI except AMOR and FREQ_MOY which do not have a meaning here.

3.5 Operand TITER

◊TITER=titer

title is the title of computation to be printed at the top of the results. See [U4.03.01].

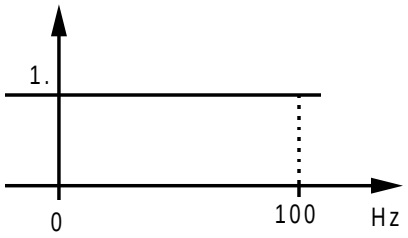
3.6 Operand INFO

◊INFO =

1 : no printing.
2 : printing of the characteristics of the definite interspectral matrix.

4 Example

In the example below one defines a function of spectral concentration (in terms of interspectrum it is about a matrix 1 X 1) in constant value:




```
INTEREXC = DEFI_INTE_SPEC      (
             DIMENSION=1,
             INFO=2,
             CONSTANT=_F (
                     NUME_ORDRE_I=1,
                    NUME_ORDRE_J=1,
                    FREQ_MIN=0.,
                    FREQ_MAX=100.,
                    PAS=1.,
                    PROL_GAUCHE=' CONSTANT',
                    PROL_DROITE=' CONSTANT',
                    INTERPOL=' LIN',
                    VALE_C= ("IH", 1. , 0.),
                          ),
                                  );
```

To define the interspectrum of a white vibration filtered by an oscillator represented by the filter of KANAI - TAJIMI:

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

```
INTKTJ1 = DEFI_INTE_SPEC   (
      DIMENSION=1,
      INFO=2,
      KANAI_TAJIMI=_F (
             NUME_ORDRE_I=1,
            NUME_ORDRE_J=1,
       FREQ_MOY=15.,
      AMOR=0.05,
            VALE_R=1.,
            INTERPOL=' LIN',
            PROL_GAUCHE=' CONSTANT',
            PROL_DROITE=' CONSTANT',
            FREQ_MIN=0.,
            FREQ_MAX=30.,
            PAS=5.,
                      ),
                         );
```

The 3 parameters of the filter were given:
1) damping = 0.05,
2) frequency = 15. Hz,
3) level = 1.

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)

5 Bibliography

1) J.S. BENDAT, J. WILEGSON: “Spectral Engineering application of correlation and analysis”.

2) C. DUVAL “Dynamic response under random excitations in *the Code_Aster* : theoretical principles and examples of use”. Note DER HP-61/92-148

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

Licensed under the terms of the GNU FDL (http://www.gnu.org/copyleft/fdl.html)