DISLIN

A Data Plotting Library

by

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Contents

Introduction / What is DISLIN?

- **DISLIN is a high-level plotting library for displaying data as curves, bar graphs, pie charts, 3D-colour plots, surfaces, contours and maps.**
- **Programming Languages: Fortran 77, Fortran 90/95, C, Perl, Python, Java**
- **Current Version: 10.3 (Jan. 2013)**
- **First Version: 1.0 (Dec. 1986)**

Introduction / Features

- 9 Vector fonts with 7 alphabets, bitmap fonts
- Support of PostScript, X11 and Windows fonts
- Axis systems with various formats
- Plotting of curves and legends
- 3-D colour graphics
- 3-D graphics
- Business graphics
- Contours
- Plotting maps
- Widget routines

Installation UNIX/Linux

- gzip –d dislin-10.3.xxx.tar.gz
- tar xvf dislin-10.3.xxx.tar
- cd dislin-10.3
- export DISLIN=dislin_directory (i.e. /usr/local/dislin)
- ./INSTALL

- General settings:

  export DISLIN=dislin_directory
  LD_LIBRARY_PATH=$DISLIN:$LD_LIBRARY_PATH
  PATH=$PATH:$DISLIN/bin

Installation Windows

- unzip dl_10_xx.zip (temporary directory)
- setup
  - choose ok
  - give the installation directory

- Global settings (Control Panel):
  DISLIN=dislin_directory
  PATH=%PATH%; dislin_directory\win

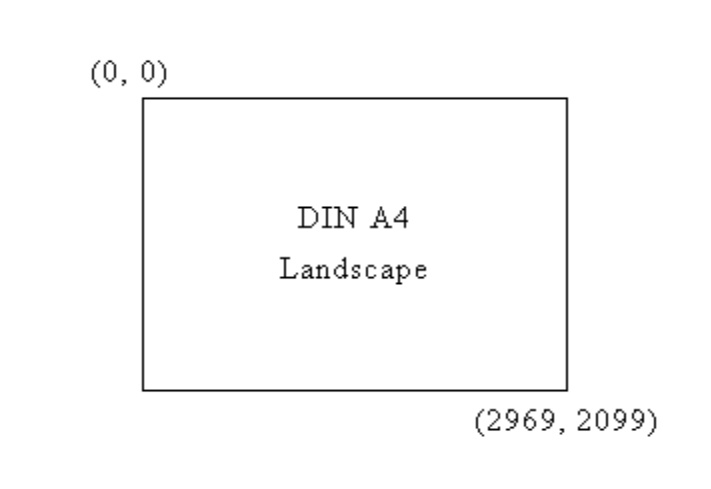
Basic Concepts / Page Format

- **Default Page:**

  DIN A4 Landscape
- **Origin:**

  Upper left corner
- **Plot unit: [cm / 100]**
- **Routines:**

  SETPAG (COPT),
  PAGE (NXP, NYP)



Basic Concepts / File Formats

- **Vector formats:** GKSLIN, CGM, PS, EPS, PDF, HPGL, WMF, SVG
- **Image formats:** TIFF, GIF, PNG, PPM, BMP
- **Screen output:** CONS, XWIN, GL
- **Routines:** METAFL (Format)
  SETFIL (Filename)

Basic Concepts / Level Structure

- **Level 0 : before DISINI or after DISFIN**
- **Level 1: after DISINI or after ENDGRF**
- **Level 2: after GRAF, GRAFMP or POLAR**
- **Level 3: after GRAF3 or GRAF3D**

Basic Concepts / Program Structure

- Setting of page format, file format and filename (SETPAG, PAGE, METAFL, SETFIL)
- Initialization (DISINI)
- Setting of plot parameters
- Plotting of the axis system (GRAF, POLAR, GRAFMP, GRAF3, GRAF3D)
- Plotting the title (TITLE)
- Plotting data points (CURVE, CURVE3, CURV3D, BARS, PIEGRF, SURFCE, CONTUR)
- Termination (DISFIN)

Basic Concepts / Conventions

- INTEGER variables begin with the character N or I
- Character variables begin with the character C. Keywords may be specified in upper or lower case and may be shortened to four characters
- Other variables are REAL
- Arrays end with the keyword ´RAY´

Initialization and Termination

- **Initialization:** CALL DISINI ()
- **Termination:** CALL DISFIN ()
- **Termination of an axis system:** CALL ENDGRF ()

Plotting Text and Numbers

• MESSAG (CSTR, NX, NY)	plots text
• NUMBER (X, NDEZ, NX, NY)	plots a number
• SYMBOL (NSYM, NX, NY)	plots symbols
• HEIGHT (NH)	sets the character height
• ANGLE (NANG)	defines the character angle
• COMPLX, SIMPLX, DUPLX, SERIF, HELVE, HELVES	define vector fonts
• PSFONT (CFNT)	defines PostScript fonts
• BMPFNT (CFNT)	defines a bitmap font
• WINFNT (CFNT)	defines a Windows font
• X11FNT (CFONT, COPT)	defines an X11 font

Axis Systems and Titles

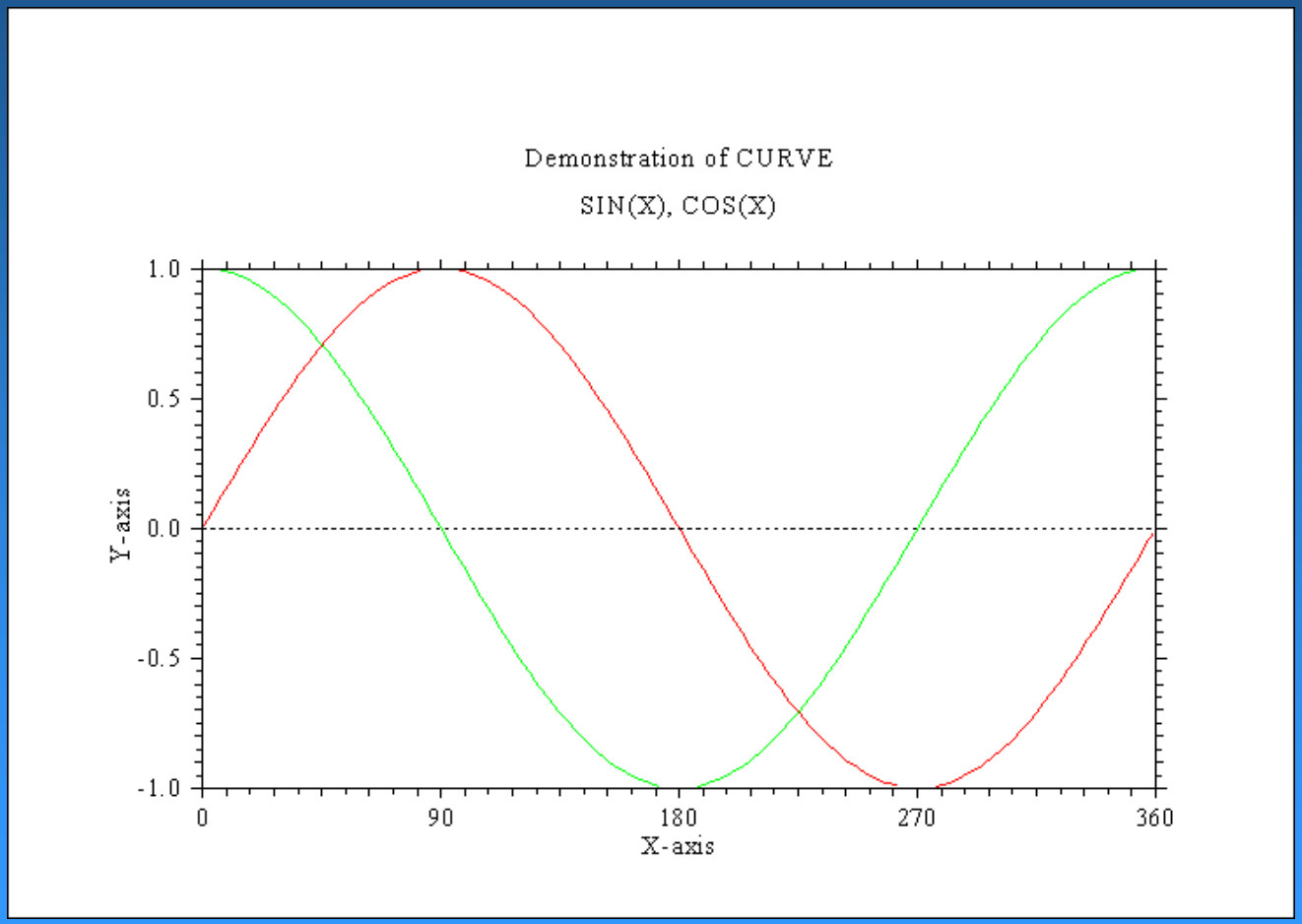
• GRAF (XA, XE, XOR, XSTP, YA, YE, YOR, YSTP)	plots an axis system
• POLAR (XE, XOR, XSTP, YOR, YSTP)	plots a polar axis system
• TITLE ()	plots a title
• AXSPOS (NXA, NYA)	defines the position
• AXSLEN (NXL, NYL)	defines axis lengths
• TICKS (N, CAX)	sets the number of ticks
• LABELS (CSTR, CAX)	defines axis labels
• NAME (CSTR, CAX)	sets axis titles
• AXSSCL (COPT, CAX)	defines the axis scaling
• TITLIN (CSTR, I)	defines text for titles

Plotting Curves

- **CURVE (XRAY, YRAY, N)** — **plots curves**

- **INCMRK (NMRK)** — **selects symbols or lines**
- **MARKER (NHSYMB)** — **defines a symbol**
- **HSYMBL (NH)** — **sets the size of symbols**
- **POLCRV (COPT)** — **sets an interpolation method**
- **THKCRV (N)** — **defines curve thickness**
- **CHNCRV (COPT)** — **sets attributes that will be automatically changed by CURVE**
- **LINTYP (N)** — **defines line styles**
- **COLOR (COPT)** — **sets a colour**

Plotting Curves / Example



Parameter Setting Routines

- Basic routines (resetting, file format, page control, error handling, viewport control)
- Axis systems (type, position, size, scaling, labels, ticks, titles, colours, clipping)
- Colours (foreground, colour tables, utility routines)
- Text and numbers
- Fonts, alphabets
- Indices and exponents
- Instruction alphabet
- TeX instructions for mathematical formulas
- Curve attributes
- Line attributes
- Shading
- Base transformations
- Shielded regions

Elementary Plot Routines

• MESSAG (CSTR, NX, NY)	plots text
• NUMBER (X, NDEZ, NX, NY)	plots numbers
• SYMBOL (NSYM, NX, NY)	plots symbols
• LINE (NX, NY, NU, NV)	plots a line
• RECTAN (NX, NY, NW, NH)	plots rectangles
• CIRCLE (NX, NY, NR)	plots circles
• ELLIPS (NX, NY, NA, NB)	plots ellipses
• VECTOR (NX, NY, NU, NV, IVEC)	plots vectors
• AREAF (NXRAY, NYRAY, N)	plots polygons
• RLMESS, RLNUMB, RLSYMB, RLINE, RLREC, RLCIRC, RLELL, RLVEC, RLAREA	are analogous routines for user coordinates

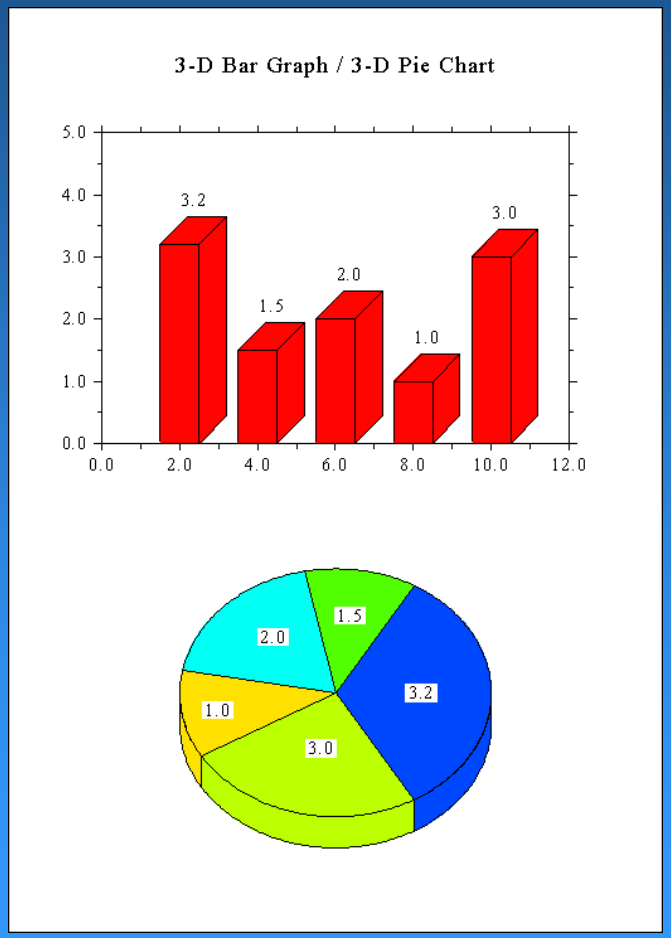
Business Graphics / Bar Graphs

• BARS (XRAY, Y1RAY, Y2RAY, N)	plots bar graphs
• BARTYP (COPT)	defines vertical or horizontal bars
• BARWTH (XWTH)	defines the width of bars
• LABELS (COPT, ´BARS´)	sets labels
• LABPOS (COPT, ´BARS´)	defines the position of labels
• LABDIG (N, ´BARS´)	sets the number of decimal places in labels
• LABCLR (NCLR, ´BARS´)	defines the colour of labels

Business Graphics / Pie Charts

• PIEGRF (CBUF, NLIN, XRAY, N)	plots pie charts
• PIETYP (COPT)	defines 2-D or 3-D pie charts
• LABELS (COPT, ´PIE´)	defines labels
• LABPOS (COPT, ´PIE´)	sets the position of labels
• LABDIG (N, COPT)	sets the number of decimal places in labels
• LABCLR (NCLR, ´PIE´)	sets the colour of labels
• PIECLR (N1RAY, N2RAY, N)	defines colours for single pies
• PIEEXP ()	enable exploded pies

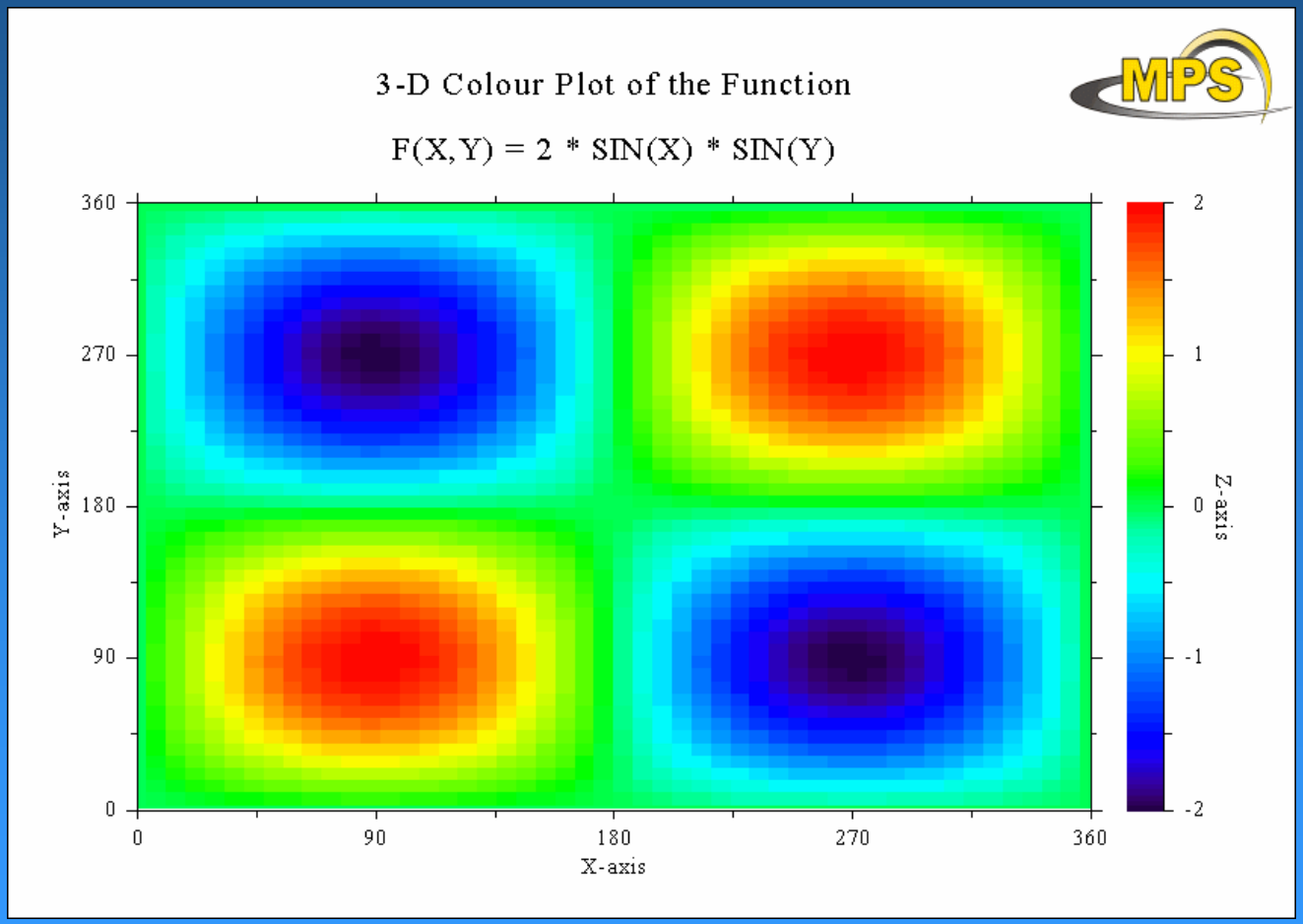
Business Graphics / Example



3-D Colour Graphics

• GRAF3 (XA, XE, XOR, XSTP, YA, YE, YOR, YSTP, ZA, ZE, ZOR, ZSTP)	plots a 3-D axis system where the Z-axis is plotted as a colour bar
• CURVE3 (XRAY, YRAY, ZRAY, N)	plots data points
• CRVMAT (ZMAT, NX, NY, IXP, IYP)	plots a coloured surface according to a matrix
• CRVTRI (XRAY, YRAY, ZRAY, N, I1RAY, I2RAY, I3RAY, NTRI)	plots the surface of a Delaunay triangulation
• SETRES (NW, NH)	defines the size of rectangles
• SHDMOD (COPT, 'CURVE')	selects symbols or rectangles
• AX3LEN (NXL, NYL, NZL)	defines axis lengths
• WIDBAR (NW)	sets the width of colour bars
• NOBAR ()	suppresses the plotting of the colour bar
• COLRAN (NCA, NCE)	defines the range of colours used for colour bars

3-D Colour Graphics / Example



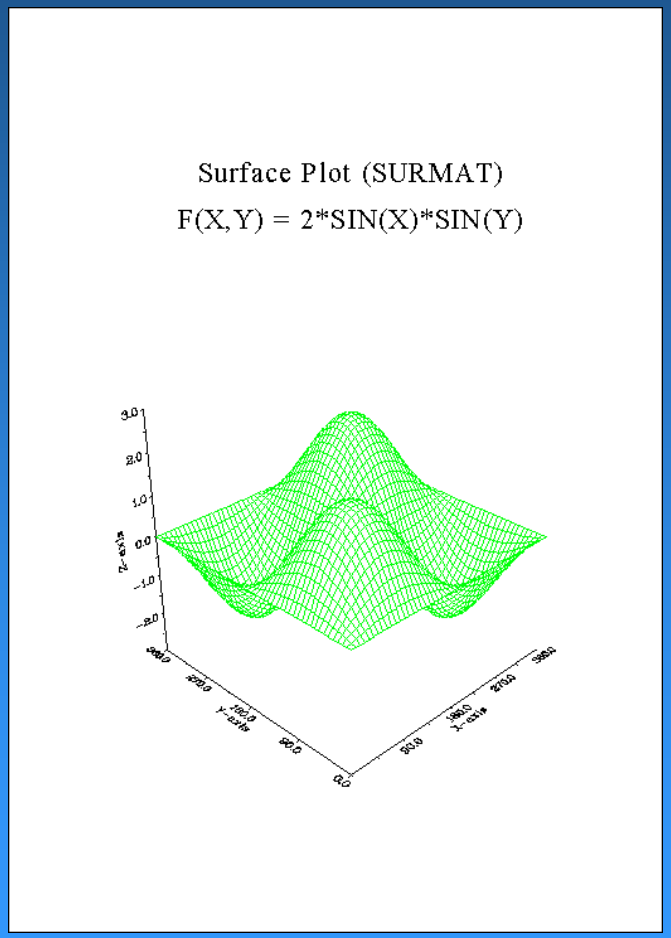
3-D Graphics / Axis System

• GRAF3D (XA, XE, XOR, XSTP, YA, YE, YOR, YSTP, ZA, ZE, ZOR, ZSTP)	plots an axis system
• GRID3D (NX, NY, COPT)	plots a grid in the 3-D box
• AXIS3D (XLEN, YLEN, ZLEN)	defines the lengths of the 3-D box
• VIEW3D (XVU, YVU, ZVU, COPT)	sets the viewpoint
• VFOC3D (XFOC, YFOC, ZFOC, COPT)	defines the focus point
• VUP3D (ANG)	defines the rotation of the camera around the viewing axis
• ANG3D (ANG)	specifies the field of view of the lens

3-D Graphics / Plotting Data

• CURV3D (XRAY, YRAY, ZRAY, N)	plots curves
• SURFCE (XRAY, N, YRAY, M, ZMAT)	plots a surface grid of a matrix
• SURFUN (ZFUN, IXP, XDEL, IYP, YDEL)	plots a surface grid of a function
• SURSHD (XRAY, NX, YRAY, NY, ZMAT)	plots a shaded surface from a matrix
• SURFCP (ZFUN, TMIN, TMAX, TSTP, • UMIN, UMAX, USTP)	plots a surface of a parametric function
• SURTRI (XRAY, YRAY, ZRAY, N, I1RAY, I2RAY, I3RAY, NTRI)	plots a surface of triangulated data
• SURISO (XRAY, NX, YRAY, NY, ZRAY, NZ, WMAT, WLEV)	plots isosurfaces of the form f (x, y, z) = constant
• BARS3D (XRAY, YRAY, Z1RAY, Z2RAY, XWRAY, YWRAY, ICRAY, N)	plots three-dimensional bars

3-D Graphics / Example

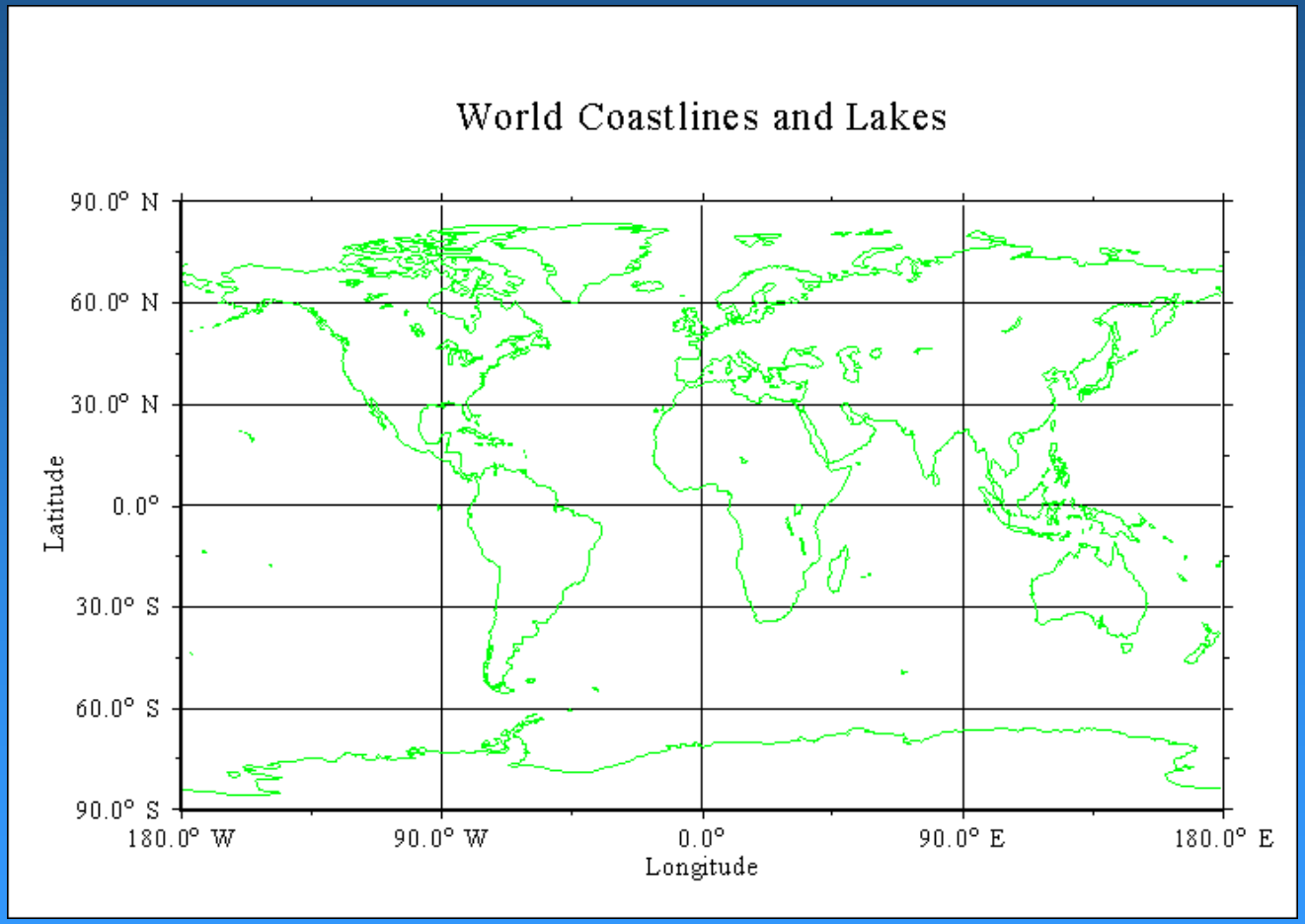


Geographical Projections

- **GRAFMP (XA, XE, XOR, XSTP, YA, YE, YOR, YSTP)** — plots a geographical axis system

- **CURVMP (XRAY, YRAY, ZRAY, N)** — plots curves
- **WORLD ()** — plots coastlines and lakes
- **SHDMAP (CMAP)** — plots shaded continents
- **PROJCT (COPT)** — selects the geographical projection
- **MAPBAS (CBAS)** — defines the used map data base
- **MAPFIL (CFIL)** — defines an external map file
- **SETCBK (Routine, 'MYPR')** — enables an user-defined projection

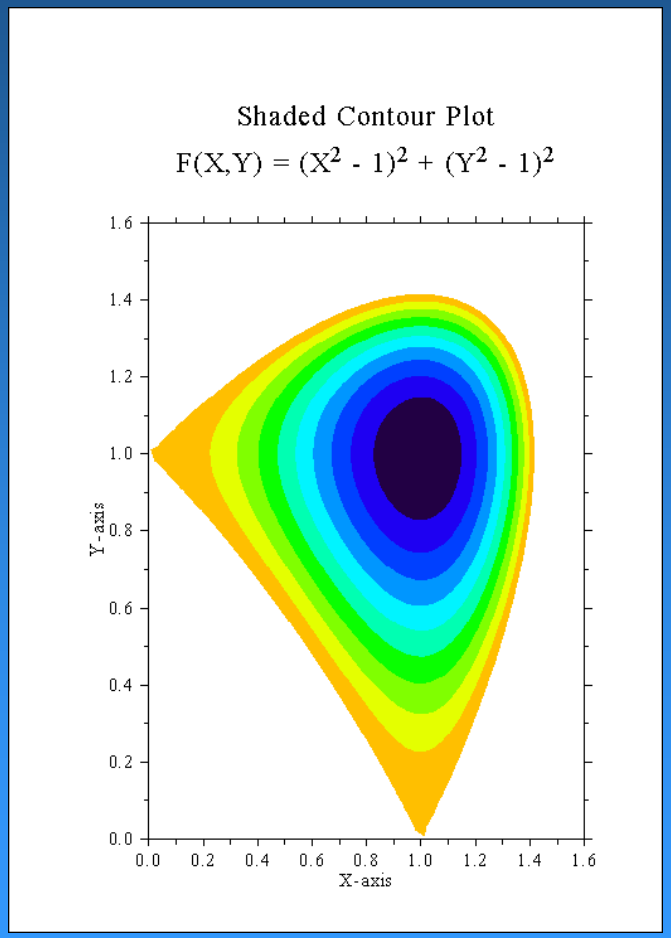
Geogr. Projections / Example



Contouring

• CONTUR (XRAY, N, YRAY, M, ZMAT, ZLEV)	plots contours of the function Z=F(X,Y)
• CONMAT (ZMAT, N, M, ZLEV)	plots contours
• CONTRI (XRAY, YRAY, ZRAY, N, I1RAY, I2RAY, I3RAY, NTRI, ZLV)	plots contours from triangulated data
• CONSHD (XRAY, N, YRAY, M, ZMAT, ZLVRAY, NLV)	plots filled contours of the function Z = F(X, Y)
• CONFLL (XRAY, YRAY, ZRAY, N, I1RAY, I2RAY, I3RAY, NTRI, ZLVRAY, NLV)	plots filled contours from triangulated data
• LABELS (COPT, 'CONTUR')	defines labels for contours
• SHDMOD (COPT, CKEY)	selects the algorithm used for contour filling

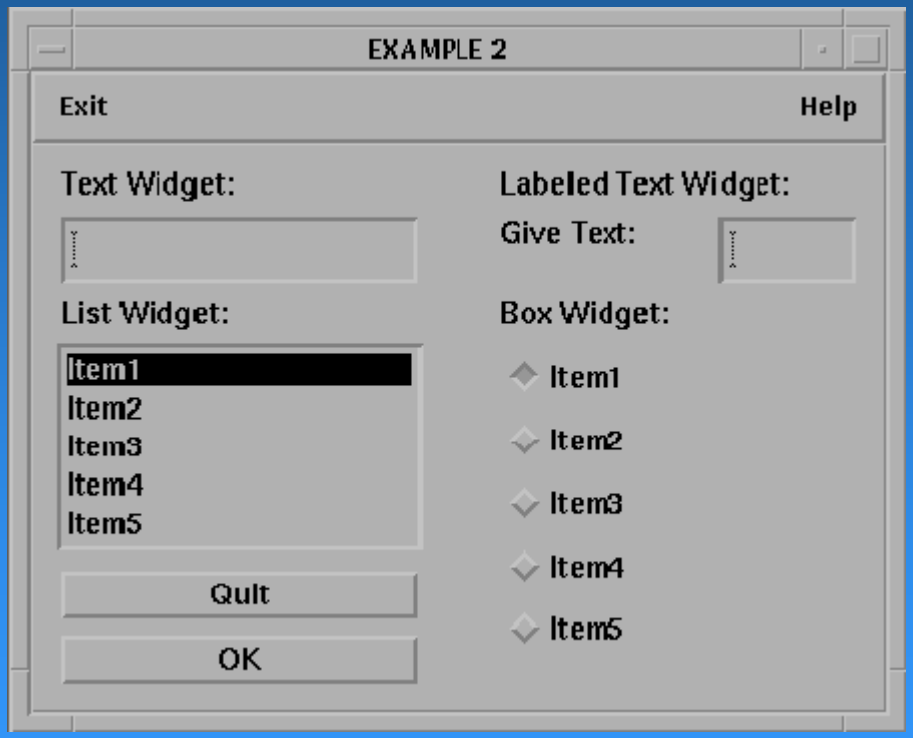
Contouring / Example



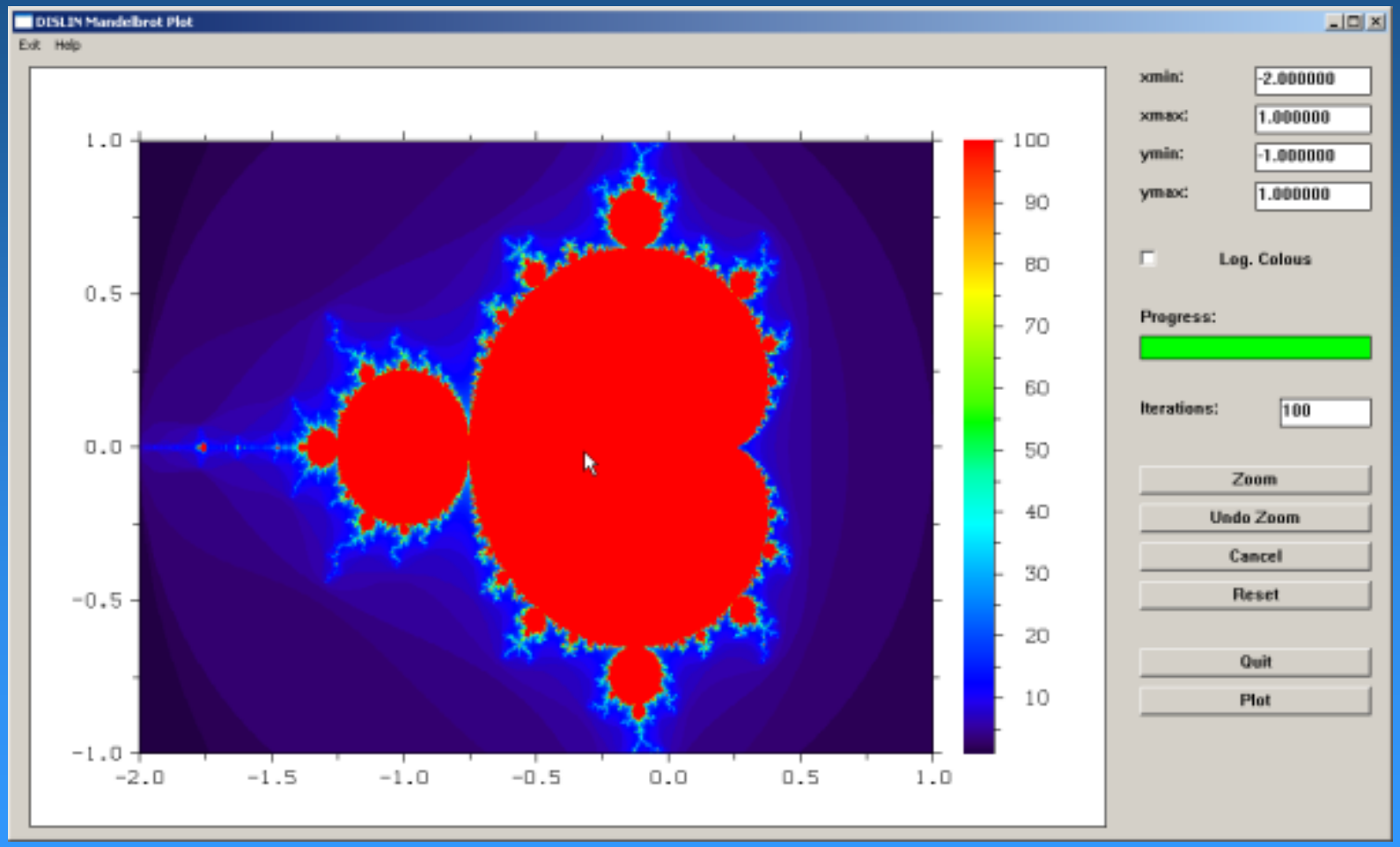
Widget Routines

• WGINI (COPT, ID)	creates a main widget
• WGFIN ()	terminates the widget routines
• WGBAS (IP, COPT, ID)	creates a container widget
• WGLAB (IP, CSTR, ID)	creates a label widget
• WGBUT (IP, CLAB, IV, ID)	creates a button widget
• WGTXT (IP, CSTR, ID)	creates a text widget
• WGFIL (IP, CLAB, CFIL, CMASK, ID)	creates a file widget
• WGLIS (IP, CLIS, ISEL, ID)	creates a list widget
• WGSCL (IP, CLAB, XMIN, XMAX, XVAL, NDEZ, ID)	creates a scale widget
• WGDRAW (IP, ID)	creates a draw widget
• WGPBUT (IP, ID)	creates a push button widget
• WGPBAR (IP, XMIN, XMAX, XSTP, ID)	creates a progress bar
• WGTBL (IP, N, M, ID)	creates a table widget

Widget Routines / Example 1



Widget Routines / Example 2



Quick Plots

• QPLOT (XRAY, YRAY, N)	curve plot
• QPLSCA (XRAY, YRAY, N)	scatter plot
• QPLBAR (XRAY, N)	plots a bar graph
• QPLPIE (XRAY, N)	plots a pie chart
• QPLCLR (ZMAT, NX, NY)	3-D colour plot
• QPLSUR (ZMAT, N, M)	surface plot
• QPLCON (ZMAT, N, M, NLV)	contour plot