

NAME

isopot – generate isopotential contour maps

SYNOPSIS

isopot [file]

DESCRIPTION

Isopot produces isopotential contour maps, from a matrix of voltage measurements. A simple, built-in drawing program lets you trace a diagram, over which the contour map will be drawn. It is not limited to isopotential maps; it can also be used to draw isotherms, isobars, or any similar contour map. The *isoprep*(1) program can be used to generate the required matrix of voltage measurements from runs of data captured by one of the capture programs (*dsepr*(1)).

If the optional *file* name argument is given, *isopot* will attempt to perform a *Load* operation on this file. (The file must be an *isopot* parameter file.) If no *file* is specified, you will have to select one later, or set all required parameters from scratch.

At the bottom of the display, *isopot* prints the following menu prompt line:

```
Draw Go Keep Load Measurements Plot Quit Set View
```

This is the *main* menu, the top level in a hierarchy of menus. To initiate an operation in this menu, or in any of the other menus in the hierarchy, type the first letter of an item in the menu. Some items will perform an operation and/or prompt you for input; other items will simply bring you to another menu, one level lower in the hierarchy. An alternative method of selection is to highlight the item you want from the menu, then hit RETURN. The *space bar* will cause the *next* item to be highlighted; the BACKSPACE key (or DEL key, if this is your *erase* key) will highlight the previous item. If an item is highlighted, the last line of the display briefly describes the choice, or shows the next menu. Pressing the ESCAPE key at any time will usually bring you back to the main menu. Some operations bring you back directly to the main menu after completion. Others leave you in some lower level menu, in which case the position in the menu hierarchy is shown at the left of the menu.

Draw

This selection allows you to draw the diagram over which the contour map will be plotted. It also allows you to position labels on the diagram, set coordinates for placement of the map, and import or export the diagram.

The *Mouse* and *Tablet* selections bring you into the "drawing program" section of *isopot*. If you use the *Mouse* selection, you will be able to draw using the standard pointing device on your graphics terminal. This is usually the mouse, but it can also be a joystick or a tablet. If you select *Tablet*, then you will be using the "Houston Instrument HIPAD Digitizer" as the pointing device. In either case, you will be using the selected pointing device to move the cursor, draw the diagram, and make selections from the drawing program's menus (including the "Quit" selection). Once you quit the drawing program, you are returned to the *isopot* menus, and the pointing device is no longer used. See *DRAWING PROGRAM* below for more details.

In order to use the HIPAD digitising tablet as your pointing device, there are a few steps required to set it up. First, the HIPAD must be connected to the proper serial port on your system. (Currently **P7** on the MC535, and **PIB** on the MC5400.) Note that the connector on the back of the tablet is not a standard RS232 connector. It requires a special cable, not just any RS232 cable, and this cable is not reversible. You must also ensure that the environment variable **INITABLET** is properly set, to indicate which special file is used to read the serial port, and which command is used to initialise it. Normally, it should be set to something like: "stty 4800 cs8 istrip -parenb icanon < /dev/hipad". The < must be present, since *isopot* looks for the device name after the last < in the string.

You can export the diagram by selecting *Draw/File/Write*. You will be prompted for the name of the diagram file to be created. If it exists, it will be overwritten. The diagram is stored in the file as ASCII text. It consists of one or more series of coordinate pairs, with each series terminated by a single "-1". A series represents a segment of connected points, and separate series are not interconnected, although

they can intersect. The coordinates are integers representing 100ths of millimetres.

The *Draw/File/Read* selection allow you to import a diagram file of the same format. You will be prompted for the name of the diagram file to be read. If you currently have a diagram in memory, and you haven't written it out to a file yet, it will be lost.

Go

This selection attempts to perform the contour map generation. It will stop if it detects a parameter which is needed, but has not been properly set. Only the first error is reported, even if several parameters still need to be set. The *View/All* operation will give you a list of all parameters required.

Once all parameters have passed the test, the diagram is drawn, then the isopotential contours are calculated and drawn.

Since the number of measurement points in the matrix is normally relatively small, it would not be possible to generate a reasonable contour map without somehow interpolating levels between the given points. *Isopot* uses a "Bicubic interpolating spline" function, described in *Spline Algorithms for Curves and Surfaces* by H. Späth, to fit a continuous surface through the given points over the entire area of the matrix.

The program can then follow contours at various levels on this continuous surface. It first searches around the borders of the map area for level transitions, then follows the contours around, staying at the same level, until the contour line hits the border at another point. These are the open loops. Then, it scans inside the map area for level transitions, and follows those contours around until it reaches the starting point. These are the closed loops.

If you press the ESCAPE key while the contours are being drawn, *isopot* will finish drawing the current contour line, then cancel the *Go* operation. Any other key pressed during this operation is ignored (and thrown away). If the standard input is redirected to read from a file, instead of from the keyboard, this feature is disabled. This will allow you to follow the **g** command with other commands in this file. This feature also works with the *Plot/File* and the *Plot/Plotter* operations.

Keep

This selection allows you to save your current set of *isopot* parameters in a file, for later use. This includes all parameters related to the placement and precision of the contour map, the display options, and the plotting options. It also includes the current measurement matrix, the diagram, and the labels.

You will be prompted for a parameter file name. The current file, if one was loaded, is the default. The file name suffix **.iso** is appended to the given file name, if it has no suffix. The parameters are then saved in the named file, overwriting any previous contents.

Load

This operation allows you to load in a new set of *isopot* parameters, from a file previously created by the *Keep* operation described above.

First, if any of your current parameters have been modified, *isopot* asks you if you want to save them. If you answer **N**, it will load the new ones, discarding the current ones. If you answer **Y**, it will perform a *Keep* operation, i.e. it will ask you in which file you want to *keep* your current parameters.

Next, you are prompted for the name of the parameter file to *load*. Once the name is entered, the parameters will be loaded from the file, replacing your current set. If a file with the given name does not exist, and the name does not have the **.iso** suffix, then this suffix will be added to the name.

Measurements

This selection is used to fetch the measurement matrix needed to generate the contour map. The usual method to get these measurements is the *Measurements/Read-matrix* selection, which reads in the matrix from an ASCII text file. You will be prompted for the name of the measurement file to be read. If you currently have a measurement matrix in memory, it will be overwritten.

The measurement matrix consists of three or more *tracks*, each containing the same number (three or more) of measurements taken at a number of *levels* (or depths). The matrix can appear in the file in either "track-major" ordering or "level-major" ordering. For "level-major" ordering, the file begins with

two integers: the number of levels, then the number of tracks. Following these is the matrix of real numbers: all measurements across the first level (in all tracks), then all measurements at the second level, and so on. For "track-major" ordering, the file begins with three integers: first, a "-1," then the number of tracks, and finally the number of levels. Following these is the matrix: all measurements down the first track (at all levels), then all measurements down the second track, and so on. The units in which these measurements are given is totally arbitrary. They can represent volts, millivolts, degrees, millimetres, or anything else, as long as all measurements in the matrix are given in the same units.

After the matrix, the file can contain the positions of the tracks and levels. The track positions are specified by the keyword **tracks**, followed by a real number for each track position. The levels (or depths) are specified by the keyword **levels**, followed by a real number for each level. The units in which these numbers are given are also arbitrary; they are only used to specify the relative spacing of tracks and levels. If these are omitted, even intervals between tracks and/or levels are assumed.

The *isoprep* program generates measurement matrices, in "track-major" order, from runs of captured data. Each run it uses corresponds to a single track. The depth information is taken from one of the captured channels. See *isoprep(1)* for details.

The *Measurements/Add-matrix* selection will also read in a matrix from an ASCII text file, and will add it to the current measurement matrix. You are first prompted for a weight, or scaling factor, by which the measurements in the matrix being read will be multiplied. You will then be prompted for the name of the measurement file to be read. The dimensions of the new matrix must match those of the current matrix, and the levels and track positions associated with the two matrices must also match.

The *Measurements/Clear* selection will clear out your current matrix. This will allow you to start a new weighted sum of matrices, using the *Add-matrix* operation, to give a weight to the first matrix of the sum. (The *Read-matrix* operation also clears out your current matrix, so you can use it to start a new sum, but it will always use a weight of **1**, rather than asking you for a weight.)

The *Measurements/Write-matrix* selection will write out the current measurement matrix, and associated levels and track positions, to an ASCII text file. You will be prompted for the name of the measurement file to be created. The default file name is the name of the last measurement file written or read. The program will ask for confirmation before overwriting an existing file.

Plot

This selection brings you to the plotting sub-system, which presents you with a secondary menu. See *PLOTTING* below.

Quit

This selection, from the main menu, allows you to exit the program. It first asks you for confirmation. If you choose **No**, you will return to the main menu. If you choose **Yes**, the program will terminate. Before exiting, if any parameters have been modified, you are asked if you want to save them. If you answer **Y**, a *Keep* operation is performed, prompting you for a parameter file name.

A *Quit* operation from any lower-level menu simply brings you up one level.

Set

This selection brings you to the parameter setting sub-system, which lets you modify the various parameters controlling the analysis and display of data. See *PARAMETER SETTING* below.

View

This selection allows you to examine the current settings of the parameters, or view a shading pattern over the current display. The *View/All* selection clears the screen, and displays the current parameter settings.

The *View/Shading* selection draws a pattern over the current display, shading alternate levels in the data. The pattern is "exclusive-or'ed" with the current graph, so a second *View/Shading* selection will erase the first. The shading density varies with the "# steps in map" parameter. Also, the levels shaded are determined by the "Level gap" parameter. The purpose of this is to verify the effect of some of your parameter settings. It indicates the position of the map on the diagram, and the precision selected by the "Level

gap." If done after a *Go* operation, it will also help identify any contour lines which may have been missed, due to a too small setting for the "# steps in map" parameter.

!command

Whenever the menu line has just been printed, instead of typing a letter to select a menu item, you can type an exclamation point, followed by any UNIX command, then hit RETURN. A UNIX shell is invoked to interpret and execute this command. This can be done at any level in the menu hierarchy, except from the drawing program menus, when cursor tracking is enabled. You can recall and edit the last command entered, by hitting the "up arrow" key, or Control-K, after typing the exclamation point.

\$ or %

Whenever the menu line has just been printed, you can also type either a dollar sign (\$), to invoke an interactive Bourne shell, or a percent sign (%), to invoke an interactive C shell. In either case, the shell will continue accepting commands until you type a **Control-D**, to exit from the shell, and return to *isopot*.

? or /

Whenever the menu line has just been printed, you can also type either a question mark (?), or slash (/), to get a short description of all choices available in the current menu.

DRAWING PROGRAM

The *Draw/Mouse* or *Draw/Tablet* selection brings you into the "drawing program" section of *isopot*. From this point on, until you quit the drawing program, all menu selections are made using the chosen pointing device. Point the cursor to the desired selection, and click the button. On a multi-button pointer, any button should do. With a stylus pointer, pressing down on the stylus makes the selection. If you are using the mouse instead of the tablet, all three buttons are treated the same. The keyboard is used only when adding or deleting text from labels.

Most of the screen is used as the *drawing area*. The box at the bottom of the screen is the drawing program's menu. There is always one item in the drawing program's menu which is underlined. This indicates the current mode of operation. Pressing the button while the cursor is in the drawing area has different effects, depending on which mode is currently selected. Initially, the *Trace* mode is selected, allowing you to trace out the diagram.

Undo

This selection undoes the last change made while in the current mode. For example, in *Trace* mode, selecting *Undo* will remove the last segment drawn. Selecting it a second time will undo the *Undo*.

Erase

This selection will erase the *entire* diagram, allowing you to start over with a clean slate.

Trace

This selection will put you in the mode which allows you to trace the diagram using the pointing device. Usually, this will be done with a tablet, but you can use the mouse for rough sketches. When using a tablet, be sure to position your original diagram on it in such a way that it won't run into the menu area.

Once *Trace* is selected, you can move the cursor into the drawing area, to a place where you want to start tracing. Hold down the button, and move the pointing device along to draw a continuous segment of the diagram. When you release the button, the program stops tracing, to allow you to point to another place and begin tracing another segment.

When tracing a diagram with the HIPAD, the resulting diagram, when plotted on the pen plotter, will be the same size as the original, unless you used the *ZoomIn* option (see below), or reduced the plot by using the *layout(1)* program.

Labels

This selection will cause the contour map area to be shaded, so you can see where on the diagram the contour lines will be drawn, and will place you in the label setting mode. In this mode, the menu is changed to have only three selections, *Text* and *Markers*, which select one of two label types, and *Quit*, which returns you to the previous drawing program menu. There is no *Undo* facility for label setting.

The *Text* label type is initially selected.

While in the *Labels* mode, with the *Text* type selected, you can point to any place in the drawing area, and click the button. This places a label handle (a small square box) on the display. You can also point to an existing label handle, hold down the button, and move the handle. If you move it off the bottom of the drawing area it will be removed.

The last handle placed has an **X** through it, indicating it is the current label handle. You can select another by pointing to it and clicking the button. Any text you type on the keyboard will appear over the current label handle. You can erase the text by hitting the BACKSPACE key (or DEL key, if this is your *erase* key) to erase one character at a time, or you can type a **Control-U** to erase the entire string.

Any label handle you place over the contour map area, which has no text above it, indicates a numeric label. In the final graph, the levels at the contours closest to these will be indicated. The label handles will not be shown in the final graph, whether the labels contain text or not; the handles are just used for positioning the labels.

Special processing is performed on any text label which contains a dollar-sign character (\$). This character is used to indicate the beginning of one of the following substitutions. A sequence of the form "\$\$" in a label is replaced by a single dollar-sign character.

A sequence of the form "\$<name>" in a label is replaced by the value of the parameter indicated by the given *name*. The parameter names are those indicated by a *View/All* operation. For example, "\$<Level gap> mV intervals" will yield something like "0.025 mV intervals" on the final display.

A sequence of the form "\${name}" in a label is replaced by the value of the environment variable indicated by the given *name*. For example, "User: \${LOGNAME}" will yield something like "User: fred" on the final display.

A label containing the sequence "\$I" is replaced by a three line legend indicating the pen colour and line type used for negative, zero, and positive contours (i.e. those below, on, and above the threshold level selected by the *Set/Disp-opt/Line-types/Thresh.* operation). If a number follows the sequence "\$I", it is taken as the length, in millimetres, of the sample lines in the legend (20 mm by default).

A label containing a sequence of the form "\$s*number units*" is replaced by a scale legend. Any text after the "\$s" will appear as a label, and below this label, a centered horizontal line is drawn. The line's length is determined by the *number* given, divided by the distance between the smallest and largest levels (depths) in the measurement matrix, and multiplied by the distance between the *Origin* and *Depth* indicated below. For example, if the Origin and Depth are 88 mm apart on the diagram, and this corresponds to an actual depth of 4 mm, as indicated in the level information of the measurement matrix, then the label "\$s1 mm" will yield the label "1 mm", with a 22 mm line below it, on the final display, indicating a magnification factor of 22. The *number* must be given in the same units as the level information of the measurement matrix for this to work correctly.

While the **Markers** input type is selected, you can point to any place in the drawing area, and click the button. This places a marker, or tag, on the display at that location. You can also point to an existing marker, hold down the button, and move the marker. If you move it off the bottom of the drawing area it will be removed.

The last marker placed has a square box around it, indicating it is the current marker. You can select another marker by pointing to it and clicking the button. You can change the size and appearance of the current marker, and all subsequent markers, by hitting single keys on the keyboard. The size can be selected by hitting any digit key, to select half-millimetre increments. The initial size is **6**, meaning 3 mm wide, and can go up to **9**, or 4.5 mm. A size of **0** will give just a single point. The type of marker shown can be selected with one the following keys:

- . A solid (filled) circle.
- o A circle outline (not filled).
- b A solid square block.
- s A square outline.

- t** A triangle outline.
- d** A diamond outline (square rotated 45 degrees).
- x** An X-shaped cross.

The initial type is **o**, the circle outline.

Origin, Depth and Width

Selecting any one of these allows you to place one of three corners of the contour map somewhere over your diagram. Since the contour map is always drawn in a parallelogram, the fourth corner is calculated from the other three. The *Origin* is the top point (first level) of the first track in your measurement matrix. The *Depth* is the last point at the bottom of the first track, and the *Width* is the top point of the last track. (When the origin is set in this fashion, the depth and width go along for the ride, maintaining the shape of the parallelogram.)

When setting any one of these three points, the bottom of the display will show the distance from the origin of the *Depth* and the *Width*, as well as the angles of the lines from the origin to these points.

ZoomIn

This selection will put you in the mode which allows you to magnify the diagram. Once selected, you can move the cursor into the drawing area, to a corner of the area you want to zoom in to. Hold down the button, and move the pointing device along to the opposite corner. A box will surround the area you are selecting, and the magnification factors for both X and Y are shown at the bottom left. When you release the button, the area selected is blown up to fill the entire drawing area. The same magnification will be applied to the final graph.

ZoomOut

This selection sets the zoom box coordinates to cover the entire original drawing area, cancelling the magnification. It also places you in the *ZoomIn* mode, so you can zoom in again, starting with the entire area.

Quit

This selection brings you out of the drawing program, and back to the main menu of *isopot*.

PARAMETER SETTING

The *Set* selection, from the main menu, is used to set the various parameters. The hierarchy of menus under this selection is arranged so that related parameters are grouped together. After setting a parameter, you are usually left in the last menu you encountered, to simplify setting groups of related parameters.

All of these parameters are set in "text mode", where you are prompted for a value for the parameter, and you type in the number or string desired.

Coord.

This selection allows you to set the X and Y coordinates for the contour map's *Origin*, *Depth*, and *Width*, as well as the coordinates of the four sides of the "Zoom box." All of the coordinates are "absolute" values, specified in 100ths of millimetres. The depth and width are *not* specified relative to the origin. These parameters can also be set visually, in the "drawing program" section of *isopot*.

Disp-opt

This selection allows you to set various display options. The *Main-title* and *Description* are two text lines which are displayed at the top of the graph. They can be suppressed, without erasing them, by setting the *Top-titles* option to N.

The *Line-types* selection brings you to a menu where you can change the line types used to draw the contour lines. Here, the *View* selection shows you the line types available. You can use any of these line types to draw contours of levels *Above*, *Below*, or *On* the threshold level. The *Thresh.* selection lets you change this threshold level, which is usually 0. Due to the relatively limited screen resolution, dotted and dashed lines will not wrap around curves as nicely on the screen as on the plotter, and may appear solid at some places.

The *Pens* selection brings you to a menu where you can change the plotter pens used to draw the contour lines. You can use any pen number, from 0 to 8, to draw contours of levels *Above*, *Below*, or *On* the threshold level. The threshold is the same as for *Line-types* above. If you set any of these three pen numbers to **0**, as they are set initially, then the corresponding levels will be drawn using the "Data pen," as selected by the *Plot/Data option*.

The *Overlay* selection brings you to a menu where you can choose to overlay two types of markers on your diagram. You can enable or disable the marking of *Tracks*, which are shown as lines at the track positions given in your measurement matrix file, from the first level to the last. You can also enable or disable the marking of *Points*, which are shown as circles at all intersections of track positions and levels given in your measurement matrix file.

The *3-D* selection brings you to a menu where you can set various parameters for a three-dimensional display of the contour map. The program will generate a 2-D projection of the 3-D figure, from the specified perspective. You can specify how high contours will climb on the Z-axis, by setting the *Level-disp.* parameter. It indicates the distance, in 100ths of millimetres, from one contour level to the next. For proper perspective, you must give the distance of the diagram from the screen and from the viewer, also in 100ths of millimetres. A *Screen-distance* of 0 (the default) is acceptable, and means that the centre of the diagram is at the centre of the screen. Initially, the *Viewing-distance* is 0, which disables 3-D plotting. To enable 3-D plotting, set this parameter, usually to something like **100000**, or 1 metre. The *Inclination*, *Tilt* and *Rotation* parameters will rotate the viewer's perspective around the X, Y and Z axes of the diagram, respectively. These angles are specified in degrees. The *Eye-shift/Horizontal* and *Eye-shift/Vertical* parameters allow shifts in the viewer's perspective. One might generate two representations of the same figure: one with a horizontal shift of -3500 (or 35 mm to the left), and the other with a horizontal shift of 3500, representing the views seen by the left and right eyes. (The distance between your eyes is about 70 mm.) By viewing the two plots stereoscopically, a 3-D image will be seen.

Graph

This selection allows you to set options controlling the contour scanning, contour following, and shading algorithms. They are there for debugging purposes, and it is unlikely that you will need to change them.

Level-gap

This selection allows you to set the level transition from one contour line to the next. It must be given in the same units as the numbers in the measurement matrix. For example, if the measurements are in millivolts, and the level gap is set to **0.05**, then contour lines are drawn at 0 mV, ± 0.05 mV, ± 0.1 mV, ± 0.15 mV, and so on. Decreasing this number will increase the density of contour lines.

Quit

This selection returns you to the main menu.

Steps

This selection allows you to set the "# steps in map" parameter, which controls the resolution for contour scanning, contour following, and shading. It represents the number of steps into which a track is broken to calculate the step size. (step size = track length / # steps)

Increasing this parameter will increase the precision of the contour lines, but will also increase (quadratically) the amount of time it takes to draw the map. Decreasing it will speed things up, but it may cause some contour lines to be missed, or make some contour lines a little jagged. The default value should be large enough for most data, unless the level gap is quite small in relation to the range of measurements in the matrix. A larger number of steps may be needed if the density of contour lines is quite high.

PLOTTING

The *Plot* selection is used to produce a plot similar to what would be displayed on the screen by the *Go* operation. A new menu is presented to you, allowing you to change certain plotting parameters. The choices are:

Axes, Data, and Markers

These selections allow you to change the pen numbers used to plot axes, data points, and markers, respectively. (The diagram and titles are drawn with the "axes" pen, the contour lines are drawn with the

"data" pen, and the labels are drawn with the "markers" pen.) You will be prompted to enter a pen number, an integer from 0 to 8. Selecting pen number 0 suppresses plotting of those items.

File

This selection allows you to store the HPGL commands used to plot the graph in a file. You will then be able to plot this graph, at a later time, by invoking *hardcopy*(1). You will be prompted to enter the file name. The graph will be stored in the given file, overwriting any previous contents.

Plotter

This selection allows you to plot the graph directly to the plotter. The *hardcopy* program is invoked to plot the displayed graph. Before beginning this operation, make sure the plotter is powered up, on-line, and that a clean sheet of paper has been loaded. Also make sure the plotter's *autoload* option is enabled.

Quit

This selection returns you to the main menu.

Screen

This selection allows you to change the "Plot screen redraw" option. If this option is enabled, the graph will be redrawn on the screen while it is being sent to the file or the spooler. If disabled, the current contents of the screen will remain, while the plot is generated.

Text

This selection allows you to change the "Plot text" option. If this option is disabled, the generated plot will not contain any text; all titles and labels will be stripped from it, leaving only the diagram, contour lines, and markers. This is useful when the plot is reduced in size to the point where the text would be illegible. If enabled, the generated graph will be complete with all titles and labels.

Video

This selection does not affect the pen plotter, but instead produces a printed copy of the video display's current contents – a screen dump – by invoking *sdump*(1). The same thing can be accomplished by pressing the *quit* key, normally **Control-B**. The *Plot/Video* operation has the advantage that it can be used even when *isopot* is reading its commands from a file, rather than the terminal. Also, the *Plot/Video* operation clears the menu area before performing the screen dump.

ERROR HANDLING

Although this program has been thoroughly tested, it is possible, in a program of this complexity, for some bugs to slip through. Severe errors, such as a memory fault, can cause the program to abort, producing a core dump. If this happens, you should keep the core dump around, so it can be examined later.

Certain other errors are caught by the program, triggering an "INTERNAL ERROR" message. If this happens, the current set of parameters will automatically be saved in a special directory, for later examination. You will be able to continue in the program, but bear in mind that any results produced at the time of the error will almost certainly be incorrect.

If you detect a bug which does not cause one of the above actions, but produces results which appear incorrect, *save your current parameters* so that the error can be reproduced, and make a note of the problem.

In all of these cases, keep the relevant data and parameter files on-line, and report the bug or error.

When *isopot* reports an error, whether an internal error or a user error, it asks you to hit a key to continue. After reading the message, hit a key from the main keyboard, such as SPACE, RETURN, or ESCAPE. The program will then return to the current menu, and allow you to continue.

If you redirected the standard input to the program, so that it reads its commands from a file, rather than the terminal, then errors (user and internal) will be handled differently. Instead of printing the message, reading the next "keystroke" from the file, and continuing, these errors are fatal; the program will show the message, and then terminate. However, warning messages are not fatal, and the program will simply continue.

OPTIONS

Normally, the only command line option given to *isopot* is the name of the parameter file to be loaded.

The command, "**isopot -core** *corefile*", will cause *isopot* to start up in the usual way, then search for the parameters in the given *corefile*, a core dump previously produced by *isopot*. This allows you to recover parameters after a fatal error, and is usually used only for debugging. It does not allow recovery of the diagram or labels.

The command, "**isopot -dispmenus**", will cause *isopot* to print a listing of its hierarchy of menus, to the standard output, then quit. In this mode, the graphics terminal is not required.

X WINDOW SUPPORT

When the X Window version of this program is run on an X Window terminal, a new window will be shown for displaying program output. Unless the input was redirected from a file, it will be taken from the keyboard when this window is the "input focus", i.e. the active window. When running this way, it is essentially detached from the *xterm* window from which you run the command, and it can be run in the background.

As for most other X Window programs in this package, the following X command line options are accepted:

-cursor *num*

You can specify any cursor number (not cursor names) in the Standard Cursor Symbols described in the *X Window System User's Guide* using the **-cursor** or **-curs** option. The default value is 68, the left pointer symbol. This can also be specified using the **CURSOR** environment variable.

-display [*host*]:*server*[,*screen*]

By default, the host, server and screen, which identify your X terminal, are obtained from the environment variable **DISPLAY**. However, you can also specify them using the **-display** or **-disp** option. The *host* is the name of the machine or terminal, on which the window is to be created, *server* is the server number, and *screen* is the screen number (default is 0).

-fn *font*

You can specify any fixed-width font to be used for text display using the **-fn** or **-font** option. The default value is **9x15** if the window is at least 900 pixels wide initially, and **fixed** otherwise. This can also be specified using the **SCRFONT** environment variable.

-geometry *geometry*

By default, the program will create a window that covers most of the display. However, you can specify custom window dimensions and location using the **-geometry** or **-geom** option. The format of the *geometry* string is described in the *X Window System User's Guide*. This can also be specified using the **GEOMETRY** environment variable.

-iconic

This option will cause the program to start up in an iconified state, which can be reactivated by double-clicking on the icon.

-rev This option will cause the program to use reverse video in its display window.

-title *name*

This option will change the name shown on the window's title bar, which is usually just the program name. It can also be given as **-name** *name*.

NOTES

Isopot should be run from a graphics terminal, or X terminal, in order to view generated graphs. It can be run from other types of terminals, to plot out graphs, but no graphs will be generated on screen.

FILES

*.iso	the isopot parameter file
/usr/neuro/bugs/iso*.iso	parameters saved after internal error

SEE ALSO

isoprep(1), fixdepths(1), analysis(1), cap(1), dsepr(1), hardcopy(1), layout(1), sdump(1)