Operator IMPR_FONCTION

1 Drank

To print the contents of objects of type function or list of realities in a file intended for a graph plotter.

Note: The arrays, they, are printed with command IMPR_TABLE.

2 Syntax

```
   IMPR_FONCTION (
            ◊FORMAT     =        "TABLEAU",
[DEFAULT]
                            /   "XMGRACE",
                            /   "AGRAF",

      # Definition of the logical unit to format AGRAF

            ◊UNITE  =/unit          ,                                   [I]
                            /25 ,
      [DEFAULT]
            ◊UNITE_DIGR   =/unit_digr     ,                             [I]
                            /26 ,
      [DEFAULT]

      # Definition of the logical unit to format XMGRACE and the pilot of printing

            ◊UNITE  =/unit          ,                                   [I]
                            /29 ,
      [DEFAULT]
            ◊PILOTE    =         ",
      [DEFAULT]
                            /   "POSTSCRIPT",                           [kN]
                            /   "EPS",
                            /   "MIF",
                            /   "SVG",
                            /   "PNM",
                            /   "PNG",
                            /   "JPEG",
                            /   "PDF",
                            /   "INTERACTIF",

      # Definition of the logical unit to format TABLEAU

            ◊UNITE  =/unit          ,                                   [I]
                            /8  ,
      [DEFAULT]

      # Put on graphic page common to XMGRACE and AGRAF
            ◊BORNE_X    =   (xmin, xmax),                               [l_R]
            ◊BORNE_Y    =   (ymin, ymax),                               [l_R]
            ◊ECHELLE_X     =      "LIN",
      [DEFAULT]
                            /   "LOG",
            ◊ECHELLE_Y     =      "LIN",
      [DEFAULT]
                            /   "LOG",
            ◊GRILL_X    =/0     ,
[DEFAULT]
                            /nx ,                                       [R]
            ◊GRILL_Y    =/0     ,
      [DEFAULT]
                            /ny ,                                       [R]
            ◊LEGENDE_X     =xlegen      ,                                  [kN]
```

```
      ◊LEGENDE_Y    =ylegen     ,                                    [kN]

# Put on page of table

      ◊SEPARATEUR   =/separ        ,
[DEFAULT]
                           /  "",                                   [kN]
      ◊COMMENTAIRE  =/com        ,                                    [kN]
                           /  "#",
[DEFAULT]     ◊COMM_PARA   =/comp          ,
    [kN]
                           /  ",
[DEFAULT]
      ◊DEBUT_LIGNE  =/deb        ,                                    [kN]
                           /  ",
[DEFAULT]
      ◊FIN_LIGNE    =/fin        ,                                    [kN]
                           /  " \,
[DEFAULT]



# Commun runs with all the formats

   ◊TITER=titer               ,                                       [kN]
   ◊SOUS_TITER=sous_titer        ,                                 [kN]
   ◊INFO=/                 1,                                      [DEFAULT]
                        /2,


# Definition of the function to be traced

   ♦COURBE    = (   _F (

      # Formatted of the function at formats XMGRACE and AGRAF

            ◊LEGENDE   =   legend,                            [kN]

            ◊STYLE  =sty     ,                                [I]

            ◊COULEUR   =coul    ,                                 [I]

            ◊MARQUEUR  =marq ,                                [I]

            ◊FREQ_MARQUEUR    =freqmarq    ,                        [I]

      # Recovery of the function to be traced

            ♦/♦FONCTION           =  Fr,
[function]
                  ◊LISTE_PARA    = will lpara,
[listr8]

               /♦FONCTION         =fc  ,
[fonction_C]
                  ◊PARTIE       =      "REEL",
                                   /   "IMAG",
                  ◊LISTE_PARA    = will lpara,
[listr8]

               /♦FONC_X          =fx   ,
[function]
```

```
                        ♦FONC_Y       =fy   ,
      [function]
                        will ◊LISTE_PARA=lpara       ,
      [listr8]

                     /♦LISTE_PARA     will =lpara ,
      [listr8]
                        ♦LISTE_RESU   =lresu   ,                        [listr8]

                     /♦ABSCISSE        =labs   ,                        [l_R]
                        ♦ORDONNEE   =lordo  ,                         [l_R]

         # Tri possible

               ◊TRI    =      " ,                                      [DEFAULT]
                           /   "X",
                           /   "Y",
                           /   "XY",
                           /   "YX",


         ),),
      )
```

3 Operands

3.1 Presentation of the curves

A set of operands optional makes it possible to define the presentation of the curve. All have a value by default.

3.1.1 Operand FORMAT

◊FORMAT =

Format of printing of function

"AGRAF" printing intended for the software agraf, which also makes it possible to adapt the parameters of presentation in interactive,

"TABLEAU" the printing in columns makes it possible to easily import the data in a spreadsheet, if one gives several curves, it is the list of the X-coordinates of the first function which is used to interpolate the values of the other functions,

"XMGRACE" printing intended for the software xmgrace. One can also adapt the parameters of presentation in interactive. The use of key word PILOTE makes it possible to directly produce a file image or postscript.

Notice

format XMGRACE is intended for versions 5 of grace and is not compatible with grace6 (version 5.99).

3.1.2 Operand UNITE

◊UNITE = links
◊UNITE_DIGR = unit_digr if FORMAT = "AGRAF"

Make it possible to choose on which logical unit one prints the functions. The value of links must be the same one as in the interface astk.

If many curves are plotted, it is more flexible to use the repe type combined with command DEFI_FICHIER, the files will be in the ./REPE_OUT directory.

With format AGRAF, the data are written in UNITE whereas the directives are written in UNITE_DIGR (is worth 26 per default).

The value by default of links is worth:

- 8 with format TABLEAU (corresponds to the results file),
- 25 with the format AGRAF,
- 29 with format XMGRACE (optional if PILOTE = "INTERACTIF")

3.1.3 Operand PILOTE

While choosing FORMAT = "XMGRACE", one by means of lays out of the pilots of output used by xmgrace key word PILOTE. This amounts using the functions of export of xmgrace via its menu "Slips by/Print Setup…".
The exact list of the pilots available on your server is provided by the option "- version" of xmgrace.

Possible values of PILOTE :

'' : in this case, no pilot is used, the file obtained is the .agr or .dat of xmgrace (file containing the data and the directing of the graph.
"POSTCRIPT", "EPS" : file postscript encapsulated full-page or,
"PNG", "JPEG", "PNM" : file of type image,
"PDF", "MIF", "SVG" : particular formats,
"INTERACTIF" : no file is turned over if one can open xmgrace with the

screen.

3.1.4 Page-setting of the graph common to XMGRACE and AGRAF

3.1.4.1 Operands BORNE_X / BORNE_Y

◊BORNE_X =

Traced function in an interval of the X-coordinates given.

◊BORNE_Y =

Traced function in an interval of the Y-coordinates given.

3.1.4.2 Operands ECHELLE_X / ECHELLE_Y

◊ECHELLE_X =

Standard of scale desired for the X-coordinates, Linear or Logarithmic curve.

◊ECHELLE_Y =

Standard of scale desired for the Y-coordinates, Linear or Logarithmic curve.

3.1.4.3 Operands LEGENDE_X / LEGENDE_Y

◊LEGENDE_X =

Legend associated with the x-axis.

◊LEGENDE_Y =

Legend associated with the y-axis.

3.1.4.4 Operands GRILLE_X / GRILLE_Y

◊GRILL_X = nx

For xmgrace, nx is the distance between two vertical successive lines of the grid.
For agraf, nx is the integer defining the frequency of layout of these lines.

◊GRILL_Y = ny

Même thing for the horizontal lines of the grid.

3.1.5 Page-setting with format TABLEAU

One can the belonging define here printed table: of a classical table in columns with a compatible format csv or HTML…

Note::

The labels of the columns are suffixées by "_+ n° of column" (while starting to 0) in order to avoid the repetition because the names all of columns must be different.

◊SEPARATEUR = separ

Defines the separator used between two columns (a space by default).

◊COMMENTAIRE = COM

Character inserted at the beginning of line to indicate line in comment (or titrates, # by default).

COMM_PARA = comp

Character inserted for commentariser line of the labels (by default, no character is inserted).

◊DEBUT_LIGNE = deb.

Chains inserted into the beginning of each line (vacuum by default).

◊FIN_LIGNE = fine

Chains inserted at the end of line (" \ by default).

3.1.6 Keywords common to all formats

◊TITER
◊SOUS_TITER

Make it possible to define the principal and secondary titles graph or table.

3.2 Key word COURBE

♦COURBE

Key word factor allowing to print the definite functions or to trace one or more functions in the same graph (a function by occurrence of the key word factor).

3.2.1 Complementary attributes for the layout of each function by the software xmgrace or agraf

◊STYLE = sty

This key word defines the style of feature of the curve.

For xmgrace, the correspondence is the following one:
0 steps from line 1 continuous feature 2 dotted lines 3 indents short 4 long indents
5,6,7,8 alternate indents dotted lines

For agraf, the styles are:
0 line 1 dotted lines 2 point

◊MARQUEUR = marq

This key word defines the type of marker or symbol of the points of the curve.

For xmgrace :
0 step of marker 1 rings 2 square 3 rhombus 4 high triangle
5 left triangle 6 low triangle 7 right triangle 8 plus 9 systems
10 star

For agraf, the markers are:
0 circle 1 square 2 plus 3 rhombus 4 rings full
5 full square 6 full rhombus 7 cercle+croix 8 losange+croix

◊COULEUR = coul

This key word defines the color of the curve.

For xmgrace, the colors are:
0 blank 1 black 2 red 3 green 4 blue
5 brown yellow 6 7 purple gray 8 9 cyan
10 magenta 11 orange 12 chestnut 13 indigo 14 turquoise
15 green dark

For agraf, the colors are:
0 black 1 red 2 dark green 3 blue 4 magenta
5 cyan 6 green 7 chestnut 8 orange 9 mauve
10 yellow 11 clear chestnut

◊LEGENDE = legend

Captions given to the function (by default one recovers the name of the function).

Whole ◊FREQ_MARQUEUR

=freqmarq indicating the frequency of printing of the marker associated with a function. All `the freqmarq` points of discretization of the function, a marker is printed (by default all points).

3.2.2 Additional attributes for the layout by the software agraf

◊TRI = tr

This key word makes it possible to sort by order ascending the parameters defining the function:

- tr = "N", not of sort,
- tr = "X", sort of the points of the function according to the order ascending of X-coordinates X,
- tr = "Y", sort of the points of the function according to the order ascending of the Y-coordinates there,
- tr = "XY", sort of the points of the function according to the order ascending of X-coordinates X and in the event of equality according to the order ascending of the Y-coordinates,
- tr = "YX", sort of the points of the function according to the order ascending of the Y-coordinates there and in the event of equality according to the order ascending of the X-coordinates,

3.2.3 Printing or traced of a real function

/♦FONCTION = Fr

Name of the real function to print or to trace.

◊LISTE_PARA = Lr

Printing or layout of the function according to the list of the parameters given.

3.2.4 Printing or layout of a function complexes

One trace either the real part, or the imaginary part. If one wants to trace the real part and the imaginary part in the same graph, it is necessary to repeat the key word factor COURBE.

/FONCTION = FC

Name of the function complexes to print or trace.

◊PARTIE =

Printing or layout of the Real or Imaginary part.

◊LISTE_PARA = Lr

Printing or layout of the function according to the list of the parameters given.
Without effect during a printing in column (format "TABLEAU").

3.2.5 Printing or layout of a function defined by 2 lists of realities

/♦LISTE_PARA = will lpara

Name of the list of the X-coordinates.

♦LISTE_RESU = lresu

Name of the list of the Y-coordinates.

Or:

/♦ABSCISSE = labs

Python list of the X-coordinates.

♦ORDONNEE = lordo

Python list of the Y-coordinates.

3.2.6 Printing or layout of a parametric function

/♦FONC_X = fx

Nom of the parametric function X = F (T) to print or trace.

♦FONC_Y = fy

Nom of the parametric function there = G (T) to print or trace.

◊LISTE_PARA = Lr

Printing or layout of the function according to the list of the parameters given.

3.2.7 Functionalities which existed in **IMPR_COURBE**

working of the graphs from array from now on is ensured by IMPR_TABLE.

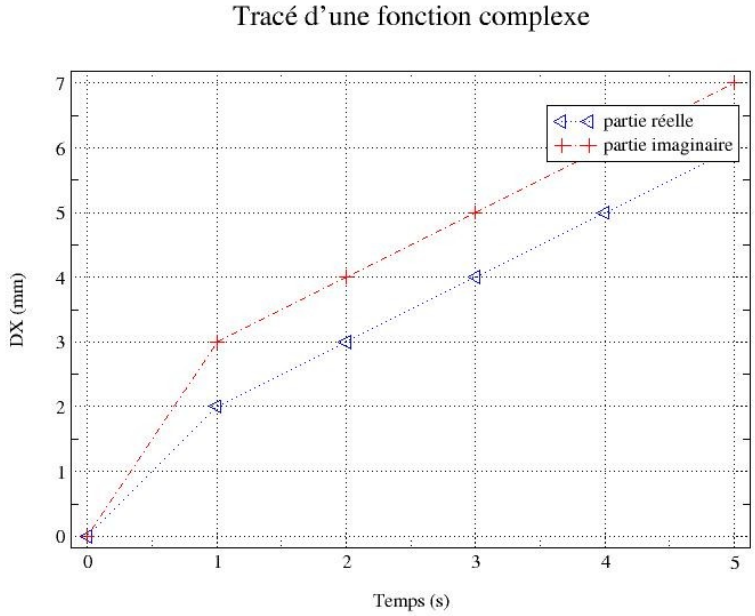
The layout of a resu_gene in a node of shock must be made in two times: to recover a function with RECU_FONCTION, key word RESU_GENE, then to print the graph with IMPR_FONCTION.

4 Examples

4.1 Curves representing a complex function

```
FC = DEFI_FONCTION (NOM_PARA=' INST', NOM_RESU=' DX',
                    VALE_C= (0. , 0. , 0. , 1. , 2. , 3. ,
                             2. , 3. , 4. , 3. , 4. , 5. ,
                             4. , 5. , 6. , 5. , 6. , 7. ),)

IMPR_FONCTION (
   UNITE     = 24,
   FORMAT    = "XMGRACE",
   PILOTE    = "POSTSCRIPT",
   LEGENDE_X = "Time (S)",
   LEGENDE_Y = "DX (mm)",
   COURBE    = (
      _F (FONCTION = FC,
          PARTIE   = "REEL",
          COULEUR  = 4,
          STYLE    = 2,
          MARQUEUR = 5,
          LEGENDE  = "left real",),
      _F (FONCTION = FC,
          PARTIE   = "IMAG",
          COULEUR  = 2,
          STYLE    = 5,
          MARQUEUR = 8,
          LEGENDE  = "left imaginary",),
   ),
   TITER     = "Traced of a complex function",
)
```



4.2 Parametric Curve

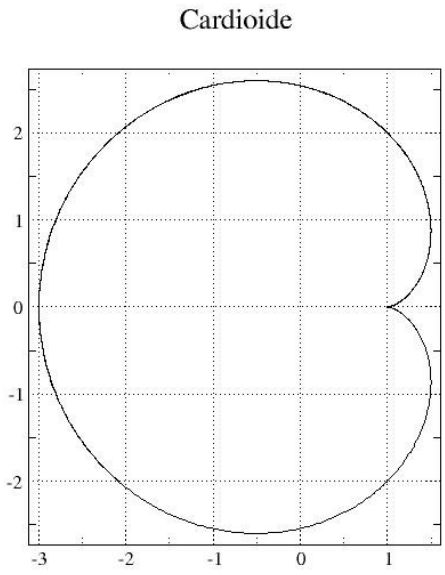
```
lt = DEFI_LIST_REEL (debut = 0. , INTERVALLE=_F (JUSQU_A=10., PAS=0.01),)

fx = FORMULA (NOM_PARA=' you,
              VALE= """ 2.*cos (T) - cos (2.*t) """,)
cardioX=CALC_FONC_INTERP (
              FONCTION  = fx,
              LIST_PARA = lt,)

fy = FORMULA (NOM_PARA=' you,
              VALE= """ 2.*sin (T) - sin (2.*t) """,)
cardioY=CALC_FONC_INTERP (
              FONCTION  = fy,
              LIST_PARA = lt,)

IMPR_FONCTION (
   UNITE    = 27,
   FORMAT   = "XMGRACE",
   TITER    = "Ardioid",
   COURBE   = (
      _F (FONC_X = cardioX,
          FONC_Y = cardioY,),
   ),
)
```

One obtains a file thus that one can visualize in `xmgrace` :



Additional working in `xmgrace` : small *Stud/Graph appearance*, type *fixed* (square grid), and to remove the legend by stripping the box *Display legend*.