Operator CALC_FONC_INTERP

1 Drank

To build a concept of type function or fonction_c from a function FORMULATES to 1 or 2 variables. Can be defined real functions with real variables, complex functions with real variables and three-dimensions functions.

One can also produce a new real or complex function, or a three-dimensions function by interpolating another standard function in the same way (real, complex or a three-dimensions function).

The use of CALC_FONC_INTERP allows a tabulation of the formula preliminary to computation. Its use is recommended before any transient analysis and/or nonlinear for reasons of performances.

The operator is not reentrant, it produces a new function or a three-dimensions function.

2 Syntax

```
Fr [*]  = CALC_FONC_INTERP

              (  ♦FONCTION  = F                                    [formula]
                                                                 /  [formule_c]
                                                                 /  [function]
                                                                 /  [fonction_c]
                                                                 /  [three-
dimensions function]

                 ◊NOM_RESU  =  "TOUTRESU"  ,                  [DEFAULT]
                                 /NR       ,                  [K8]
                 ◊NOM_PARA  =np   ,

                 ♦/VALE_PARA       =lvale   ,                    [l_R]
                    /LIST_PARA     will =lpara     ,
[listr8]

                 ◊PROL_DROITE  =      "CONSTANT",
                                     /"LINEAIRE",
                                     /"EXCLUDED"   ,
[DEFAULT]

                 ◊PROL_GAUCHE  = /"CONSTANT",
                                     /"LINEAIRE",
                                     /"EXCLUDED"   ,
[DEFAULT]

                 ◊INTERPOL  =      "LIN",                       [DEFAULT]
                                 /   "LOG",                     [l_Kn]
                                 /   "NON",

                 ◊NOM_PARA_FONC    = npf,

                    ♦/VALE_PARA_FONC     = lvalef,             [l_R]
                       /LIST_PARA_FONC   = lparaf,              [listr8]

                    ◊PROL_DROITE_FONC    =      "CONSTANT",
                                              /"LINEAIRE",
                                              /"EXCLUDED"   ,
[DEFAULT]

                    ◊PROL_GAUCHE_FONC    =      "CONSTANT",
                                              /"LINEAIRE",
                                              /"EXCLUDED"   ,
[DEFAULT]

                    ◊INTERPOL_FONC    =            "LIN",
[DEFAULT]
                                              /   "LOG",         [l_Kn]
                                              /   "NON",

                 ◊INFO   =/1          ,
   [DEFAULT]
                              /2 ,

                 ◊TITER  = Ti ,                                 [l_Kn]
```

)

If F is a formula with 1 parameter, [*] =fonction ,
formula with 2 parameters, three-dimensions function,
formule_c with 1 parameter, fonction_c,
three-dimensions function, three-dimensions function,
function, function,
fonction_c, fonction_c.

3 Operands

3.1 Operand FONCTION

♦FONCTION = F

Name of the FORMULA (interpretable function (FORMULA cf [U4.31.05])).
This function can be with one or two variables in the case of the real formulas, with a variable only in the case of the complex formulas.

One can however create a new function (respectively fonction_c, three-dimensions function) from a function (respectively fonction_c, three-dimensions function) by interpolating the first on a different parameter list. This possibility is primarily used in the macro - commands.

When the type in entry is a formula and that NOM_PARA_FONC is provided, the produced data structure is a three-dimensions function.

Notice

During the interpolation of a formula with two parameters, one and the checks coherence between the parameters of the formula key words NOM_PARA and NOM_PARA_FONC. See the example of paragraph 4.2.

3.2 Operand NOM_RESU

◊NOM_RESU = NR

Indicates the name of result, the function thus created is a function whose value is of name NR (8 characters).

3.3 Operand NOM_PARA

◊NOM_PARA = NR

Indicates the name of the parameter of the function or the three-dimensions function. By default, the name of the parameter of the formula or provided function is employed.

3.4 Operands VALE_PARA/LISTE_PARA

◊/VALE_PARA = lvale,

lvale is the list of the values of the parameter.

/LIST_PARA = will lpara,

will lpara is the list of the values of the parameter: it is a concept of the listr8 type previously created by the command DEFI_LIST_REEL [U4.34.01].

3.5 Operands PROL_DROITE and PROL_GAUCHE

◊PROL_DROITE and PROL_GAUCHE =

Define the type of prolongation on the right (on the left) of the field of definition of the parameter of the function or of three-dimensions function

"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"	extrapolation from 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),

3.6 Operand INTERPOL

◊INTERPOL =

Standard of interpolation of the function between the values variable or type of interpolation of the three-dimensions function enters the values of the parameter. Behind this key word one expects a parameter list (two at the most).

"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).

If only one value is given, the interpolation will be identical for the X-coordinates and the ordered. If two values are given, the first corresponds to the interpolation of the X-coordinates and the second with the interpolation of the Y-coordinates.

3.7 Operand NOM_PARA_FONC

◊NOM_PARA_FONC = NR

Indicates the name of the variable of the functions defining the three-dimensions function. When the type as starter is a formula and that this key word is indicated, then the produced data structure is a three-dimensions function.

3.8 Operands VALE_PARA_FONC/LISTE_PARA_FONC

◊/VALE_PARA_FONC = lvale,

lvale is the list of the values of the variable of the functions defining the three-dimensions function.

/LIST_PARA_FONC = will lpara,

will lpara is the list of the values of the variable of the functions defining the three-dimensions function: it is a concept of the listr8 type previously created by the command DEFI_LIST_REEL [U4.34.01].

3.9 Operands PROL_DROITE_FONC and PROL_GAUCHE_FONC

◊PROL_DROITE_FONC and PROL_GAUCHE_FONC =

Define the type of prolongation on the right (on the left) of the field of definition of the variable of the functions of the three-dimensions function:
"CONSTANT", "LINEAIRE", "EXCLU" have the same meaning as previously.

3.10 Operand INTERPOL_FONC

◊INTERPOL_FONC =

Standard of interpolation of the functions between the values of the variable of the functions defining the three-dimensions function. Behind this key word one expects a parameter list (two at the most).

Operation is identical to INTERPOL.

3.11 Operand INFO

◊INFO =

Specifies the options of printing on the message file .

1: no the printing (option by default)
2: printing of the parameters plus the list of the first 10 values in the order ascending of the parameter

3.12 Operand TITER

◊TITER = Ti

Titrates attached to the product concept by this operator [U4.03.01].

4 Case

4.1 examples of a function

4.1.1 To define the function FORMULATES sin (T)

```
IF = FORMULA (NOM_PARA = "INST",
              VALE = "sin (INST)"  )
```

4.1.2 Tabuler sin (T) from a list of realities

```
   DEPI=   2.*pi
   PAS0=   DEPI/200.
   LI1=    DEFI_LIST_REEL   (debut = 0, INTERVALLE=_F (JUSQU_A=DEPI,
PAS=PAS0),)

   SI1=    CALC_FONC_INTERP    (FONCTION= IF, LIST_PARA = LI1, NOM_RESU =
"DEPL",
                            PROL_GAUCHE=' EXCLU', PROL_DROITE=' CONSTANT',
                            INTERPOL=' LIN', TITER=' FONCTION SINUS'  )
```

4.1.3 Tabuler sin (T) from a list of values

```
   LI2=    (0. , 0.01, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.10)

   SI2=    CALC_FONC_INTERP    ( FONCTION = IF, VALE_PARA = LI2,
                              NOM_PARA = ' INST',
                              PROL_GAUCHE = "EXCLUDED", PROL_DROITE =
"EXCLUDED",
                              INTERPOL = "LIN", TITER = "FONCTION SINE")
```

4.2 Case of a three-dimensions function

4.2.1 To define the function FORMULATES sin (Omega * T)

```
IF = FORMULA (NOM_PARA = ("FREQ", "INST"),
              VALE = "sin (2*pi*FREQ*INST)")
```

4.2.2 Tabuler sin (Omega * T) from a list of times

the parameter of the three-dimensions function is "FREQ", the variable of the functions defining the three-dimensions function is "INST". One checks in CALC_FONC_INTERP which the first parameter of the formula is the same one as NOM_PARA, and than the second parameter of the formula is identical to NOM_PARA_FONC.

```
LI_FREQ=   DEFI_LIST_REEL   (DEBUT = 10, INTERVALLE=_F (JUSQU_A=100,
PAS=10),)
LI_INST=   DEFI_LIST_REEL   (DEBUT = 0, INTERVALLE=_F (JUSQU_A=100, PAS=1),)

SI1=   CALC_FONC_INTERP    ( FONCTION= IF,
                             NOM_RESU = "DEPL",
                             NOM_PARA_FONC=' INST',
                            LIST_PARA_FONC = LI_INST
                             PROL_GAUCHE_FONC=' EXCLU',
                             PROL_DROITE_FONC=' CONSTANT',
                             INTERPOL_FONC=' LIN',
```

```
NOM_PARA=' FREQ',
LIST_PARA = LI_FREQ
PROL_GAUCHE=' LINEAIRE',
PROL_DROITE=' LINEAIRE',
INTERPOL=' LIN',
TITER=' FONCTION SINUS',)
```