Package ‘PBSmodelling’

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Title GUI Tools Made Easy: Interact with Models and Explore Data

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Depends R (>= 2.15.0)

Imports methods, tcltk, XML

Suggests PBSmapping, deSolve, KernSmooth

NeedsCompilation yes

SystemRequirements BWidget

Description Provides software to facilitate the design, testing, and operation of computer models. It focuses particularly on tools that make it easy to construct and edit a customized graphical user interface (GUI). Although our simplified GUI language depends heavily on the R interface to the Tcl/Tk package, a user does not need to know Tcl/Tk. Examples illustrate models built with other R packages, including PBSmapping, PBSddesolve, and BRugs. A complete user's guide 'PBSmodelling-UG.pdf' shows how to use this package effectively.

License GPL (>= 2)

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http://code.google.com/p/pbs-tools/

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addArrows

Description

Call the arrows function using relative (0:1) coordinates.

Usage

addArrows(x1, y1, x2, y2, ...)

Arguments

x1  x-coordinate (0:1) at base of arrow.
y1  y-coordinate (0:1) at base of arrow.
x2  x-coordinate (0:1) at tip of arrow.
y2  y-coordinate (0:1) at tip of arrow.
...  additional parameters for the function arrows.

Details

Lines will be drawn from \((x1[i], y1[i])\) to \((x2[i], y2[i])\).
addLabel

Author(s)
Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also
addLabel, addLegend

Examples

code

Add a Label to a Plot Using Relative (0:1) Coordinates

Description
Place a label in a plot using relative (0:1) coordinates

Usage
addLabel(x, y, txt, ...)

Arguments
x x-axis coordinate in the range (0:1); can step outside.
y y-axis coordinate in the range (0:1); can step outside.
txt desired label at (x, y).
... additional arguments passed to the function text.

Author(s)
Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also
addArrows, addLegend
addLegend

Add a Legend to a Plot Using Relative (0:1) Coordinates

Description

Place a legend in a plot using relative (0:1) coordinates.

Usage

addLegend(x, y, ...)

Arguments

x x-axis coordinate in the range (0:1); can step outside.

y y-axis coordinate in the range (0:1); can step outside.

... arguments used by the function legend, such as lines, text, or rectangle.

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

addArrows, addLabel

Examples

```r
local(envir=.PBSmodEnv, expr={
  oldpar = par(no.readonly=TRUE)
  resetGraph()
  add.legend(0.75, seq(from=0.9, to=0.1, by=-0.10), c('a','b','c'), col="#0033AA")
  par(oldpar)
})
```
calcFib  Calculate Fibonacci Numbers by Several Methods

Description
Compute Fibonacci numbers using four different methods: 1) iteratively using R code, 2) via the closed function in R code, 3) iteratively in C using the .C function, and 4) iteratively in C using the .Call function.

Usage
calcFib(n, len=1, method="C")

Arguments
n  nth fibonacci number to calculate
len  a vector of length len showing previous fibonacci numbers
method  select method to use: C, Call, R, closed

Value
Vector of the last len Fibonacci numbers calculated.

Author(s)
Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

calcGM  Calculate the Geometric Mean, Allowing for Zeroes

Description
Calculate the geometric mean of a numeric vector, possibly excluding zeroes and/or adding an offset to compensate for zero values.

Usage
calcGM(x, offset = 0, exzero = TRUE)

Arguments
x  vector of numbers
offset  value to add to all components, including zeroes
exzero  if TRUE, exclude zeroes (but still add the offset)
Value

Geometric mean of the modified vector $x + \text{offset}$

Note

NA values are automatically removed from $x$

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Examples

```r
local(envir=.PBSmodEnv,expr={
  calcGM(c(0,1,100))
  calcGM(c(0,1,100), offset=0.01, exzero=FALSE)
})
```

---

**calcMin**

*Calculate the Minimum of a User-Defined Function*

Description

Minimization based on the R-stat functions *nlm*, *nlminb*, and *optim*. Model parameters are scaled and can be active or not in the minimization.

Usage

```r
calcMin(pvec, func, method="nlm", trace=0, maxit=1000, reltol=1e-8,
  steptol=1e-6, temp=10, repN=0, ...)
```

Arguments

- **pvec**: Initial values of the model parameters to be optimized. `pvec` is a data frame comprising four columns ("val", "min", "max", "active") and as many rows as there are model parameters. The "active" field (logical) determines whether the parameters are estimated (T) or remain fixed (F).

- **func**: The user-defined function to be minimized (or maximized). The function should return a scalar result.

- **method**: The minimization method to use: one of *nlm*, *nlminb*, Nelder-Mead, BFGS, CG, L-BFGS-B, or SANN. Default is *nlm*.

- **trace**: Non-negative integer. If positive, tracing information on the progress of the minimization is produced. Higher values may produce more tracing information: for method "L-BFGS-B" there are six levels of tracing. Default is 0.

- **maxit**: The maximum number of iterations. Default is 1000.
**calcMin**

- **reltol**: Relative convergence tolerance. The algorithm stops if it is unable to reduce the value by a factor of $\text{reltol} \times (\text{abs}(\text{val}) + \text{reltol})$ at a step. Default is $1e^{-8}$.

- **steptol**: A positive scalar providing the minimum allowable relative step length. Default is $1e^{-6}$.

- **temp**: Temperature controlling the "SANN" method. It is the starting temperature for the cooling schedule. Default is $10$.

- **repN**: Reports the parameter and objective function values on the R-console every repN evaluations. Default is 0 for no reporting.

- **...**: Further arguments to be passed to the optimizing function chosen: nlm, nlminb, or optim. Beware of partial matching to earlier arguments.

**Details**

See `optim` for details on the following methods: Nelder-Mead, BFGS, CG, L-BFGS-B, and SANN.

**Value**

A list with components:

- **fout**: The output list from the optimizer function chosen through method.
- **iters**: Number of iterations.
- **evals**: Number of evaluations.
- **cpuTime**: The user CPU time to execute the minimization.
- **elapTime**: The total elapsed time to execute the minimization.
- **fminS**: The objective function value calculated at the start of the minimization.
- **fmine**: The objective function value calculated at the end of the minimization.
- **Pstart**: Starting values for the model parameters.
- **Pend**: Final values estimated for the model parameters from the minimization.
- **AIC**: Akaike’s Information Criterion
- **message**: Convergence message from the minimization routine.

**Note**

Some arguments to `calcMin` have no effect depending on the method chosen.

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`scalePar, restorePar, calcMin, GT0`

In the stats package: nlm, nlminb, and optim.
Examples

```r
local(envir=.PBSmodEnv,expr={
  Ufun <- function(P) {
    Linf <- P[1]; K <- P[2]; t0 <- P[3]; obs <- afilen Len;
    pred <- Linf * (1 - exp(-K*(afilen age-t0)));
    n <- length(obs); ssq <- sum((obs-pred)^2);
    return(n*log(ssq)); }
  oldpar = par(no.readonly = TRUE)
  afilen <- data.frame(age=1:16, len=c(7.36,14.3,21.8,27.6,31.5,35.3,39,
                                    41.1,43.8,45.1,47.4,48.9,50.1,51.7,51.7,54.1));
  pvec <- data.frame(val=c(70,0,5,0), min=c(40,0.01,-2), max=c(100,2,2),
                     active=c(TRUE,TRUE,TRUE), row.names=c("Linf","K","t0"),
                     stringsAsFactors=FALSE);
  alist <- calcMin(pvec=pvec, func=Ufun, method="nlm", steptol=1e-4, repN=10);
  print(alist[-1]); P <- alist&Pend;
  #resetGraph();
  expandGraph();
  xnew <- seq(afilen age[1], afilen age[nrow(afilen)], len=100);
  ynew <- P[1] * (1 - exp(-P[2]*(xnew-P[3])));
  plot(afilen); lines(xnew, ynew, col="red", lwd=2);
  addlabel(.05,.88,paste(paste(c("Linf","K","t0"),round(P,c(2,4,4)),
                             sep=" "),collapse="\n"),adj=0,cex=0.9);
  par(olddpar)
})
```
Details

Handline surveys for rockfish have been conducted in Johnstone Strait (British Columbia) and adjacent waterways (126° 37'W to 126°53'W, 50°32’N to 50°39’N) since 1986. Yamanaka and Richards (1993) describe surveys conducted in 1986, 1987, 1988, and 1992. In 2001, the Rockfish Selective Fishery Study (Berry 2001) targeted quillback rockfish *Sebastes maliger* for experiments on improving survival after capture by hook and line gear. The resulting data subsequently have been incorporated into the survey data series. The most recent survey in 2004 essentially repeated the 1992 survey design. Fish samples from surveys have been supplemented by commercial handline fishery samples taken from a larger region (126°35’W to 127°39’W, 50°32’N to 50°59’N) in the years 1984-1985, 1989-1991, 1993, 1996, and 2000 (Schnute and Haigh 2007).

Note


Source

Fisheries and Oceans Canada - GFBio database:


References


Examples

```r
local(envir=.PBSmodEnv,expr=
  oldpar = par(no.readonly=TRUE)
  # Plot age proportions (blue bubbles = survey data, red = commercial)
  data(CCA.qbr,envir=.PBSmodEnv); clrs=c("cornflowerblue","orangered")
  z <- CCA.qbr; cyr <- attributes(z)$cyr;
  z <- apply(z,2,function(x){x/sum(x)}); z[,cyr] <- -z[,cyr];
  x <- as.numeric(dimnames(z)[[2]]); xlim <- range(x) + c(-.5,.5);
  y <- as.numeric(dimnames(z)[[1]]); ylim <- range(y) + c(-1,1);
  expandGraph(mgp=c(2,.5,0),las=1)
  plotBubbles(z,xval=x,yval=y,powr=.5,size=0.15,clrs=clrs, xlab="Year",ylab="Age",cex.lab=1.5)
  addLegend(.5,1,bty="n",pch=1,cex=1.2,col=clrs, legend=c("Survey","Commercial"),horiz=TRUE,xjust=.5)
  par(oldpar)
)
```
chooseWinVal  

*Choose and Set a String Item in a GUI*

**Description**

Prompts the user to choose one string item from a list of choices displayed in a GUI, then sets a specified variable in a target GUI.

**Usage**

```r
chooseWinVal(choice, varname, winname="window")
```

**Arguments**

- `choice`: vector of strings from which to choose
- `varname`: variable name to which `choice` is assigned in the target GUI
- `winname`: window name for the target GUI

**Details**

`chooseWinVal` activates a `setWinVal` command through an `onClose` function created by the `getChoice` command and modified by `chooseWinVal`.

**Value**

No value is returned directly. The choice is written to the PBS options workspace, accessible through `getPBSOptions("getChoice")`. Also set in PBS options is the window name from which the choice was activated.

**Note**

Microsoft Windows users may experience difficulties switching focus between the R console and GUI windows. The latter frequently disappear from the screen and need to be reselected (either clicking on the task bar or pressing `<Alt><Tab>`). This issue can be resolved by switching from MDI to SDI mode. From the R console menu bar, select `<Edit>` and `<GUI preferences>`, then change the value of “single or multiple windows” to SDI.

**Author(s)**

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`getChoice`, `getWinVal`, `setWinVal`
chooseWinVal

Examples

```r
# Not run:
local(envir=.PBSmodEnv, expr={
  dfnam <- c("airquality","attitude","ChickWeight","faithful","freeny",
    "iris","LifeCycleSavings","longley","morley","Orange",
    "quakes","randu","rock","stackloss","swiss","trees")
  wlist <- c({
    "window name=choisir title=\"Test chooseWinVal\"",
    "label text=\"Press <ENTER> in the green entry box \nto choose a file, then press <GO>\" sticky=W pady=5",
    "grid 1 3 sticky=W",
    "label text=File: sticky=W",
    "entry name=fnam mode=character width=23 value="",
    func=chFile entrybg=darkolivegreen1 pady=5",
    "button text=GO bg=green sticky=W func=test",
    ""
  )
  chFile <- function(ch=dfnam,fn="fnam")
    {chooseWinVal(ch,fn,winname="choisir")};

  #-- Example 1 GUI test
  test <- function() {
    oldpar = par(no.readonly=TRUE); on.exit(par(oldpar))
    getWinVal(winName="choisir",scope="\"
    if (fnam="" & any(fnam==dfnam)) {
      file <- get(fnam);
      pairs(file,gap=0); }
    else {
      resetGraph();
      addLabel(.5,.5,"Press <ENTER> in the green entry box \nto choose a file, then press <GO>", col="red",cex=1.5)
    }
  }

  #-- Example 2 Non-GUI test
  #To try the non-GUI version, type 'test2()' on the command line
  test2 <- function(fnames=dfnam) {
    oldpar = par(no.readonly=TRUE); on.exit(par(oldpar))
    frame();resetGraph()
    again <- TRUE;
    while (again) {
      fnam <- sample(fnames,1); file <- get(fnam);
      flds <- names(file);
      xfld <- getChoice(paste("Pick x-field from",fnam),flds,gui=FALSE);
      yfld <- getChoice(paste("Pick y-field from",fnam),flds,gui=FALSE)
      plot(file[,xfld],file[,yfld],xlab=xfld,ylab=yfld,
           pch=16,cex=1.2,col="red");
      again <- getChoice("Plot another pair?",gui=FALSE)
    }
  }
require(PBSmodelling)
```
cleanProj

Launch a GUI for Project File Deletion

Description
Launches a new window which contains an interface for deleting junk files associated with a prefix and a set of suffixes (e.g., PBSadmb project) from the working directory.

Usage
cleanProj(prefix, suffix, files)

Arguments
prefix default prefix for file names.
suffix character vector of suffixes used for clean options.
files character vector of file names used for clean options.

Details
All arguments may contain wildcard characters ("*" to match 0 or more characters, "?" to match any single character).
The GUI includes the following:

1 An entry box for the prefix.
The default value of this entry box is taken from prefix.
2 Check boxes for each suffix in the suffix argument and for each file name in the files argument.
3 Buttons marked "Select All" and "Select None" for selecting and clearing all the check boxes, respectively.
4 A "Clean" button that deletes files in the working directory matching one of the following criteria:
   (i) file name matches both an expansion of a concatenation of a prefix in the entry box and a suffix chosen with a check box; or
   (ii) file name matches an expansion of a file chosen with a check box.

Author(s)
Anisa Egeli, Vancouver Island University, Nanaimo BC
cleanWD

Launch a GUI for File Deletion

Description

Launches a new window which contains an interface for deleting specified files from the working directory.

Usage

cleanWD(files)

Arguments

files character vector of file names used for clean options.

Details

All arguments may contain wildcard characters ("*" to match 0 or more characters, "?" to match any single character).

The GUI includes the following:

1. Check boxes for each suffix in the suffix argument and for each file name in the files argument.
2. Buttons marked "Select All" and "Select None" for selecting and clearing all the check boxes, respectively.
3. A "Clean" button that deletes files in the working directory matching file name expansion of files chosen with a check box.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Examples

### Not run:
local(envir=.PBSmodEnv,expr={
cleanProj(prefix="foo",suffix=c(".a*",".b?",".c","-old.d"),files=c("red","blue"))
})
### End(Not run)
clearAll  
*Remove all R Objects From a Specified Environment*

**Description**

Generic function to clear all objects from .RData in R

**Usage**

`clearAll(hidden=TRUE, verbose=TRUE, PBSsave=TRUE, pos=".PBSmodEnv")`

**Arguments**

- `hidden` if TRUE, remove variables that start with a dot(·).
- `verbose` if TRUE, report all removed items.
- `PBSsave` if TRUE, do not remove .PBSmod.
- `pos` The pos argument can specify the environment in which to look for the object in any of several ways: as an integer (the position in the search list); as the character string name of an element in the search list; or as an environment (including using `sys.frame` to access the currently active function calls).

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

---

clearPBSext  
*Clear File Extension Associations*

**Description**

Disassociate any number of file extensions from commands previously saved with `setPBSext`.

**Usage**

`clearPBSext(ext)`

**Arguments**

- `ext` optional character vector of file extensions to clear; if unspecified, all associations are removed

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC
clearRcon

**See Also**

`setPBSext, getPBSext, openFile`

---

### clearRcon

**Clear the R Console / Focus on the RGui Window**

**Description**

Clear the R console window or focus on the RGui window using Visual Basic shell scripts.

**Usage**

```r
clearRcon(os=Platform$OS.type)
focusRgui(os=Platform$OS.type)
```

**Arguments**

- `os` operating system (e.g., "windows", "unix").

**Details**

Creates a VB shell script file called `clearRcon.vbs` or `focusRgui.vbs` in R's temporary working directory, then executes the script using the `shell` command.

While `clearRcon` clears the R console, `focusRgui` returns the desktop focus back to the RGui window.

These commands will only work on Windows operating platforms, using the system’s executable `%SystemRoot%\system32\cscript.exe`.

**Author(s)**

Norm Olsen, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`cleanWD, clearPBSext, clearWinVal`

**Examples**

```r
## Not run:
local(envir=.PBSmodEnv, expr={
  createWin( c("window title=Focus",
    "button text="Go to RGui" width=20 bg=aliceblue func=focusRgui"), astext=T)
})

## End(Not run)
```
clearWinVal  

Remove all Current Widget Variables

Description

Remove all global variables that share a name in common with any widget variable name defined in names(getWinVal()). Use this function with caution.

Usage

clearWinVal()

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

getWinVal

clipVector  

Clip a Vector at One or Both Ends

Description

Clip a vector at one or both ends using the specified clip pattern to match.

Usage

clipVector(vec, clip, end=0)

Arguments

vec      vector object to clip
clip     value or string specifying repeated values to clip from ends
end      end to clip clip from: 0=both, 1=front, 2=back

Details

If the vector is named, the names are retained. Otherwise, element positions are assigned as the vector’s names.

Value

Clipped vector with names.
**closeWin**

**Author(s)**

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`createVector`

**Examples**

```r
local(envir=.PBSmodEnv, expr=
  x=c(0,0,0,1,1,1,0,0)
  print(clipVector(x,0))

  x=c(TRUE,TRUE,FALSE,TRUE)
  print(clipVector(x,TRUE))

  x=c("red","tide","red","red")
  print(clipVector(x,"red",2))
)
```

---

### closeWin

**Close GUI Window(s)**

**Description**

Close (destroy) one or more windows made with `createWin`.

**Usage**

```r
closeWin(name)
```

**Arguments**

- **name**: a vector of window names that indicate which windows to close. These names appear in the window description file(s) on the line(s) defining WINDOW widgets. If name is omitted, all active windows will be closed.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

`createWin`
Compile a C File into a Shared Library Object

Description
This function provides an alternative to using R's SHLIB command to compile C code into a shared library object.

Usage
compileC(file, lib="", options="", logWindow=TRUE, logFile=TRUE)

Arguments
- file: name of the file to compile.
- lib: name of shared library object (without extension).
- options: linker options (in one string) to prepend to a compilation command.
- logWindow: if TRUE, a log window containing the compiler output will be displayed.
- logFile: if TRUE, a log file containing the compiler output will be created.

Details
If lib="", it will take the same name as file (with a different extension).
If an object with the same name has already been dynamically loaded in R, it will be unloaded automatically for recompilation.
The name of the log file, if created, uses the string value from lib concatenated with ".log".

Author(s)
Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also
loadC

Examples
```r
## Not run:
local(envir=.PBSmodEnv, expr={
  cwd = getwd()
  edir <- system.file("examples", package = "PBSmodelling")
  file.copy(paste(edir,"fib.c",sep="/"), tempdir(), overwrite=TRUE)
  setwd(tempdir())
  compileC("fib.c", lib="myLib", options="myObj.o", logWindow=FALSE)
  print(list.files())
  setwd(cwd)
})
```
## compileDescription

Convert and Save a Window Description as a List

### Description

Convert a window description file (ASCII markup file) to an equivalent window description list. The output list (an ASCII file containing R-source code) is complete, i.e., all default values have been added.

### Usage

```r
compileDescription(descFile, outFile)
```

### Arguments

- `descFile`: name of window description file (markup file).
- `outFile`: name of output file containing R source code.

### Details

The window description file `descFile` is converted to a list, which is then converted to R code, and saved to `outFile`.

### Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

### See Also

- `parseWinFile`
- `createWin`

## convSlashes

Convert Slashes from UNIX to DOS

### Description

Convert slashes in a string from `'/` to `\\` if the operating system is 'windows'. Do the reverse if the OS is 'unix'.

### Usage

```r
convSlashes(expr, os=.Platform$OS.type, addQuotes=FALSE)
```
createVector

**Arguments**

- `expr` String value (usually a system pathway).
- `os` operating system (either "windows" or "unix").
- `addQuotes` logical: if TRUE, enclose the string expression in escaped double quotation marks.

**Value**

Returns the input string modified to have the appropriate slashes for the specified operating system.

**Author(s)**

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

---

**createVector**

Create a GUI with a Vector Widget

**Description**

Create a basic window containing a vector and a submit button. This provides a quick way to create a window without the need for a window description file.

**Usage**

```r
createVector(vec, vectorLabels=NULL, func="", windowname="vectorwindow", env=NULL)
```

**Arguments**

- `vec` a vector of strings representing widget variables. The values in `vec` become the default values for the widget. If `vec` is named, the names are used as the variable names.
- `vectorLabels` an optional vector of strings to use as labels above each widget.
- `func` string name of function to call when new data are entered in widget boxes or when "GO" is pressed.
- `windowname` unique window name, required if multiple vector windows are created.
- `env` an environment in which to evaluate widget callback functions.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

- `createWin`
createWin

Create a GUI Window

Description

Create a GUI window with widgets using instructions from a Window Description File (aka markup file).

Usage

createWin( fname, astext=FALSE, env=NULL )

Arguments

- fname: name of window description file or list returned from parseWinFile.
- astext: logical; if TRUE, interpret fname as a vector of strings with each element representing a line in a window description file.
- env: an environment in which to evaluate widget callback functions; see example.

Details

Generally, the markup file contains a single widget per line. However, widgets can span multiple lines by including a backslash (\) character at the end of a line, prompting the suppression of the newline character.

For more details on widget types and markup file, see “PBSModelling-UG.pdf” in the R directory .../library/PBSmodelling/doc.

It is possible to use a Window Description List produced by compileDescription rather than a file name for fname.

Another alternative is to pass a vector of characters to fname and set astext=T. This vector represents the file contents where each element is equivalent to a new line in the window description file.
Note

Microsoft Windows users may experience difficulties switching focus between the R console and GUI windows. The latter frequently disappear from the screen and need to be reselected (either clicking on the task bar or pressing <Alt><Tab>). This issue can be resolved by switching from MDI to SDI mode. From the R console menu bar, select <Edit> and <GUI preferences>, then change the value of “single or multiple windows” to SDI.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

parseWinFile, getWinVal, setWinVal
closeWin, compileDescription, createVector
initHistory for an example of using astext=TRUE
environment

Examples

## Not run:
# See file .../library/PBSmodelling/testWidgets/LissWin.txt
# Calculate and draw the Lissajous figure
local(envir=.PBSmodEnv, expr={
drawLiss <- function() {
  oldpar = par(no.readonly=TRUE); on.exit(par(oldpar))
  getWinVal(scope="L"); ti=2*pi*(0:k)/k;
  x=sin(2*pi*ti); y=sin(2*pi*(n+ti+phi));
  plot(x,y,type=ptype); invisible(NULL); }
  createWin(system.file("testWidgets/LissWin.txt",package="PBSmodelling")); })

#############################################################################
# Environment example:
# function in global
local(envir=.PBSmodEnv, expr={
  hello <- function() {
    stop("I shouldn't be called")
  }

  newNameGreeter <- function( name ) {
    # method to display window
    greet <- function() {
      createWin(c("button \"Say hello\" func=hello"), astext=TRUE, env=parent.env(environment()))
    }
    # hello method will refer to the name in this local scope
    hello <- function() {
      cat("Hello", name, "\n")
    }
  }
# return functions which the user can call directly
return( list( greet=greet, hello=hello ) )
}
alex <- newNameGreeter( "Alex" )
jon <- newNameGreeter( "Jon" )
alex$hello() # prints hello Alex
jon$hello() # prints hello Jon
alex$greet() # creates a GUI with a button, which will print "hello Alex" when pushed
#
## End(Not run)

---

## declareGUIOptions

Declare Option Names that Correspond with Widget Names

### Description

This function allows a GUI creator to specify widget names that correspond to names in PBS options. These widgets can then be used to load and set PBS options using `getGUIoptions` and `setGUIoptions`.

### Usage

```r
declareGUIoptions(newOptions)
```

### Arguments

- `newOptions`: a character vector of option names

### Details

declareGUIoptions is typically called in a GUI initialization function. The option names are remembered and used for the functions `getGUIoptions`, `setGUIoptions`, and `promptSave`.

### Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

### See Also

`getGUIoptions`, `setGUIoptions`, `promptWriteOptions`

### Examples

```r
## Not run:
local(envir=.PBSmodEnv,expr={
  declareGUIoptions("editor")
})
## End(Not run)
```
doAction  

*Execute Action Created by a Widget*

**Description**

Executes the action expression formulated by the user and written as an ‘action’ by a widget.

**Usage**

```
doAction(act)
```

**Arguments**

- `act`  
  string representing an expression that can be executed

**Details**

If `act` is missing, `doAction` looks for it in the action directory of the window’s widget directory in `.PBSmod`. This action can be accessed through `getWinAct()`.

Due to parsing complications, the expression `act` translates various symbols. The function translates:

1. The back tick character `''` to a double quote `'"'` character. For example,
   
   `"openFile(paste(getWinVal('$prefix','.tpl',sep='"')))"

2. Underscore period `_.` to four back slashes and one period `\`\`\`\`. For example,
   
   `"poop=strsplit('some.thing.else',split='\.')"

**Value**

Invisibly returns the string expression `expr`.

**Author(s)**

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`createWin`, `evalCall`, `getWinAct`

**Examples**

```r
local(envir=.PBSmodEnv,expr={
  createWin("button text="list objects" func=doAction action=print(ls(all.names=TRUE))",
         astext=TRUE)
})
```
drawBars

**Description**

Draw a linear barplot on the current plot.

**Usage**

drawBars(x, y, width, base = 0,...)

**Arguments**

- `x` : x-coordinates
- `y` : y-coordinates
- `width` : bar width, computed if missing
- `base` : y-value of the base of each bar
- `...` : further graphical parameters (see `par`) may also be supplied as arguments

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**Examples**

```r
local(envir=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)
  plot(0:10,0:10,type="n")
  drawBars(x=1:9,y=9:1,col="deepskyblue4",lwd=3)
  par(oldpar)
})
```

evalCall

**Evaluate a Function Call**

**Description**

Evaluates a function call after resolving potential argument conflicts.

**Usage**

evalCall(fn, argu, ..., envir = parent.frame(),
checkdef=FALSE, checkpar=FALSE)
Arguments

- **fn**: R function
- **argu**: list of explicitly named arguments and their values to pass to fn.
- **...**: additional arguments that a user might wish to pass to fn.
- **envir**: environment from which the call originates (currently has no use or effect).
- **checkdef**: logical: if TRUE, gather additional formal arguments from the functions default function.
- **checkpar**: logical: if TRUE, gather additional graphical arguments from the list object par.

Details

This function builds a call to the specified function and executes it. During the build, optional arguments (...) are checked for
(i) duplication with explicit arguments argu: if any are duplicated, the user-supplied arguments supersede the explicit ones;
(ii) availability as usable arguments in fn, fn.default if checkdef=TRUE, and par if checkpar=TRUE.

Value

Invisibly returns the string expression of the function call that is passed to `eval(parse(text=expr))`.

Note

Sometimes the user may wish to pass arguments into a function to be used by other functions within, but may not want all the arguments to be used, depending on the functions subsequently called. In this case, the user needs to create a list object called `dots`, which is passed to evalCall.

For instance, if the user passes `lwd=4` but only wants this used in a call to `lines` but not in a call to `points`, the function might look like this:

```r
myfunc = function(x=seq(0,360,5), ...) {
  pdots = ldots = list(...)
  pdots[["lwd"]]] = NULL
  ldots[["col"]]] = "cyan"
  xrad = x*pi/180
  plot(sin(xrad),type="n")
  evalCall(lines, argu=list(x=sin(xrad)), dots=ldots, checkpar=TRUE)
  evalCall(points, argu=list(x=sin(xrad)), dots=pdots, checkpar=TRUE)
}
myfunc(lwd=4,pch=20,col=" blue")
```

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

`doAction`, `plotAsp`
Examples

```r
local(envr=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)
  # A user may have a function that calls other functions
  # using specific defaults (e.g., blue triangles)
  #------------------------------------
  pbsfun = function(..., use.evalCall=TRUE) {
    plotasp(0,0,type="n",xlim=c(-1.5,1.5),ylim=c(-1.5,1.5),
    axes=FALSE, frame.plot=TRUE, xlab="",ylab="")
    if (use.evalCall)
      evalCall(polygon, ...,
      argu=list(x=c(-1,1,0),y=c(1,1,-1), col="dodgerblue", border="grey"))
    else
      polygon(x=c(-1,1,0),y=c(1,1,-1),col="dodgerblue",border="grey",...)
  }
  par(mfrow=c(2,1))
  pbsfun(lwd=4,use.evalCall=FALSE)
  #------------------------------------
  # But what if the user wants pink triangles?
  pbsfun(col="pink",lwd=4,use.evalCall=TRUE,checkpar=TRUE)
  par(oldpar)
})
# Without 'evalCall' an error occurs due to duplicated arguments
## Not run: pbsfun(col="pink",lwd=4,use.evalCall=FALSE)
```

---

**expandGraph**

*Expand the Plot Area by Adjusting Margins*

**Description**

Optimize the plotting region(s) by minimizing margins.

**Usage**

```r
expandGraph(mar=c(4,3,1.2,0.5), mgp=c(1.6,.5,0),...)
```

**Arguments**

- `mar` numerical vector of the form `c(bottom, left, top, right)` specifying the margins of the plot
- `mgp` numerical vector of the form `c(axis title, axis labels, axis line)` specifying the margins for axis title, axis labels, and axis line
- `...` additional graphical parameters to be passed to `par`

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC
See Also

resetGraph

Examples

```r
local(envir=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)
  expandGraph(mfrow=c(2,1));
  tt=seq(from=-10, to=10, by=0.05);

  plot(tt,sin(tt), xlab="this is the x label", ylab="this is the y label",
       main="main title", sub="sometimes there is a \"sub\" title")
  plot(cos(tt),sin(tt*2), xlab="cos(t)", ylab="sin(2 t)", main="main title",
       sub="sometimes there is a \"sub\" title")
  par(oldpar)
})
```

---

**exportHistory**

Export a Saved History

**Description**

Export the current history list.

**Usage**

```r
exportHistory(hisname="", fname="")
```

**Arguments**

- **hisname**: name of the history list to export. If set to ",", the value from `getWinAct()$1` will be used instead.
- **fname**: file name where history will be saved. If it is set to "", a <Save As> window will be displayed.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

`importHistory`, `initHistory`
findPat  Search a Character Vector to Find Multiple Patterns

Description

Use all available patterns in pat to search in vec, and return the matched elements in vec.

Usage

findPat(pat, vec)

Arguments

pat      character vector of patterns to match in vec
vec      character vector where matches are sought

Value

A character vector of all matched strings.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Examples

local(envir=.PBSmodEnv, expr={
  # find all strings with a vowel, or that start with a number
  print(findPat(c("aeiou", "[0-9]"), c("hello", "WORLD", "lover")))
})

findPrefix  Find a Prefix Based on Names of Existing Files

Description

Find the prefixes or suffixes of files with a given suffix or prefix in a directory.

Usage

findPrefix(suffix, path=".")
findSuffix(prefix, path=".")
findProgram

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>suffix</td>
<td>character vector of suffixes</td>
</tr>
<tr>
<td>prefix</td>
<td>character vector of prefixes</td>
</tr>
<tr>
<td>path</td>
<td>directory to look for files in</td>
</tr>
</tbody>
</table>

Details

The function `findPrefix` locates all files in a directory that end with one of the provided suffixes; whereas `findSuffix` locates all files that start with the given prefixes.

Value

A character vector of all the prefixes or suffixes of files in the working directory that matched to one of the given suffixes.

Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

Examples

```r
local(envir=.PBSmodEnv,expr={
edir = system.file("examples", package="PBSmodelling")
print(findPrefix(suffix=c(".txt", ".r"), path=edir)); cat("\n")

# or use R's dir for similar functionality
print(dir(pattern="txt$", path=edir)); cat("\n")
print(dir(pattern="[a-h]", path=edir)); cat("\n")})
```

findProgram

Locates a program in the PATH environment variable

Description

Returns the complete filename and path of a program in the PATH environment variable. This is a wrapper for `Sys.which`, and may be deprecated in the future.

Usage

```r
findProgram( name, includename=FALSE )
```

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>name of a program to locate</td>
</tr>
<tr>
<td>includename</td>
<td>boolean: if true, include the filename in the path returned, otherwise just the directory.</td>
</tr>
</tbody>
</table>
Value

A string containing the location of the program. NULL is returned if the program is not located.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

Sys.which

Examples

local(envir=.PBSmodEnv, expr={
  print(list(
    gcc = findProgram("gcc"),
    notepad = findProgram("notepad"),
    R = findProgram("R", includename=TRUE ))))

focusWin

Set the Focus on a Particular Window

Description

Bring the specified window into focus, and set it as the active window. focusWin will fail to bring
the window into focus if it is called from the R console, since the R console returns focus to itself
once a function returns. However, it will work if focusWin is called as a result of calling a function
from the GUI window. (i.e., pushing a button or any other widget that has a function argument).

Usage

focusWin(winName, winVal=TRUE)

Arguments

winName name of window to focus

winVal if TRUE, associate winName with the default window for setWinVal and getWinVal

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC
Examples

```r
## Not run:
local(envir=.PBSmodEnv,expr={
 .focus <- function()
    winName <- getWinVal()$select;
    focusWin(winName);
    mess = paste("Calling focusWin("", winName, ",")\n", getWinVal()$myvar, ",\n\n", sep="", collapse="")
    cat(mess); invisible()
}
create three windows named win1, win2, win3
foreach having three radio buttons, which are used to change the focus
for(i in 1:3) {
  winDesc <- c(
    paste('window onclose=closeWin name=win',i,',"title="Win',i,",", sep="", sep=""),
    paste('entry myvar ','i', sep=""),
    'radio name=select value=win1 text="one" function=focus mode=character',
    'radio name=select value=win2 text="two" function=focus mode=character',
    'radio name=select value=win3 text="three" function=focus mode=character');
  createWin(winDesc, astext=TRUE);
}
## End(Not run)
```

---

genMatrix

**Generate Test Matrices for plotBubbles**

**Description**

Generate a test matrix of random numbers \((\mu = \text{mean} \text{ and } \sigma = \text{standard deviation})\), primarily for plotBubbles.

**Usage**

```r
genMatrix(m, n, mu=0, sigma=1)
```

**Arguments**

- `m` number of rows
- `n` number of columns
- `mu` mean of normal distribution
- `sigma` standard deviation of normal distribution

**Value**

An \(m\) by \(n\) matrix with normally distributed random values.
getChoice

Author(s)
Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also
plotBubbles

Examples
local(envir=.PBSmodEnv, expr={
  plotBubbles(genMatrix(20,6))
})

getChoice  Choose One String Item from a List of Choices

description
Prompts the user to choose one string item from a list of choices displayed in a GUI. The simplest case getChoice() yields TRUE or FALSE.

Usage
getchoice(choice=c("Yes","No"), question="Make a choice: ",
  winname="getChoice", horizontal=TRUE, radio=FALSE,
  qcolor="blue", gui=FALSE, quiet=FALSE)

Arguments
choice  vector of strings from which to choose.
question  question or prompting statement.
winname  window name for the getChoice GUI.
horizontal  logical: if TRUE, display the choices horizontally, else vertically.
radio  logical: if TRUE, display the choices as radio buttons, else as buttons.
qcolor  colour for question.
gui  logical: if TRUE, getChoice is functional when called from a GUI, else it is functional from command line programs.
quiet  logical: if TRUE, don’t print the choice on the command line.

details
The user’s choice is stored in .PBSmod$options$getChoice (or whatever winname is supplied).
getchoice generates an onClose function that returns focus to the calling window (if applicable) and prints out the choice.
getGUIoptions

Get PBS Options for Widgets

Description

Get the PBS options declared for GUI usage and set their corresponding widget values.

Value

If called from a GUI (gui=TRUE), no value is returned directly. Rather, the choice is written to the PBS options workspace, accessible through getPBSoptions("getChoice") (or whatever winname was supplied).

If called from a command line program (gui=FALSE), the choice is returned directly as a string scalar (e.g., answer <- getChoice(gui=F)).

Note

Microsoft Windows users may experience difficulties switching focus between the R console and GUI windows. The latter frequently disappear from the screen and need to be reselected (either clicking on the task bar or pressing <Alt><Tab>). This issue can be resolved by switching from MDI to SDI mode. From the R console menu bar, select <Edit> and <GUI preferences>, then change the value of “single or multiple windows” to SDI.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

chooseWinVal, getWinVal, setWinVal

Examples

```r
## Not run:
##-- Example 1
local(envir=.PBSmodEnv,expr={
  getChoice(c("Fame","Fortune","Health","Beauty","Lunch"),
  "What do you want?",qcolor="red",gui=FALSE)
})

##-- Example 2
local(envir=.PBSmodEnv,expr={
  getChoice(c("Homer Simpson","Wilberforce Humphries","Miss Marple","Gary Numan"),
  "Who's your idol?",horiz=FALSE,radio=TRUE,gui=FALSE)
})

## End(Not run)
```
getOptions

Usage

getGUIoptions()

Details

The options declared using declareGUIoptions are copied from the R environment into widget values. These widgets should have names that match the names of their corresponding options.

Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also

declareGUIoptions, setGUIoptions, promptWriteOptions, readPBSoptions

Examples

## Not run:
local(envir=.PBSmodEnv,expr={
  getPBSoptions() #loads from default PBSoptions.txt
})

## End(Not run)

---

getOptions  Get and Set User Options

Description

Functions to get and set user options within an option class object.

Usage

getOptions(option.object, key)
setOptions(option.object, ...)

Arguments

option.object  options class object used for storing package options
...
  any number of user options to set where either (a) the named argument is the option key and the value is the option value or (b) the single unnamed argument is a list object where each named list element is the option key and the value is the element’s value
key  name of option to retrieve; if missing, all options are returned
getOptionsFileName

Value

Value of the option specified by key (if specified) or a list of all options (if missing).

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

See PBSoptions-class for more details and an example that uses PBSmodelling’s option management functions.

getOptionsFileName

Get and Set File Name for Saving and Loading of Options

Description

Functions for retrieving and setting the default file name used by loadOptions and saveOptions.

Usage

getOptionsFileName(option.object)
setOptionsFileName(option.object, name)

Arguments

option.object options class object used for storing package options
name new name for default file name

Value

getOptionsFileName: the default file name

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

loadOptions, saveOptions
See PBSoptions-class for more details and an example using PBSmodelling’s option management functions.
**getOptionsPrefix**

*Get and Set GUI Prefix of Options Class*

**Description**

The GUI prefix is used for determining which GUI variables are associated with a user option.

**Usage**

```r
getOptionsPrefix(option.object)
```

```r
setOptionsPrefix(option.object, prefix)
```

**Arguments**

- `option.object`: options class object used for storing package options
- `prefix`: new prefix to use

**Value**

- `getOptionsPrefix`: a prefix string used to reference GUI variables

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

See `PBSoptions-class` for more details and an example using `PBSmodelling`'s option management functions.

**Examples**

```r
local(envir=.PBSmodEnv.expr={
    # For the example, the options object is saved to the temporary environment;
    # however, a user would normally create the object in his/her workspace.
    .mypkg <- new("PBSoptions", filename="my_pkg.txt",
        initial.options=list(pi=3.14), gui.prefix="opt")

    #prefix the option "pi" with "opt" to get "optpi"
    createWin("entry name=optpi", astext = TRUE )

    #the GUI variable "optpi" will be loaded with the option "pi"
    loadOptionsGUI(.mypkg)
})
```
getPBSExt  
*Get a Command Associated With a File Name*

**Description**
Display all locally defined file extensions and their associated commands, or search for the command associated with a specific file extension `ext`.

**Usage**
```plaintext
getPBSExt(ext)
```

**Arguments**
- `ext` optional string specifying a file extension.

**Value**
Command associated with file extension.

**Note**
These file associations are not saved from one *PBS Modelling* session to the next unless explicitly saved and loaded (see `writePBSExtions` and `readPBSExtions`).

**Author(s)**
Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**
- `setPBSExt`, `openFile`, `clearPBSExt`

getPBSExtions  
*Retrieve A User Option*

**Description**
Get a previously defined user option.

**Usage**
```plaintext
getPBSExtions(option)
```

**Arguments**
- `option` name of option to retrieve. If omitted, a list containing all options is returned.
**getWinAct**

**Value**

Value of the specified option, or **NULL** if the specified option is not found.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

`getPBSext`, `readPBSoptions`

---

**getWinAct**  
*Retrieve the Last Window Action*

**Description**

Get a string vector of actions (latest to earliest).

**Usage**

`getWinAct(winName)`

**Arguments**

`winName` name of window to retrieve action from

**Details**

When a function is called from a GUI, a string descriptor associated with the action of the function is stored internally (appended to the first position of the action vector). A user can utilize this action as a type of argument for programming purposes. The command `getWinAct()[1]` yields the latest action.

**Value**

String vector of recorded actions (latest first).

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC
getWinFun  

*Retrieve Names of Functions Referenced in a Window*

**Description**

Get a vector of all function names referenced by a window.

**Usage**

```r
getWinFun(winName)
```

**Arguments**

- `winName` name of window, to retrieve its function list

**Value**

A vector of function names referenced by a window.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

---

getWinVal  

*Retrieve Widget Values for Use in R Code*

**Description**

Get a list of variables defined and set by the GUI widgets. An optional argument `scope` directs the function to create local or global variables based on the list that is returned.

**Usage**

```r
getWinVal(v=NULL, scope='', asvector=FALSE, winName='')
```

**Arguments**

- `v` vector of variable names to retrieve from the GUI widgets. If NULL, v retrieves all variables from all GUI widgets.
- `scope` scope of the retrieval. The default sets no variables in the non-GUI environment; scope="L" creates variables locally in relation to the parent frame that called the function; scope="P" creates variables in the temporary package workspace called .PBSmodEnv; and scope="G" creates global variables (pos=1).
- `asvector` return a vector instead of a list. WARNING: if a widget variable defines a true vector or matrix, this will not work.
- `winName` window from which to select GUI widget values. The default takes the window that has most recently received new user input.
**getYes**

**Details**

TODO: talk about scope=G/P/L and side effects of overwriting existing variables

**Value**

A list (or vector) with named components, where names and values are defined by GUI widgets.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

parseWinFile, setWinVal, clearWinVal

---

**getYes**  
*Prompt the User to Choose Yes or No*

**Description**

Display a message prompt with "Yes" and "No" buttons.

**Usage**

getYes(message, title="Choice", icon="question")

**Arguments**

- message: message to display in prompt window.
- title: title of prompt window.
- icon: icon to display in prompt window; options are "error", "info", "question", or "warning".

**Value**

Returns TRUE if the "Yes" button is clicked, FALSE if the "No" button is clicked.

**Author(s)**

Anisa Egeli, Vancouver Island University, Nanaimo BC

**See Also**

showAlert, getChoice, chooseWinVal
Examples

```r
## Not run:
local(envir=.PBSmodEnv.expr={
  if(getYes("Print the number 1?"))
    print(1) else print("hallucination")
})
## End(Not run)
```

GT0

<table>
<thead>
<tr>
<th>GT0</th>
<th>Restrict a Numeric Variable to a Positive Value</th>
</tr>
</thead>
</table>

Description

Restrict a numeric value \( x \) to a positive value using a differentiable function. GT0 stands for “greater than zero”.

Usage

\[ \text{GT0}(x, \text{eps}=1e^{-4}) \]

Arguments

- **x**: vector of values
- **eps**: minimum value greater than zero.

Details

\[
\begin{align*}
\text{if } (x \geq \text{eps}) & \quad \text{GT0} = x \\
\text{if } (0 < x < \text{eps}) & \quad \text{GT0} = (\text{eps}/2) \ast (1 + (x/\text{eps})^2) \\
\text{if } (x \leq 0) & \quad \text{GT0} = \text{eps}/2
\end{align*}
\]

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

`scalePar`, `restorePar`, `calcMin`
Examples

```r
local(envir=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)
  plotGT0 <- function(eps=1,x1=-2,x2=10,n=1000,col="black") {
    x <- seq(x1,x2,len=n); y <- GT0(x,eps);
    lines(x,y,col=col,lwd=2); invisible(list(x=x,y=y)); }

testGT0 <- function(eps=c(7,5,3,1..1),x1=-2,x2=10,n=1000) {
  x <- seq(x1,x2,len=n); y <- x;
  plot(x,y,type="l");
  mycol <- c("red","blue","green","brown","violet","orange","pink");
  for (i in 1:length(eps))
    plotGT0(eps=eps[i],x1=x1,x2=x2,n=n,col=mycol[i]);
  invisible(); }

testGT0()
  par(oldpar)
})
```

---

**importHistory**

**Import a History List from a File**

**Description**

Import a history list from file `fname`, and place it into the history list `hisname`.

**Usage**

```r
importHistory(hisname="", fname="", updateHis=TRUE)
```

**Arguments**

- `hisname` : name of the history list to be populated. The default (""") uses the value from `getWinAct()[1].`
- `fname` : file name of history file to import. The default (""") causes an open-file window to be displayed.
- `updateHis` : logical: if TRUE, update the history widget to reflect the change in size and index.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

- `exportHistory`
- `initHistory`
initHistory

Create Structures for a New History Widget

Description

PBS history functions (below) are available to those who would like to use the package’s history functionality, without using the pre-defined history widget. These functions allow users to create customized history widgets.

Usage

initHistory(hisname=NULL, indexname=NULL, sizename=NULL, buttonnames=NULL, modename=NULL, func=NULL, overwrite=TRUE)
rmHistory(hisname="", index="")
addHistory(hisname="")
forwHistory(hisname="")
backHistory(hisname="")
lastHistory(hisname="")
firstHistory(hisname="")
jumphistory(hisname="", index="")
clearHistory(hisname="")

Arguments

hisname name of the history "list" to manipulate. If it is omitted, the function uses the value of getWinAct()[1] as the history name. This allows the calling of functions directly from the window description file (except initHistory, which must be called before createWin()).
indexname name of the index entry widget in the window description file. If NULL, then the current index feature will be disabled.
sizename name of the current size entry widget. If NULL, then the current size feature will be disabled.
buttonnames named list of names of the first, prev, next, and last buttons. If NULL, then the buttons are not disabled ever
modename name of the radio widgets used to change addHistory\'s mode. If NULL, then the default mode will be to insert after the current index.
index index to the history item. The default ("" ) causes the value to be extracted from the widget identified by indexname.
func name of user supplied function to call when viewing history items.
overwrite if TRUE, history (matching hisname) will be cleared. Otherwise, the imported history will be merged with the current one.
Details

PBS Modelling includes a pre-built history widget designed to collect interesting choices of GUI variables so that they can be redisplayed later, rather like a slide show.

Normally, a user would invoke a history widget simply by including a reference to it in the window description file. However, PBS Modelling includes support functions (above) for customized applications.

To create a customized history, each button must be described separately in the window description file rather than making reference to the history widget.

The history "List" must be initialized before any other functions may be called. The use of a unique history name (hisname) is used to associate a unique history session with the supporting functions.

The indexname and szename arguments correspond to the given names of entry widgets in the window description file, which will be used to display the current index and total size of the list. The indexname entry widget can also be used by jumphistory to retrieve a target index.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

importHistory, exportHistory

Examples

```r
## Not run:
# ****** THIS CODE DOES NOT RUN. NEEDS FIXING *****
# Example of creating a custom history widget that saves values
# whenever the "Plot" button is pressed. The user can tweak the
# inputs "a", "b", and "points" before each "Plot" and see the
# "Index" increase. After sufficient archiving, the user can review
# scenarios using the "Back" and "Next" buttons.
# A custom history is needed to achieve this functionality since
# the packages pre-defined history widget does not update plots.

# To start, create a Window Description to be used with createWin
# using astext=TRUE. P.S. Watch out for special characters which
# must be "escaped" twice (first for R, then PBSmodelling).

local(envir=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)

  winDesc <- '
    window title="Custom History"
    vector names="a b k" labels="a b points" font="bold" \n    values="1 1 1000" function=myPlot
    grid 1 3
    button function=myHistoryBack text="<- Back"
    button function=myPlot text="Plot"
    button function=myHistoryForw text="Next ->"
```

grid 2 2
label "Index"
entry name="myHistoryIndex" width=5
label "Size"
entry name="myHistorySize" width=5,

# Convert text to vector with each line represented as a new element
winDesc <- strsplit(winDesc, "\n")[[1]]

# Custom functions to update plots after restoring history values
myHistoryBack <- function()
{
  backHistory("myHistory");
  myPlot(saveVal=FALSE); # show the plot with saved values
}
myHistoryForw <- function()
{
  forwHistory("myHistory");
  myPlot(saveVal=FALSE); # show the plot with saved values
}
myPlot <- function(saveVal=TRUE) {
  # save all data whenever plot is called (directly)
  if (saveVal) addHistory("myHistory");
  getWinVal(scope="L");
  tt <- 2*pi*(0:k)/k;
  x <- (1+sin(a*tt)); y <- cos(tt)*(1+sin(b*tt));
  plot(x, y);
}

iHistory("myHistory", "myHistoryIndex", "myHistorySize")
createWin(winDesc, astext=TRUE)
par(oldpar)
}

## End(Not run)

---

**isWhat**

Identify an Object and Print Information

**Description**

Identify an object by class, mode, typeof, and attributes.

**Usage**

isWhat(x)

**Arguments**

x an R object
Value

No value is returned. The function prints the object’s characteristics on the command line.

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Description

The function `lisp` returns a vector of character strings giving the names of the objects in `.PBSmodEnv`. It is only a wrapper for the base function `ls`.

Usage

```r
lisp(name, pos = .PBSmodEnv, envir = as.environment(pos),
     all.names = TRUE, pattern)
```

Arguments

- `name`: which environment to use in listing the available objects. See the details section of `ls`.
- `pos`: an alternative argument to `name` for specifying the environment as a position in the search list.
- `envir`: an alternative argument to `name` for specifying the environment.
- `all.names`: a logical value. If `TRUE`, all object names are returned. If `FALSE`, names which begin with a `.` are omitted.
- `pattern`: an optional regular expression. Only names matching `pattern` are returned. See `ls` for additional details.

Details

See the base function `ls` for details.

Author(s)

Copyright 1995–2012 R Core Development Team; distributed under GPL 2 or later.

See Also

- `ls`, `tget` for converting wildcard patterns to regular expressions.
loadC

Launch a GUI for Compiling and Loading C Code

Description

A GUI interface allows users to edit, compile, and embed C functions in the R environment.

Usage

loadC()

Details

The function loadC() launches an interactive GUI that can be used to manage the construction of C functions intended to be called from R. The GUI provides tools to edit, compile, load, and run C functions in the R environment.

The loadC GUI also includes a tool for comparison between the running times and return values of R and C functions. It is assumed that the R and C functions are named prefix.r and prefix.c, respectively, where prefix can be any user-chosen prefix. If an initialization function prefix.init exists, it is called before the start of the comparison.

The GUI controls:

- **File Prefix**: Prefix for .c and .r files.
- **Lib Prefix**: Prefix for shared library object.
- **Set WD**: Set the working directory.
- **Open Log**: Open the log file.
- **Open .c File**: Open the file prefix.c from the working directory.
- **Open .r File**: Open the file prefix.r from the working directory.
- **COMPILE**: Compile prefix.c into a shared library object.
- **LOAD**: Load the shared library object.
- **SOURCE R**: Source the file prefix.r.
- **UNLOAD**: Unload the shared library object.

**Options**

- **Editor**: Text editor to use.
- **Update**: Commit option changes.
- **Browse**: Browse for a text editor.

**Clean Options**

- **Select All**: Select all check boxes specifying file types.
- **Select None**: Select none of the check boxes.
- **Clean Proj**: Clean the project of selected file types.
- **Clean All**: Clean the directory of selected file types.

**Comparison**

- **Times to Run**: Number of times to run the R and C functions.
- **RUN**: Run the comparison between R and C functions.
- **R Time**: Computing time to run the R function multiple times.
- **C Time**: Computing time to run the C function multiple times.
- **Ratio**: Ratio of R/C run times.
Save and Load Options to and from Disk

Description

Save and load options for use from one R session to another. If no file name is given, then the default file name (specified when the option object was created) is used.

Usage

```r
loadOptions(option.object, fname, prompt = FALSE)
saveOptions(option.object, fname, prompt = FALSE)
```

Arguments

- `option.object` : options class object used for storing package options
- `fname` : file name to use: if missing the default file name is used; if given, file name becomes the default.
- `prompt` : logical: if TRUE, prompt the user to select a file from an interactive GUI. If `fname` is given, then the value appears as the default selected file.

Details

If `fname` is given (or selected when `prompt`=TRUE), then that file becomes the default file name for subsequent loading and saving.

See Also

See `PBSoptions-class` for more details and an example using `PBSmodelling`'s option management functions.
Load and Save Options Values to and from a GUI

Description
These functions are used to move option values to and from a GUI. Option values are stored within an R object (as referenced by the `option.object`).
- `loadOptionsGUI` copies the values from the R object to the GUI.
- `saveOptionsGUI` copies the GUI values from the tcltk GUI to the R object.

Usage
```r
loadOptionsGUI(option.object)
saveOptionsGUI(option.object)
```

Arguments
- `option.object` options class object used for storing package options

See Also
- See `PBSoptions-class` for more details and an example using `PBSmodelling`'s option management functions.

Convert Solid Colours to Translucence

Description
Convert a vector of solid colours to a vector of translucent ones (or vice versa)

Usage
```r
lucent(col.pal=1, a=1)
```

Arguments
- `col.pal` vector of colours
- `a` alpha transparency value (0 = fully transparent, 1 = opaque)

Details
The function acts as a small wrapper to the `rgb` function.

Value
Vector of transformed colours depending on the alpha transparency value `a`. 
openExamples

Author(s)
Steve Martell, International Pacific Halibut Commission, Seattle WA

See Also
pickcol, testcol, col2rgb, rgb

Examples

```r
local(envir=.PBSmodEnv, expr=
oldpar = par(no.readonly=TRUE)
pbsfun = function(clrs=c("moccasin",rainbow(3))){
  clrs = c(clrs,lucent(clrs,a=0.25))
testcol(clrs); invisible() 
  pbsfun()
  par(oldpar)
})
```

openExamples | Open Example Files from a Package

Description
Open examples from the examples subdirectory of a given package.

Usage
openExamples(package, prefix, suffix)

Arguments
- package: name of the package that contains the examples.
- prefix: prefix of the example file(s).
- suffix: character vector of suffixes for the example files.

Details
Copies of each example file are placed in the working directory and opened. If files with the same name already exist, the user is prompted with a choice to overwrite.

To use this function in a window description file, the package, prefix and suffix arguments must be specified as the action of the widget that calls openExamples. Furthermore, package, prefix, and each suffix must be separated by commas. For example, action=myPackage,example1,.r,.c will copy example1.r and example2.c from the examples directory of the package myPackage to the working directory and open these files. If the function was called by a widget, a widget named prefix will be set to the specified prefix.
openFile

Note
If all the required arguments are missing, it is assumed that the function is being called by a GUI widget.

Author(s)
Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also
openFile

Examples
```r
## Not run:
# Copies fib.c and fib.r from the examples directory in
# PBSmodelling to the temporary working directory, and opens these files.
local(envir=.PBSmodEnv, expr={
cwd = getwd(); setwd(tempdir())
openExamples("PBSmodelling", c("fib"), c(".r", ".c"))
setwd(cwd)
})

## End(Not run)
```

---

openFile | Open a File with an Associated Program

Description
Open a file using the program that the operating system (Windows/Mac OS X/Linux) associates with its type. Users wishing to override the default application can specify a program association using setPBSext.

Usage
```r
openFile(fname, package=NULL)
```

Arguments
- `fname` character vector, containing file names to open.
- `package` (optional) open files relative to this package.

Value
An invisible string vector of the file names and/or commands with file names.
Note

If a command is registered with `setPBSext`, then `openFile` will replace all occurrences of "%f" with the absolute path of the filename before executing the command.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

`getPBSext`, `setPBSext`, `clearPBSext`, `writePBSoptions`

Examples

```r
## Not run:
local(envir=.PBSmodEnv, expr={
  # use openFile directly:
  openFile("doc/PBSmodelling-UG.pdf", package="PBSmodelling")
})
local(envir=.PBSmodEnv, expr=
  # via doAction in a window description file:
  createWin("button text=help func=doAction width=20 pady=25 bg=green action="\"openFile('doc/PBSmodelling-UG.pdf',package='PBSmodelling')\"", astext=TRUE)
})
local(envir=.PBSmodEnv, expr=
  # set up Firefox to open .html files (only applicable if Firefox is NOT default web browser)
  setPBSext("html", file:/c:/Program Files/Mozilla Firefox/firefox.exe file://%f")
  openFile("foo.html")
})
## End(Not run)
```

Description

Open package User’s Guide ‘pkg-UG.pdf’ if it exists. This function is essentially a wrapper for `codeopenFile`.

Usage

```r
openUG(pkg = "PBSmodelling")
```

Arguments

`pkg` Full name (with or without quotes) of a package installed on the user’s system.
Details

We assume that the name of the User’s Guide follows ‘PBS’ conventions. This means a user’s guide in PDF format with extension pdf. The name of the PDF file will be ‘<pkg>-UG.pdf’ (e.g., PBSmodelling-UG.pdf).

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

openFile, showHelp, viewCode

packList

Pack a List with Objects

Description

Pack a list with existing objects using names only.

Usage

packList(stuff, target="PBSlist", value, penv=NULL, tenv=.PBSmodEnv)

Arguments

stuff    string vector of object names
target   target list object
value    an optional explicit value to assign to stuff
penv     parent environment (default) or user-specified environment where stuff resides
tenv     target environment where target list is or will be located

Details

A list object called target will be located in the tenv environment. The objects named in stuff and located in the penv environment will appear as named components within the list object target.

If an explicit value is specified, the function uses this value instead of looking for local objects. Essentially, stuff = value which is then packed into target.

Value

No value is returned
Note

The function determines the parent environment from within. This environment contains the objects from which the function copies to the target environment. Alternatively, the user can specify the environment where stuff resides.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

unpackList, readList, writeList

Uses accessor functions: tget, tcall, and tput

Examples

local(envir=.PBSmodEnv,expr={
  fn = function()
    alpha=rnorm(10)
    beta=letters
    gamma=mean
    delta=longley
    packList(c("alpha","beta","gamma","delta"))
  fn(); tprint(PBSlist)
})

---

pad0

Pad Values with Leading Zeroes

Description

Pad numbers and/or text with leading and/or trailing zeroes.

Usage

pad0(x, n, f = 0)

Arguments

x vector of numbers and/or strings
n number of text characters representing a padded integer
f factor of 10 transformation on x before padding

Details

Converts numbers (or text coerced to numeric) to integers and then to text, and pads them with leading zeroes. If the factor f is >0, then trailing zeroes are also added.
Value

If `length(f) == 1` or `length(x) == 1`, the function returns a character vector representing `x` with leading zeroes.

If both `f` and `x` have lengths >1, then a list of character vectors indexed by `f` is returned.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

`showP`, `gtP`

Examples

```r
local(envir=.PBSmodEnv,expr=
  resetGraph(); x <- pad0(x=123,n=10,f=0:7);
  add.label(.5,.5,paste(x,collapse="\n"),cex=1.5);
)
```

---

**parseWinFile**  
*Convert a Window Description File into a List Object*

**Description**

Parse a `window description file` (markup file) into the list format expected by `createWin`.

**Usage**

```r
parseWinFile(fname, astext=FALSE)
```

**Arguments**

- `fname`  
  file name of the `window description file`.

- `astext`  
  if `TRUE`, `fname` is interpreted as a vector of strings, with each element representing a line of code in a `window description file`.

**Value**

A list representing a parsed `window description file` that can be directly passed to `createWin`.

**Note**

- All widgets are forced into a 1-column by N-row grid.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC
See Also

createWin, compileDescription

Examples

```r
## Not run:
local(envir=.PBSmodEnv, expr=
  x <- parseWinFile(system.file("examples/LissFigWin.txt",package="PBSmodelling"))
  createWin(x)
}

## End(Not run)
```

---

**pause**

*Pause Between Graphics Displays or Other Calculations*

---

**Description**

Pause, typically between graphics displays. Useful for demo purposes.

**Usage**

`pause(s = "Press <Enter> to continue")`

**Arguments**

`s` text issued on the command line when `pause` is invoked.

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

---

**PBSmodelling**

*PBS Modelling*

---

**Description**

*PBS Modelling* provides software to facilitate the design, testing, and operation of computer models. It focuses particularly on tools that make it easy to construct and edit a customized graphical user interface (GUI). Although it depends heavily on the R interface to the Tcl/Tk package, a user does not need to know Tcl/Tk.

PBSmodelling contains examples that illustrate models built using other R packages, including PBSmapping, odesolve, PBSddesolve, and BRugs. It also serves as a convenient prototype for building new R packages, along with instructions and batch files to facilitate that process.
The R directory .../library/PBSmodelling/doc includes a complete user guide “PBSmodelling-UG.pdf”. To use this package effectively, please consult the guide.

_PBS Modelling_ comes packaged with interesting examples accessed through the function runExamples(). Additionally, users can view _PBS Modelling_ widgets through the function testWidgets(). More generally, a user can run any available demos in his/her locally installed packages through the function runDemos().

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**PBSOptions-class**

**S4: Project Options Class**

**Description**

Projects commonly involve various settings or options such as paths to C compilers or other third-party tools. _PBSmodelling_ provides a set of option management functions for managing user-specific options. Options can be modified through the provided set of functions on the command line, or through a custom GUI. These options can be saved to disk for use in subsequent R sessions.

To use _PBSmodelling_’s suite of option management functions, a PBSoptions object must be created for each of your projects. Each PBSoptions object contains a distinct R environment where option values are stored; this allows different projects to use overlapping option names without conflicts (provided each project has its own PBSoptions class object).

**Details**

When a PBSoptions object is created with the new function, the initial.options list, if supplied, is stored as initial user options in the object. The initialization routine then attempts to load user set options from the filename file. If such a file exists, these values are stored in the PBSoptions object overwriting any initial values as specified by initial.options

Option values are not directly stored in the object, but rather in an environment stored in the instance slot. Using an environment rather than slots for storing options allows us to pass option object by reference rather than value; that is, we can save options in the object without the need of returning a new modified class object. It is therefore necessary that users use the functions listed in the "see also" section to effectively manage user options.

**Objects from the Class**

Objects can be created by calls of the form

new("PBSOptions", filename, initial.options=list(), gui.prefix="option").

filename: default file name to use when saving and loading options to and from disk
initial.options: a list with distinctly named initial options to use if no previously saved file exists

gui.prefix: a prefix used to identify GUI variables which correspond to user options

**Slots**

instance: The R environment used to store options. Please do not use this directly; use the functions listed under the "see also" section.
Methods

print signature(x = "PBSOptions"): prints the list of options

Warning

Do not use the slots directly – use the access functions instead.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

getOptions for retrieving and modifying user options
getOptionsFileName for retrieving and modifying the default options file name
loadOptions for loading and saving options from and to disk
getOptionsPrefix for retrieving and modifying the GUI prefix (for custom GUI interfaces)
loadOptionsGUI for setting GUI values to reflect user options and vice-versa

Examples

local(envir=.PBSmodEnv,expr={
    #initialize an option manager with a single logical option
    .mypkg <- new("PBSOptions", filename="my_pkg.txt",
    initial.options=list( sillyhatday=FALSE )
    #retrieving an option
    silly <- getOptions( .mypkg, "sillyhatday" )
    cat("today is", ifelse( silly, "silly hat day!", "monday" ), "\n")
    #set an option
    setOptions( .mypkg, sillyhatday = TRUE, photos = "/shares/silly_hat_photos" )
    #create a GUI which works with options
    createWin( c( "check name=option sillyhatday text="silly hat day\","entry name=option photos width=22 mode=character label="photos directory\","button func=doAction text=save action=saveOptionsGUI(.mypkg)" ), astext = TRUE )
    #update GUI values based on values stored in .mypkg's options
    loadOptionsGUI(.mypkg )
    print(getOptions(.mypkg ))
})
pickCol

**Pick a Colour From a Palette and get the Hexadecimal Code**

**Description**

Display an interactive colour palette from which the user can choose a colour.

**Usage**

```r
pickCol(returnValue=TRUE)
```

**Arguments**

- `returnValue`
  - If TRUE, display the full colour palette, choose a colour, and return the hex value to the R session.
  - If FALSE, use an intermediate GUI to interact with the palette and display the hex value of the chosen colour.

**Value**

A hexadecimal colour value.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

testCol

**Examples**

```r
## Not run:
local(envir=.PBSmodEnv,expr=
  junk<-pickCol(); resetGraph()
  addLabel(.5,.5,junk,cex=4,col=junk)
})
## End(Not run)
```
plotACF

Plot Autocorrelation Bars From a Data Frame, Matrix, or Vector

Description

Plot autocorrelation bars (ACF) from a data frame, matrix, or vector.

Usage

plotACF(file, lags=20,
         clrs=c("blue","red","green","magenta","navy"), ...)

Arguments

file         data frame, matrix, or vector of numeric values.
lags         maximum number of lags to use in the ACF calculation.
clrs         vector of colours. Patterns are repeated if the number of fields exceed the length
             of clrs.
...          additional arguments for plot or lines.

Details

This function is designed primarily to give greater flexibility when viewing results from the R-
package BRugs. Use plotACF in conjunction with samplesHistory("*",beg=0,plot=FALSE)
rather than samplesAutoC which calls plotAutoC.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Examples

local(envir=.PBSmodEnv,expr={
   oldpar = par(no.readonly=TRUE)
   resetGraph(); plotACF(trees,lwd=2,lags=30)
   par(oldpar)
})
Construct a Plot with a Specified Aspect Ratio

Description

Plot x and y coordinates using a specified aspect ratio.

Usage

plotAsp(x, y, asp=1, ...)

Arguments

- x: vector of x-coordinate points in the plot.
- y: vector of y-coordinate points in the plot.
- asp: y/x aspect ratio.
- ...: additional arguments for plot.

Details

The function plotAsp differs from plot(x,y,asp=1) in the way axis limits are handled. Rather than expand the range, plotAsp expands the margins through padding to keep the aspect ratio accurate.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

Examples

```r
local(envir=.PBSmodEnv,expr=
  oldpar = par(no.readonly=TRUE)
  x <- seq(0,10,0.1)
  y <- sin(x)
  par(mfrow=2:1)
  plotAsp(x,y,asp=1,xlim=c(0,10),ylim=c(-2,2), main="sin(x)")
  plotAsp(x,y^2,asp=1,xlim=c(0,10),ylim=c(-2,2), main="sin^2(x)"
  par(oldpar)
)
```
plotBubbles

Construct a Bubble Plot from a Matrix

Description

Construct a bubble plot for a matrix \( z \).

Usage

\[
\text{plotBubbles}(z, xval=FALSE, yval=FALSE, dnam=FALSE, rpro=FALSE, cpro=FALSE, rres=FALSE, cres=FALSE, powr=0.5, size=0.2, lwd=1, clrs=c("black","red","blue"), hide@=FALSE, frange=0.1, prettyaxis=FALSE, \ldots)
\]

Arguments

- **z**: input matrix, array (2 dimensions) or data frame.
- **xval**: x-values and/or labels for the columns of \( z \). if \( \text{xval=} \text{TRUE} \), the first row contains x-values for the columns.
- **yval**: y-values and/or labels for the rows of \( z \). If \( \text{yval=} \text{TRUE} \), the first column contains y-values for the rows.
- **dnam**: logical: if \( \text{TRUE} \), attempt to use \text{dimnames} of input matrix \( z \) as \( \text{xval} \) and \( \text{yval} \). The \text{dimnames} are converted to numeric values and must be strictly increasing or decreasing. If successful, these values will overwrite previously specified values of \( \text{xval} \) and \( \text{yval} \) or any default indices.
- **rpro**: logical: if \( \text{TRUE} \), convert rows to proportions.
- **cpro**: logical: if \( \text{TRUE} \), convert columns to proportions.
- **rres**: logical: if \( \text{TRUE} \), use row residuals (subtract row means).
- **cres**: logical: if \( \text{TRUE} \), use column residuals (subtract column means).
- **powr**: power transform. Radii are proportional to \( z^{\text{powr}} \). Note: \( \text{powr=} \text{0.5} \) yields bubble areas proportional to \( z \).
- **size**: size (inches) of the largest bubble.
- **lwd**: line width for drawing circles.
- **clrs**: colours (3-element vector) used for positive, negative, and zero values, respectively.
- **hide@**: logical: if \( \text{TRUE} \), hide zero-value bubbles.
- **frange**: number specifying the fraction by which the range of the axes should be extended.
- **prettyaxis**: logical: if \( \text{TRUE} \), apply the pretty function to both axes.
- **\ldots**: additional arguments for plotting functions.
The function `plotBubbles` essentially flips the `z` matrix visually. The columns of `z` become the x-values while the rows of `z` become the y-values, where the first row is displayed as the bottom y-value and the last row is displayed as the top y-value. The function’s original intention was to display proportions-at-age vs. year.

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`genMatrix`

**Examples**

```r
local(envir=.PBSmodEnv,expr=
  oldpar = par(no.readonly=TRUE)
  plotBubbles(round(genMatrix(40,20),0),clrs=c("green","grey","red"));
  data(CCA.qbr,envir=.PBSmodEnv)
  plotBubbles(CCA.qbr,cpro=TRUE,powr=.5,dnam=TRUE,size=.15,
    ylim=c(0,70),xlab="Year",ylab="Quillback Rockfish Age")
  par(oldpar)
)
```

---

**plotCsum**

**Plot Cumulative Sum of Data**

**Description**

Plot the cumulative frequency of a data vector or matrix, showing the median and mean of the distribution.

**Usage**

```r
plotCsum(x, add = FALSE, ylim = c(0, 1), xlab = "Measure",
  ylab = "Cumulative Proportion", ...)
```

**Arguments**

- `x` vector or matrix of numeric values.
- `add` logical: if TRUE, add the cumulative frequency curve to a current plot.
- `ylim` limits for the y-axis.
- `xlab` label for the x-axis.
- `ylab` label for the y-axis.
- `...` additional arguments for the `plot` function.
plotDens

Author(s)
Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Examples

```r
local(envir=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)
  x <- rgamma(n=1000,shape=2)
  plotCsum(x)
  par(oldpar)
})
```

---

**plotDens**  
*Plot Density Curves from a Data Frame, Matrix, or Vector*

**Description**
Plot the density curves from a data frame, matrix, or vector. The mean density curve of the data combined is also shown.

**Usage**

```r
plotDens(file, clrs=c("blue","red","green","magenta","navy"), ...)
```

**Arguments**

- `file`  
data frame, matrix, or vector of numeric values.
- `clrs`  
vector of colours. Patterns are repeated if the number of fields exceed the length of `clrs`.
- `...`  
additional arguments for `plot` or `lines`.

**Details**
This function is designed primarily to give greater flexibility when viewing results from the R-package BRugs. Use `plotDens` in conjunction with `samplesHistory("*",beg=0,plot=FALSE)` rather than `samplesDensity` which calls `plotDensity`.

**Author(s)**
Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**Examples**

```r
local(envir=.PBSmodEnv,expr={
  oldpar = par(no.readonly=TRUE)
  z <- data.frame(y1=rnorm(50, sd=2), y2=rnorm(50, sd=1), y3=rnorm(50, sd=.5))
  plotDens(z, lwd=3)
  par(oldpar)
})
```
plotFriedEggs  

Render a Pairs Plot as Fried Eggs and Beer

**Description**

Create a pairs plot where the lower left half comprises either fried egg contours or smoke ring contours, the upper right half comprises glasses of beer filled to the correlation point, and the diagonals show frequency histograms of the input data.

**Usage**

```r
plotFriedEggs(A, eggs=TRUE, rings=TRUE, levs=c(0.01,0.1,0.5,0.75,0.95),
              pepper=200, replace=FALSE, jitt=c(1,1), bw=25, histclr=NULL)
```

**Arguments**

- `A`: data frame or matrix for use in a pairs plot.
- `eggs`: logical: if TRUE, fry eggs in the lower panels.
- `rings`: logical: if TRUE, blow smoke rings in the lower panels.
- `levs`: explicit contour levels expressed as quantiles.
- `pepper`: number of samples to draw from `A` to pepper the plots.
- `replace`: logical: if TRUE, sample `A` with replacement.
- `jitt`: argument factor used by function `base::jitter` when peppering. If user supplies two numbers, the first will jitter `x`, the second will jitter `y`.
- `bw`: argument bandwidth used by function `KernSmooth::bkde2D`.
- `histclr`: user-specified colour(s) for histogram bars along the diagonal.

**Details**

This function comes to us from Dr. Steve Martell of the Fisheries Science Centre at UBC. Obviously many hours of contemplation with his students at the local pub have contributed to this unique rendition of a pairs plot.

**Note**

- If `eggs=TRUE` and `rings=FALSE`, fried eggs are served.
- If `eggs=FALSE` and `rings=TRUE`, smoke rings are blown.
- If `eggs=TRUE` and `rings=TRUE`, only fried eggs are served.
- If `eggs=FALSE` and `rings=FALSE`, only pepper is sprinkled.

**Author(s)**

Steve Martell, International Pacific Halibut Commission, Seattle WA
\textbf{plotSidebars}  

\textit{Plot Table as Horizontal Sidebars}

\textbf{Description}

Plot \((x,y)\) table (matrix or data frame) as horizontal sidebars.

\textbf{Usage}

\begin{verbatim}
plotSidebars(z, scale = 1, col = lucent("blue", 0.25), ...)
\end{verbatim}

\textbf{Arguments}

\begin{itemize}
  \item \texttt{z} \hspace{1cm} data frame or matrix of \(z\)-values (e.g., age frequencies) where rows form the plot’s \(y\)-values and columns describe the grouping variable along the \(x\)-axis.
  \item \texttt{scale} \hspace{1cm} numeric scale factor controlling the leftward expansion of \(z\)-value bars.
  \item \texttt{col} \hspace{1cm} colour to fill bars.
  \item \texttt{...} \hspace{1cm} additional parameters used by \texttt{par} and \texttt{polygon}. The user can also pass in two non-formal arguments to control the function:
  \hspace{1cm} \texttt{lb1} – labels for the \(x\)- and \(y\)-axis;
  \hspace{1cm} \texttt{margin} – function to report margin summaries.
\end{itemize}

\textbf{Details}

Plots \(z\)-data as horizontal bars arising from an \(x\)-coordinate controlled by the column names of \(z\). The bars extend left along the \(y\)-coordinate by \(z*\text{scale}\) from the central \(x\)-coordinate.
plotTrace

Plot Trace Lines from a Data Frame, Matrix, or Vector

Description

Plot trace lines from a data frame or matrix where the first field contains x-values, and subsequent fields give y-values to be traced over x. If input is a vector, this is traced over the number of observations.

Usage

plotTrace(file, clrs=c("blue","red","green","magenta","navy"), ...)

Arguments

file data frame or matrix of x and y-values, or a vector of y-values.
clrs vector of colours. Patterns are repeated if the number of traces (y-fields) exceed the length of clrs.
... additional arguments for plot or lines.

Details

This function is designed primarily to give greater flexibility when viewing results from the R-package BRugs. Use plotTrace in conjunction with samplesHistory("*",beg=0,plot=FALSE) rather than samplesHistory which calls plotHistory.
Author(s)
Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Examples

```r
local(envir=.PBSmodEnv,expr=
  {
    oldpar = par(no.readonly=TRUE)
    z <- data.frame(x=1:50,y1=rnorm(50, sd=3), y2=rnorm(50, sd=1), y3=rnorm(50, sd=.25))
    plotTrace(z, lwd=3)
    par(oldpar)
  })
```

---

**presentTalk**  
*Run a Presentation in R*

---

Description

Start an R talk from a *talk description file* that launches a control GUI.

Usage

```r
presentTalk(talk)
```

Arguments

talk  
name of file containing XML code (e.g., *swisstalk.xml*).

Details

The function `presentTalk` is a tool that facilitates lectures and workshops in R. The function allows the presenter to show code snippets alongside their execution, making use of R’s graphical capabilities. When `presentTalk` is called, a graphical user interface (GUI) is launched that allows the user to control the flow of the talk (e.g., switching between talks or skipping to various sections of a talk).

The automatic control buttons allow the user to move forward or backward in the talk. The **Go** button moves forward one tag segment, the **Back** button moves back to the previous tag segment. The blue buttons allow movement among sections – **Prev** to the previous section, **Restart** to the start of the current section, and **Next** to the next section. Drop down lists are provided for both indicating the current section and slide number and as an additional interface for jumping between different sections or slide numbers.

In addition to the automatic menu items, a user can add buttons to the GUI that accomplish similar purposes.

Note

See the PBSmodelling User’s Guide for more information.
Author(s)
Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also
See `PBStalk-class` for more details on PBSmodelling's talk presentation classes.

Examples

```r
local(envir=.PBSmodEnv, expr=
  {
    cwd = getwd()
    talk_dir <- system.file("examples", package = "PBSmodelling")
    setwd(talk_dir)
    presentTalk("swisstalk.xml") # closing the GUI should restore cwd
  })
```

**promptWriteOptions**  
*Prompt the User to Write Changed Options*

Description
If changes have been made to PBS options, this function allows the user to choose whether to write PBS options to an external file that can be loaded later by `readPBSoptions`.

Usage

```r
promptWriteOptions(fname="")
```

Arguments

- **fname**  
  name of file where options will be saved.

Details
If there are options that have been changed in the GUI but have not been committed to PBSmodelling memory in the global R environment, the user is prompted to choose whether or not to commit these options.

Then, if any PBS options have been changed, the user is prompted to choose whether to save these options to the file `fname`. (When a new R session is started or when a call to `readPBSoptions` or `writePBSoptions` is made, PBS options are considered to be unchanged; when an option is set, the options are considered to be changed).

If `fname=""`, the user is prompted to save under the file name last used by a call to `readPBSoptions` or `writePBSoptions` if available. Otherwise, the default file name "PBSoptions.txt" is used.

Author(s)
Anisa Egeli, Vancouver Island University, Nanaimo BC
See Also

`writePBSoptions`, `readPBSoptions`, `setPBSoptions`

Examples

```r
text = c("peter", "peter", "katie")
writePBSoptions(text, filename = "wmap.txt")
readPBSoptions("wmap.txt")
```

```r
## Not run:
local(envir=.PBSmodEnv, expr=
  promptWriteOptions() # uses default filename PBSoptions.txt
)

## End(Not run)
```

### readList

**Read a List from an ASCII File**

Description

Read in a list previously saved to an ASCII file by various R functions such as `dput`, `dump`, and `writelist`. The latter can render lists in a convenient **PBSmodelling** format. The function `readList` detects the format automatically.

For information about the **PBSmodelling** format, see `writelist`.

Usage

```r
readList(fname)
```

Arguments

- `fname` file name of the text file containing the list.

Value

Returns a list object from ASCII files originally formatted in one of the following ways:

- "D" = created by the R functions `dput` or `dump`;
- "R" = R list object that uses ‘structure’ (e.g., Windows History file);
- "P" = PBS-formatted file (see `writeList`);
- "C" = comment-delimited file (e.g., Awatea/Coleraine input files).

Warning

When importing a list in the PBSmodelling ("P") format, if two list elements share the same name, the list will import incorrectly.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC
See Also

packList, unpackList, writeList

readPBSoptions  
Read PBS Options from an External File

Description

Load options that were saved using writePBSoptions, for use with openFile, getPBSoptions or interfaces such as loadC.

Usage

readPBSoptions(fname="PBSoptions.txt")

Arguments

fname       file name or full path of file from which the options will be loaded.

Note

If an option exists in R memory but not in the saved file, the option is not cleared from memory.

Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also

writePBSoptions, getGUIoptions, openFile, getPBSoptions

resetGraph  
Reset par Values for a Plot

Description

Reset par() to default values to ensure that a new plot utilizes a full figure region. This function helps manage the device surface, especially after previous plotting has altered it.

Usage

resetGraph(reset.mf=TRUE)

Arguments

reset.mf       if TRUE reset the multi-frame status; otherwise preserve mfrow, mfcol, and mfg
This function resets par() to its default values. If reset.mf=TRUE, it also clears the graphics device with frame(). Otherwise, the values of mfr, mfc, and mf are preserved, and graphics continues as usual in the current plot. Use resetGraph only before a high level command that would routinely advance to a new frame.

Value

invisible return of the reset value par()

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

Arguments

S scaled parameter vector.
pvec a data frame comprising four columns - c("val", "min", "max", "active") and as many rows as there are model parameters. The "active" field (logical) determines whether the parameters are estimated (TRUE) or remain fixed (FALSE).

Details

Restoration algorithm: \[ P = P_{\text{min}} + (P_{\text{max}} - P_{\text{min}})(\sin(\frac{\pi S}{2}))^2 \]

Value

Parameter vector converted from scaled units to original units specified by pvec.

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

scalePar, calcMin, GT0
runDemos

Examples

\[
\text{local(}\text{envir=.PBSmodEnv,}\text{expr=}{
  \text{pvec} \leftarrow \text{data.frame(val=c(1,100,10000),min=c(0,0,0),max=c(5,500,50000),}
  \text{active=c(TRUE,TRUE,TRUE)})
  \text{S} \leftarrow c(5,5.5)
  \text{P} \leftarrow \text{restorePar}(\text{S,pvec})
  \text{print(cbind(pvec,S,P))}
}\)
\]

runDemos

Interactive GUI for R Demos

Description

An interactive GUI for accessing demos from any R package installed on the user's system. runDemos is a convenient alternative to R's demo function.

Usage

runDemos(package)

Arguments

package display demos from a particular package (optional).

Details

If the argument package is not specified, the function will look for demos in all packages installed on the user's system.

Note

The runDemos GUI attempts to retain the user's objects and restore the working directory. However, pre-existing objects will be overwritten if their names coincide with names used by the various demos. Also, depending on conditions, the user may lose working directory focus. We suggest that cautious users run this demo from a project where data objects are not critical.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

runExamples for examples specific to PBSmodelling.
Description

Display a GUI to demonstrate one PBS Modelling example.
The example source files can be found in the R directory .../library/PBSmodelling/examples.

Usage

runExample(ex, pkg="PBSmodelling")

Arguments

- **ex**: string specifying an example in the pkg directory examples.
- **pkg**: package with an examples subdirectory.

Details

If no example is specified or if the example does not exist, a GUI pops up informing you of potential choices. Note that the string choice is case-sensitive.

Some examples use external packages which must be installed to work correctly:

- BRugs - LinReg, MarkRec, and CCA;
- odesolve/PBSddesolve - FishRes;
- PBSmapping - FishTows.

Note

The examples are copied from .../library/PBSmodelling/examples to R’s current temporary working directory and run from there.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

runDemos, runExamples
runExamples \hspace{5mm} \textit{Run GUI Examples Included with PBS Modelling}

\textbf{Description}

Display an interactive GUI to demonstrate PBS Modelling examples. The example source files can be found in the R directory \texttt{.../library/PBSmodelling/examples}.

\textbf{Usage}

\begin{verbatim}
runExamples()
\end{verbatim}

\textbf{Details}

Some examples use external packages which must be installed to work correctly:

\begin{itemize}
  \item \texttt{BRugs-LinReg, MarkRec, and CCA;}
  \item \texttt{odesolve/PBSddesolve - FishRes;}
  \item \texttt{PBSmapping - FishTows.}
\end{itemize}

\textbf{Note}

The examples are copied from \texttt{.../library/PBSmodelling/examples} to R’s current temporary working directory and run from there.

\textbf{Author(s)}

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

\textbf{See Also}

\begin{verbatim}
runDemos, runExample
\end{verbatim}

\scalePar \hspace{5mm} \textit{Scale Parameters to [0,1]}

\textbf{Description}

Scale parameters for function minimization by \texttt{calcMin}.

\textbf{Usage}

\begin{verbatim}
scalePar(pvec)
\end{verbatim}
selectDir

Arguments

pvec a data frame comprising four columns - `c(val, min, max, active)` and as many rows as there are model parameters. The "active" field (logical) determines whether the parameters are estimated (TRUE) or remain fixed (FALSE).

Details

Scaling algorithm: 
\[ S = \frac{2}{\pi} \sin \sqrt{\frac{P - P_{\min}}{P_{\max} - P_{\min}}} \]

Value

Parameter vector scaled between 0 and 1.

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

`restorePar`, `calcMin`, `GT0`

Examples

```r
local(envir=.PBSmodEnv, expr={
  pvec <- data.frame(val=c(1,100,100000),min=c(0,0,0),max=c(5,500,50000),
    active=c(TRUE,TRUE,TRUE))
  S <- scalePar(pvec)
  print(cbind(pvec,S))
})
```

selectDir

Display Dialogue: Select directory

Description

Display the default directory chooser prompt provided by the Operating System.

Usage

```r
selectDir(initialdir=getwd(), mustexist=TRUE, title="", usewidget=NULL)
```

Arguments

```
initialdir initially selected directory
mustexist if logical value is TRUE, only an existing directory can be selected
title title for the prompt window
usewidget store the selected directory in the named entry widget
```
selectFile

Value
The directory path selected by the user

Author(s)
Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also
selectFile

Examples
```r
## Not run:
local(envir=.PBSmodEnv,expr={
  dir(selectDir(title="select a directory to list contents of"))
}

#integration with widget via doAction
createWin( c( "entry foo mode=character", "button text=\"select dir\"
  func=doAction action="\"selectDir(usewidget='foo')\"", astext=TRUE )
})

## End(Not run)
```

selectFile Display Dialogue: Open or Save File

Description
Display the default **Open** or **Save** prompt provided by the Operating System.

Usage
```r
selectFile(initialfile="", initialdir=getwd(),
  filetype=list(c("\","All Files")), mode="open", multiple=FALSE,
  title="\", defaultextension="", usewidget=NULL)
```

Arguments
- `initialfile` initially selected file
- `initialdir` initially directory the dialog opens
- `filetype` a list of character vectors indicating file types made available to users of the GUI. Each vector is of length one or two. The first element specifies either the file extension or "\" for all file types. The second element gives an optional descriptor name for the file type. The supplied `filetype` list appears as a set of choices in the pull-down box labelled "Files of type: ".
**setFileOption**

Set a PBS File Path Option Interactively

**Description**
Set a PBS option by browsing for a file. This function provides an alternative to using `setPBSoptions` when setting an option that has a path to a file as its value.

**Usage**

```
setFileOption(option)
```

**Arguments**

- `option` name PBS option to change
setGUIoptions

Description

Set PBS options from corresponding values of widgets in a GUI.

Usage

setGUIoptions(option)

Arguments

option the name of a single option or the string "*".

Details

A GUI may have PBS options that it uses, which have corresponding widgets that are used for entering values for these options. These are declared by declareGUIoptions.

If the option argument is the name of an option, setGUIoptions transfers the value of this option from a same-named widget into PBS options global R environment database.

If the option argument is "*", then all the options that have been declared by declareGUIoptions will be transferred in this fashion.

To use this function in a window description file, the option argument must be specified as the action of the widget that calls setGUIoptions – action=editor or action=*, for example.
**setPathOption**

**Note**

If all the required arguments are missing, it is assumed that the function is being called by a GUI widget.

**Author(s)**

Anisa Egeli, Vancouver Island University, Nanaimo BC

**See Also**

declareGUIoptions, getGUIoptions, setPBSoptions.

**Examples**

```r
## Not run:
local(envir=.PBSmodEnv,expr={
    setGUIoptions("editor")
})

## End(Not run)
```

---

**setPathOption**  
*Set a PBS Path Option Interactively*

**Description**

Set a PBS option by browsing for a directory. This function provides an alternative to using setPBSoptions when setting an option that has a path as its value.

**Usage**

```r
setPathOption(option)
```

**Arguments**

- **option**: name PBS option to change

**Note**

If all the required arguments are missing, it is assumed that the function is being called by a GUI widget.

**Author(s)**

Anisa Egeli, Vancouver Island University, Nanaimo BC

**See Also**

setFileOption, setPBSoptions
setPBSext

**Examples**

```plaintext
## Not run:
local(envir=.PBSmodEnv,expr={
    setPathOption("myPath")
})

## End(Not run)
```

---

**setPBSext**  
*Set a Command Associated with a File Name Extension*

---

**Description**

Set a command with an associated extension, for use in `openFile`. The command must specify where the target file name is inserted by indicating a "%f".

**Usage**

```plaintext
setPBSext(ext, cmd)
```

**Arguments**

- `ext`  
  string specifying the extension suffix.

- `cmd`  
  command string to associate with the extension.

**Note**

These values are not saved from one *PBS Modelling* session to the next.

**Author(s)**

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

**See Also**

`getPBSext`, `openFile`, `clearPBSext`
setPBSoptions 85

setPBSoptions  Set A User Option

Description

Options set by the user for use by other functions.

Usage

setPBSoptions(option, value, sublist=FALSE)

Arguments

option name of the option to set.
value new value to assign this option.
sublist if value is a sublist (list component) of option, this list component can be changed individually using sublist=TRUE.

Details

Objects can be placed into the PBS options manager (see PBSoptions-class). If the user wishes to change the object associated with an option, issue the command:

setPBSoptions("someOldOption",someNewOption)

If an option comprises a list object, a user can alter specific components of the list by activating the sublist argument:

setPBSoptions(option="myList", value=list(gamma=130), sublist=TRUE)

See example below.

Note

A value .PBSmod$.options$.optionsChanged is set to TRUE when an option is changed, so that the user doesn’t always have to be prompted to save the options file.
By default, .PBSmod$.options$.optionsChanged is not set or NULL.
Also, if an option is set to "" or NULL then it is removed.
.initPBSOptions() is now called first (options starting with a dot "." do not set .optionsChanged).

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

getPBSoptions, writePBSoptions, readPBSoptions
Examples

```r
local(envir=.PBSmodEnv, expr={
    myList=list(alpha=1, beta=2, gamma=3, delta=4)
    setPBSOptions(option="myList", myList)
    cat("Original myList:\n-------------------\n")
    print(getPBSOptions("myList"))
    setPBSOptions(option="myList", value=list(gamma=130), sublist=TRUE)
    cat("Revised myList:\n-------------------\n")
    print(getPBSOptions("myList"))
})
```
The setWidgetColor function allows dynamic updating of widget colors during program execution. However, two factors determine whether dynamic color updating is possible for a particular widget: (i) the type of widget, and (ii) the nature of the Tk implementation in the underlying widget library. Thus, a given widget may not support all combinations of colour variables. The following widgets support the corresponding options:

- **button**: fg, bg, disablefg
- **check**: fg, bg, disablefg, entryfg, entrybg
- **data**: entryfg, entrybg, noeditfg, noeditbg
- **droplist**: fg, bg
- **entry**: entryfg, entrybg, noeditfg, noeditbg
- **label**: fg, bg
- **matrix**: entryfg, entrybg, noeditfg, noeditbg
- **object**: entryfg, entrybg, noeditfg, noeditbg
- **progressbar**: fg, bg
- **radio**: fg, bg
- **slide**: fg, bg
- **spinbox**: entryfg, entrybg
- **text**: fg, bg
- **vector**: entryfg, entrybg, noeditfg, noeditbg

These options are described in the PBSmodelling User Guide under Appendix A.

Be aware that Tk uses gray for the highlight color during a selection operation. This means that when the background colour is also gray, there is no visual clue that the value has been selected for a copy operation.

**Author(s)**

Alex Couture-Beil (VIU, Nanaimo BC) and Allen R. Kronlund (PBS, Nanaimo BC)
Examples

```r
local(envir=.PBSmodEnv,expr={
  createWin("label \"hello world\" name=hello", astext=TRUE)
  setWidgetColor( "hello", bg="lightgreen", fg="purple" )
})
local(envir=.PBSmodEnv,expr={
  createWin("vector names=v length=3 values="1 2 3\"", astext=TRUE)
  setWidgetColor( "v[1]", entrybg="lightgreen", entryfg="purple" )
  setWidgetColor( "v[2]", entrybg="green", entryfg="purple" )
  setWidgetColor( "v[3]", entrybg="forestgreen", entryfg="purple" )
})
```

---

**setWidgetState**  
*Update Widget State*

**Description**

Update the read-only state of a widget.

**Usage**

```r
setWidgetState( varname, state, radiovalue, winname, warn=TRUE )
```

**Arguments**

- `varname`  
  the name of the widget
- `state`  
  "normal" or "disabled" and for some widgets "readonly" as described under Details below.
- `radiovalue`  
  if specified, disable a particular radio option, as identified by the value, rather than the complete set (identified by the common name)
- `winname`  
  window from which to select the GUI widget. The window that most recently receive user input is used by default if winname is not supplied.
- `warn`  
  if TRUE, display a warning if readonly is converted to disabled (only applies for widgets that don’t accept readonly)

**Details**

The `setWidgetState` function allows dynamic control of widget functioning during program execution. The function serves as a wrapper for the `tkconfigure` function available in the underlying Tk libraries used by PBS Modelling. Thus, `setWidgetState` is only available for those widgets that use Tk library widgets.

The state of the following PBS Modelling widgets can be set to "normal" or "disabled": button, check, data, droplist, entry, matrix, object, radio, slide, spinbox, table, text, and vector. When the state variable is set to “disabled”, values displayed in the widget cannot be changed or copied except in the case of the object and table widgets which permit the values to be copied.
The data, entry, matrix, and vector widgets support a "readonly" state that allows values displayed in the widget to be copied but not changed. The displayed value can be selected using the keyboard or mouse. However, the copy and paste operations can only be accomplished via Ctrl-C and Ctrl-V, respectively, not the mouse.

Be aware that Tk uses gray for the highlight color during a selection operation. This means that when the background colour is also gray, there is no visual clue that the value has been selected for a copy operation.

Exceptions to the behaviour determined by state include the object, table and text widgets. There is no "readonly" state applicable to these widgets. Nevertheless, the values displayed can be copied even when the state is "disabled".

Individual radio widgets grouped by the name variable of a radio declaration can be updated by specifying radioValue in the call to setWidgetState.

The state of individual elements in the data, matrix, and vector widgets can be updated by indexing. For the vector and matrix widgets any element can be addressed by appending the desired index to the widget name using square brackets (e.g., "myVec[2]" or "myMatrix[2,3]"). The data widget is indexed differently than the matrix widget by adding "d" after the brackets (e.g., "myData[1,1]d"). This change in syntax is required for internal coding of PBS Modelling.

Author(s)

Alex Couture-Beil (VIU, Nanaimo BC) and Allen R. Kronlund (PBS, Nanaimo BC)

Examples

```r
## Not run:
local(envir=.PBSmodEnv,expr={
  winDesc <- c('vector length=3 name=vec labels="normal disabled readonly" values="1 2 3"',
               "matrix nrow=2 ncol=2 name=mat", "button name=but_name" );
  createWin(winDesc, astext=TRUE)
  setWidgetState( "vec[1]", "normal" )
  setWidgetState( "vec[2]", "disabled" )
  setWidgetState( "vec[3]", "readonly" )
  setWidgetState( "mat", "readonly" )
  setWinVal( list( mat = matrix( 1:4, 2, 2 ) ) )
  #works for buttons too
  setWidgetState( "but_name", "disabled" )
})
## End(Not run)
```
Description

Append a string value specifying an action to the first position of an action vector.

Usage

setWinAct(winName, action)

Arguments

- winName: window name where action is taking place.
- action: string value describing an action.

Details

When a function is called from a GUI, a string descriptor associated with the action of the function is stored internally (appended to the first position of the action vector). A user can utilize this action as a type of argument for programming purposes. The command getWinAct() yields the latest action.

Sometimes it is useful to “fake” an action. Calling setWinAct allows the recording of an action, even if a button has not been pressed.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

setWinVal Update Widget Values

Description

Update a widget with a new value.

Usage

setWinVal(vars, winName)

Arguments

- vars: a list or vector with named components.
- winName: window from which to select GUI widget values. The default takes the window that has most recently received new user input.
Details

The vars argument expects a list or vector with named elements. Every element name corresponds to the widget name which will be updated with the supplied element value.

The vector, matrix, and data widgets can be updated in several ways. If more than one name is specified for the names argument of these widgets, each element is treated like an entry widget.

If however, a single name describes any of these three widgets, the entire widget can be updated by passing an appropriately sized object.

Alternatively, any element can be updated by appending its index in square brackets to the end of the name. The data widget is indexed differently than the matrix widget by adding "d" after the brackets. This tweak is necessary for the internal coding (bookkeeping) of PBS Modelling. Example: "foo[1,1]d".

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

getWinVal, createWin

Examples

## Not run:
local(envir=.PBSmodEnv, expr={
  winDesc <- c("vector length=3 name=vec",
               "matrix nrow=2 ncol=2 name=mat", "slideplus name=foo"contest=TRUE)
  createWin(winDesc, aslist=TRUE)
  setWinVal(list(vec=1:3, "mat[1,1]"=123, foo.max=1.5, foo.min=0.25, foo=0.7))
})

## End(Not run)

show0

Convert Numbers into Text with Specified Decimal Places

Description

Return a character representation of a number with added zeroes out to a specified number of decimal places.

Usage

show0(x, n, add2int=FALSE, round2n=FALSE)
Arguments

- x: numeric data (scalar, vector, or matrix).
- n: number of decimal places to show, including zeroes.
- add2int: if TRUE, add zeroes to integers after the decimal.
- round2n: if TRUE, round x first to n decimal places.

Value

A scalar/vector of strings representing numbers. Useful for labelling purposes.

Note

By default, this function does not round or truncate numbers. It simply adds zeroes if n is greater than the available digits in the decimal part of a number. The user can choose to round the numbers first by setting argument round2n = TRUE.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

pad0, GT0

Examples

```r
local(envir=.PBSmodEnv, expr={
  oldpar = par(no.readonly=TRUE)
  frame()

  # do not show decimals on integers
  addLabel(0.25, 0.75, show0(15.2,4))
  addLabel(0.25, 0.7, show0(15.1,4))
  addLabel(0.25, 0.65, show0(15,4))

  # show decimals on integers
  addLabel(0.25, 0.55, show0(15.2,4,TRUE))
  addLabel(0.25, 0.5, show0(15.1,4,TRUE))
  addLabel(0.25, 0.45, show0(15,4,TRUE))
  par(oldpar)
})
```
showAlert

Display a Message in an Alert Window

Description

Display an alert window that contains a specified message and an OK button for dismissing the window.

Usage

showAlert(message, title="Alert", icon="warning")

Arguments

- message: message to display in alert window
- title: title of alert window
- icon: icon to display in alert window; options are "error", "info", "question", or "warning".

Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also

getYes

Examples

```r
# Not run:
local(envir=.PBSmodEnv, expr={
  showAlert("Hello World!")
})

# End(Not run)
```

showArgs

Display Expected Widget Arguments

Description

For each widget specified, display its arguments in order with their default values. The display list can be expanded to report each argument on a single line.
showHelp

Usage

showArgs(widget, width=70, showargs=FALSE)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>widget</td>
<td>vector string of widget names; if not specified (default), the function displays information about all widgets in alphabetical order.</td>
</tr>
<tr>
<td>width</td>
<td>numeric width used by <code>strwrap</code> to wrap lines of the widget usage section.</td>
</tr>
<tr>
<td>showargs</td>
<td>logical; if TRUE, the display also lists each argument on single line after the widget usage section.</td>
</tr>
</tbody>
</table>

Value

A text stream to the R console. Invisibly returns the widget usage lines.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

showHelp

Display HTML Help Pages for Packages in Browser

Description

Display the help pages for installed packages that match the supplied pattern in an HTML browser window.

Usage

showHelp(pattern="methods", ...)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pattern</td>
<td>string pattern to match to package names</td>
</tr>
<tr>
<td>...</td>
<td>allows user to specify two additional arguments:</td>
</tr>
<tr>
<td></td>
<td>remote - character string giving a valid URL for the <code>R_HOME</code> directory on a remote location;</td>
</tr>
<tr>
<td></td>
<td>update - logical; if TRUE, attempt to update the package index to reflect the currently available packages. (Not attempted if remote is non-NULL.)</td>
</tr>
</tbody>
</table>

Details

The specified pattern is matched to R-packages installed on the user’s system. The code uses the `utils` function `browseURL` to display the HTML Help Pages using a browser that the system associates with html extensions. (See help for `browseURL` for other operating systems.)
showPacks

Value

A list is invisibly returned, comprising:

- **Apacks**: all packages installed on user’s system
- **Spacks**: selected packages based on specified pattern
- **URLs**: path and file name of HTML Help Page

Help pages are displayed in a separate browser window.

Note

The connection time for browsers (at least in Windows OS) is slow. If the HTML browser program is not already running, multiple matching pages will most likely not be displayed. However, subsequent calls to `showHelp` should show all matches.

This function will now only work in R (>=3.2.0) or from SVN revision >= 67548. The CRAN gurus now disallow direct calls to `tools:::httpdPort`.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

`viewCode`, `showPacks`

---

showPacks  

*Show Packages Required But Not Installed*

Description

Show the packages specified by the user and compare these to the installed packages on the user’s system. Display packages not installed.

Usage

```r
showPacks(packs=c("PBSmodelling","PBSmapping","PBSdodesolve",  
"rgl","deSolve","akima","deldir","sp","maptools","KernSmooth"))
```

Arguments

- **packs**: string vector of package names that are compared to installed packages.

Value

Invisibly returns a list of Apacks (all packages installed on user’s system), Spacks (packages in packs that are installed), and Mpacks (packages that are missing).
showRes

**Description**

Evaluate the supplied expression, reflect it on the command line, and show the results of the evaluation.

**Usage**

```
showRes(x, cr=TRUE, pau=TRUE)
```

**Arguments**

- **x**
  - an R expression to evaluate
- **cr**
  - logical: if TRUE, introduce extra carriage returns
- **pau**
  - logical: if TRUE, pause after expression reflection and execution

**Value**

The results of the expression are return invisibly.

**Author(s)**

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**Examples**

```
local(envir=.PBSmodEnv,expr={
  showRes("x=rnorm(100)",pau=FALSE)
})
```
showVignettes  Display Vignettes for Packages

Description

Create a GUI that displays all vignettes for installed packages. The user can choose to view the
source file for building the vignette or the final .pdf file.

Usage

showVignettes(package)

Arguments

package character string specifying package name that exists in the user’s R library

Details

If the argument package is not specified, the function will look for vignettes in all packages installed
on the user’s system. The user can choose to view the source file for building the vignette (usually
*.Rnw or *.Snw files) or the final build from the source code (*.pdf).

showVignettes uses the PBSmodelling function openFile to display the .Rnw and .pdf files
using programs that the system associates with these extensions. On systems that do not support
file extension associations, the function setPBSext can temporarily set a command to associate
with an extension.

Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also

showHelp, openFile, setPBSext, getPBSext

sortHistory  Sort an Active or Saved History

Description

Utility to sort history. When called without any arguments, an interactive GUI is used to pick which
history to sort. When called with hisname, sort this active history widget. When called with file
and outfile, sort the history located in file and save to outfile.

Usage

sortHistory(file="", outfile=file, hisname="")
Arguments

file       file name of saved history to sort.
outfile    file to save sorted history to.
hisname    name of active history widget and window it is located in, given in the form WINDOW.HISTORY.

Details

After selecting a history to sort (either from given arguments, or interactive GUI) the R data editor window will be displayed. The editor will have one column named "new" which will have numbers 1,2,3,...,n. This represents the current ordering of the history. You may change the numbers around to define a new order. The list is sorted by reassigning the index in row i as index i.

For example, if the history had three items 1,2,3. Reordering this to 3,2,1 will reverse the order; changing the list to 1,2,1,1 will remove entry 3 and create two duplicates of entry 1.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

importHistory, initHistory

talk-class  S4: Present Talk Classes

Description

The function presentTalk is a tool that facilitates lectures and workshops in R. It allows the presenter to show code snippets alongside their execution, making use of R’s graphical capabilities.

For presentTalk to work, six S4 class objects are created:
talk......root element that constitutes a talk;
section...branch element that defines a section within a talk;
text......leaf element that specifies text to be printed on the R console;
file......leaf element that specifies files to be opened by the OS;
code......leaf element that specifies R code to be executed;
break......leaf element that specifies where to allow a break in the talk.

The leaf elements, also termed primitive elements, occur in isolation and cannot contain other elements. Therefore, only two levels of nesting are supported: sections within a talk and primitives within a section.
Details

This function uses a convenience function called `xmlGetAttr` (from the package `XML`) that retrieves the value of a named attribute in an XML node.

The function `presentTalk` translates the XML code into a list structure called `.presentTalk` below the global object `.PBSmod`. The GUI is represented as a list structure called `presentwin` under `.PBSmod`, as for all GUI objects in `PBSmodelling`.

Slots Available

talk

name character string giving the name of the talk (required)
sections list list of sections within the talk
files list list of files within the talk

section

name character string giving the name of the section (required)
items list list of the four primitive (leaf-element) S4 classes
button logical should GUI have a button that selects section?
col integer column in lower section of GUI to place button
section_id integer specify if section does not immediately follow a talk

text
text character text to display on the R console
"break" logical break the presentation after displaying the text specified?

file

name character string giving the name in the GUI for a group of files to open (required)
filename character individual file names associated with the group name in the GUI
"break" logical break the presentation after opening the group of files?
button logical should GUI add a button that opens this group of files?
col integer column in lower section of GUI to place button

code

show logical show the code snippet in the R console?
print logical print the results of running the R code?
code character the actual chunk of R code
"break" character string describing where to introduce breaks in the code segment
eval logical evaluate the R code?
break

.xData NULL allows a break in the talk for user interaction on the R console.

Creating S4 Objects

Objects can be created by calls of the form:

```
new("talk", name=name)
new("section",
    name = node$attributes["name"],
    button = as.logical(xmlGetAttr(node,"button",FALSE)),
```
testAlpha

Description
Display how the alpha transparency for rgb() varies.

Usage
```r
testAlpha(alpha=seq(0,1,len=25), fg="blue", bg="yellow", border="black", grid=FALSE, ...)
```

Arguments
- `alpha` numeric vector of alpha transparency values values from 0 to 1.
- `fg` foreground colour of the top shape that varies in transparency.
- `bg` background colour (remains constant) of the underlying shape.
- `border` border colour (which also changes in transparency) of the foreground polygon.

Author(s)
Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also
- `presentTalk` for presenting a talk in R.
- `xmlGetAttr` for retrieving the value of a named attribute in an XML node.
- `setClass` for creating a class definition.
- `PBSoptions-class` for a complicated S4 class implementation.
grid logical: if TRUE, lay a grey grid on the background colour.

Value

Invisibly returns the compound RGB matrix for fg, alpha, bg, and border.

Author(s)

Jon T. Schnute, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

testcol, testPch, testLty, testLwd

testcol     Display Colours Available Using a Set of Strings

Description

Display colours as round patches in a plot. Useful for programming purposes. Colours can be specified in any of 3 different ways:
(i) by colour name,
(ii) by hexadecimal colour code created by rgb(), or
(iii) by calling one of the colour palettes.

Usage

testcol(cnam=colors()[sample(length(colors()),15)])

Arguments

cnam vector of colour names to display. Defaults to 15 random names from the color palette to use as patterns.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

pickCol, testAlpha, testPch, palettes
Examples

```r
local(envir=.PBSmodEnv,expr=
  # mix and match patterns
testCol(c("sky","fire","sea","wood"))
)
local(envir=.PBSmodEnv,expr=
  # display transparencies of blue
testCol(rgb(0,0,1,seq(0.05,1,0.05)))
)
local(envir=.PBSmodEnv,expr=
  # display colours of the rainbow
testCol(rainbow(64,end=0.75))
)
local(envir=.PBSmodEnv,expr=
  # display basic palette colours
testCol(1:length(palette()))
)
local(envir=.PBSmodEnv,expr=
  # mix colour types
testCol(c("#9e7ad3", "purple", 6))
)
```

---

testLty

### Display Line Types Available

**Description**

Display line types available.

**Usage**

`testLty(newframe=TRUE, n=1:18, ...)`

**Arguments**

- `newframe` if TRUE, create a new blank frame, otherwise overlay current frame.
- `n` vector of line type numbers.
- `...` additional arguments for function `lines`.

**Note**

Quick representation of line types for reference purposes.

**Author(s)**

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**See Also**

`testLwd`, `testPch`, `testCol`
**testLwd**  
*Display Line Widths*

**Description**

Display line widths. User can specify particular ranges for `lwd`. Colours can also be specified and are internally repeated as necessary.

**Usage**

```r
testLwd(lwd=1:20, col=c("black","blue"), newframe=TRUE)
```

**Arguments**

- `lwd`: line widths to display. Ranges can be specified.
- `col`: colours to use for lines. Patterns are repeated if `length(lwd) > length(col)`.
- `newframe`: if `TRUE`, create a new blank frame, otherwise overlay current frame.

**Author(s)**

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

**Examples**

```r
local(envir=.PBSmodEnv, expr=
  testLwd(3:15, col=c("salmon","aquamarine","gold"))
)
```

---

**testPch**  
*Display Plotting Symbols or Octal Strings*

**Description**

Display plotting symbols or octal strings. User can specify particular ranges (increasing continuous integer) for `pch`.

**Usage**

```r
testPch(pch=1:100, ncol=10, grid=TRUE, newframe=TRUE, octal=FALSE, ...)
```
Arguments

pch  symbol codes or octal string numbers.
ncol  number of columns in display (can only be 2, 5, or 10). Most sensibly this is set to 10.
grid logical: if TRUE, grid lines are plotted for visual aid.
newframe logical: if TRUE reset the graph, otherwise overlay on top of the current graph.
octal logical: if TRUE, show octal strings (backslash characters) used in text statements (e.g., "30\272C" = 30°C).
... additional arguments for functions points or text.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

testLty, testLwd, addLabel

Examples

```r
local(envir=.PBSmodEnv, expr=
  testPch(123:255)
)
local(envir=.PBSmodEnv, expr=
  testPch(1:25, ncol=5)
)
local(envir=.PBSmodEnv, expr=
  testPch(41:277, octal=TRUE)
)
```

description

Display an interactive GUI to demonstrate the available widgets in PBS Modelling. A text window displays the window description file source code. The user can modify this sample code and recreate the test GUI by pressing the button below.

The Window Description Files can be found in the R directory ...
library/PBSmodelling/testWidgets.

Usage

testWidgets()
Details

Following are the widgets and default values supported by PBS Modelling. For detailed descriptions, see Appendix A in 'PBSModelling-UG.pdf' located in the R directory ...

```r
button text="Calculate" font="" fg="black" bg="" disablefg=NULL
width=0 name=NULL function="" action="button" sticky=""
padx=0 pady=0

check name mode="logical" checked=FALSE text="" font="" fg="black"
bg="" disablefg=NULL function="" action="check" edit=TRUE
sticky="" padx=0 pady=0

data nrow ncol names modes="numeric" rowlabels=""
collabels="" rownames="X" colnames="Y" font="" fg="black" bg="" entryfont=""
entryfg="black" entrybg="white" noeditfg="black" noeditbg="gray"
values="" byrow=TRUE function="" enter=TRUE action="data"
edit=TRUE width=6 borderwidth=0 sticky="" padx=0 pady=0

droplist name values=NULL choices=NULL labels=NULL selected=1
add=FALSE font="" fg="black" bg="white" function="" enter=TRUE
action="droplist" edit=TRUE mode="character" width=20
sticky="" padx=0 pady=0

entry name value="" width=20 label=NULL font="" fg="" bg=""
entryfont="" entryfg="black" entrybg="white" noeditfg="black"
noeditbg="gray" edit=TRUE password=FALSE function="" enter=TRUE
action="entry" mode="numeric" sticky="" padx=0 pady=0

grid nrow=1 ncol=1 toptitle="" sidetitle="" topfont="" sidefont=""
topfg=NULL sidefg=NULL fg="black" topbg=NULL sidebg=NULL bg=""
byrow=TRUE borderwidth=1 relief="flat" sticky="" padx=0 pady=0

history name="default" function="" import="" fg="black" bg=""
entryfg="black" entrybg="white" text=NULL textsize=0 sticky=""
padx=0 pady=0

image file=NULL varname=NULL subsample=NULL sticky="" padx=0 pady=0

include file=NULL name=NULL

label text="" name="" mode="character" font="" fg="black" bg=""
sticky="" justify="left" anchor="center" wraplength=0 width=0
padx=0 pady=0

matrix nrow ncol names rowlabels="" collabels="" rownames=""
colnames="" font="" fg="black" bg="" entryfont="" entryfg="black"
entrybg="white" noeditfg="black" noeditbg="gray" values=""
byrow=TRUE function="" enter=TRUE action="matrix" edit=TRUE
```
mode="numeric" width=6 borderwidth=0 sticky="" padx=0 pady=0

testWidgets

menu nitems=1 label font="" fg="" bg=""

menuitem label font="" fg="" bg="" function action="menuitem"

notebook tabs name=NULL selected=1 tabpos="top" font="" fg=NULL
 bg=NULL width=0 height=0 homogeneous=FALSE arcradius=2
 tabbevelsize=0 function=NULL action="notebook" sticky="we"
 padx=0 pady=0

null bg="" padx=0 pady=0

object name rowshow=0 font="" fg="black" bg="" entryfont=""
 entryfg="black" entrybg="white" noeditfg="black" noeditbg="gray"
 vertical=FALSE collabels=TRUE rrowlabels=TRUE function=""
 enter=TRUE action="data" edit=TRUE width=6 borderwidth=0
 sticky="" padx=0 pady=0

progressbar name value=0 maximum=100 style="normal"
 width=NULL height=NULL vertical=FALSE fg=NULL bg=NULL relief="sunken"
 borderwidth=2 sticky="" padx=0 pady=0

radio name value text="" font="" fg="black" bg="" function=""
 action="radio" edit=TRUE mode="numeric" selected=FALSE
 sticky="" padx=0 pady=0

slide name from=0 to=100 value=NA showvalue=FALSE
 orientation="horizontal" font="" fg="black" bg="" function=""
 action="slide" sticky="" padx=0 pady=0

slideplus name from=0 to=1 by=0.01 value=NA font="" fg="black"
 bg="" entryfont="" entryfg="black" entrybg="white" function=""
 enter=FALSE action="slideplus" sticky="" padx=0 pady=0

spinbox name from to by=1 value=NA label="" font="" fg="black"
 bg="" entryfont="" entryfg="black" entrybg="white" function=""
 enter=TRUE edit=TRUE action="droplist" width=20 sticky=""
 padx=0 pady=0

table name rowshow=0 font="" fg="black" bg="white" rrowlabels=""
 collabels="" function="" action="table" edit=TRUE width=10
 sticky="" padx=0 pady=0

text name height=8 width=30 edit=FALSE scrollbar=TRUE fg="black"
 bg="white" mode="character" font="" value="" borderwidth=1
 relief="sunken" sticky="" padx=0 pady=0
tget

Get/Print Objects From or Put Objects Into Temporary Work Environment

Description

Get/print objects from or put objects into a temporary work environment called .PBSmodEnv. These objects include .PBSmod, which controls the GUI system.

Usage

\[
\begin{align*}
tget(x, penv=NULL, tenv=.PBSmodEnv) \\
tcall(x, penv=NULL, tenv=.PBSmodEnv) \\
tprint(x, penv=NULL, tenv=.PBSmodEnv) \\
tput(x, penv=NULL, tenv=.PBSmodEnv)
\end{align*}
\]

Arguments

- **x**: name (with or without quotes) of an object to retrieve or store in the temporary environment.
- **penv**: parent environment, defaults to `parent.frame()` called from within the function.
- **tenv**: temporary working environment, defaults to `.PBSmodEnv`.

Details

These accessor functions were developed as a response to the CRAN repository policy statement: “Packages should not modify the global environment (user’s workspace).”

There are also wrapper functions called .win.tget, .win.tcall, and .win.tprint that can be used in window description files to launch functions or print objects from the .PBSmodEnv workspace. The wrapper uses `getWinAct` to get the function (or object) name that a user specifies in the action argument of a widget command.

Author(s)

Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also

createWin, showArgs
Value

Objects are retrieved from or sent to the temporary working environment to/from the place where the function(s) are called. Additionally, tcall invisibly returns the object without transferring, which is useful when the object is a function that the user may wish to call, for example, tcall(myfunc()).

Note

Additional wrapper functions to access functions in .PBSmodEnv are named with the prefix .win.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

References

CRAN Repository Policy: http://cran.r-project.org/web/packages/policies.html

Examples

```r
local(envir=.PBSmodEnv,expr={
  str(tcall(.PBSmod),2)
})
```

---

**unpackList**  
*Unpack List Elements into Variables*

Description

Make local or global variables (depending on the scope specified) from the named components of a list.

Usage

```r
unpackList(x, scope="L")
```

Arguments

- **x**: named list to unpack.
- **scope**: If "L", create variables local to the parent frame that called the function. If "P", create variables in the temporary package workspace called .PBSmodEnv. If "G", create global variables.

Value

A character vector of unpacked variable names.
updateGUI

Author(s)
Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also
packlist, readlist, writelist

Examples
local(envir=.PBSmodEnv, expr={
x <- list(a=21, b=23);
unpackList(x);
print(a);
})

updateGUI

Update Active GUI With Local Values

Description
Update the currently active GUI with values from R’s memory at the specified location.

Usage
updateGUI(scope = "L")

Arguments
scope either "L" for the parent frame, "P" for the temporary work environment .PBSmodEnv, "G" for the global environment, or an explicit R environment.

Details
If the characteristics of the local R objects do not match those of the GUI objects, the update will fail.

Value
Invisibly returns a Boolean vector that specifies whether the objects in the local R environment match items in the active GUI.

Author(s)
Rob Kronlund, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also
getWinVal, setWinVal
Examples

```r
local{envir=.PBSmodEnv.expr={
  #law of free food: http://www.phdcomics.com/comics.php?f=1223
  createWin( c(
    "vector names="foodquality hunger cost" values="0.6 0.8 0.1" width=10",
    "entry name=taste edit=F label=taste:" ), astext=TRUE )
  getWinVal( scope="P" )
  taste <- foodquality * hunger / cost
  updateGUI()
})
```

---

## vbdata

### Data: Lengths-at-Age for von Bertalanffy Curve

#### Description

Lengths-at-age for freshwater mussels (*Anodonta kennerlyi*).

#### Usage

```r
data(vbdata)
```

#### Format

A data frame with 16 rows and 2 columns `c("age","len").`

#### Details

Data for demonstration of the von Bertalanffy model used in the `calcMin` example.

#### Source

Fisheries and Oceans Canada - Mittertreiner and Schnute (1985)

#### References

vbpars

Data: Initial Parameters for a von Bertalanffy Curve

Description

Starting parameter values for $L_{\infty}$, $K$, and $t_0$ for von Bertalanffy minimization using length-at-age data (vbdata) for freshwater mussels (*Anodonta kennerlyi*).

Usage

data(vbpars)

Format

A matrix with 3 rows and 3 columns c("$L_{\infty}$", "$K$", "$t_0$"). Each row contains the starting values, minima, and maxima, respectively, for the three parameters.

Details

Data for demonstration of the von Bertalanffy model used in the calcMin example.

References


view

View First/Last/Random n Elements/Rows of an Object

Description

View the first or last or random n elements or rows of an object. Components of lists will be subset using iterative calls to view.

Usage

view(obj, n=5, last=FALSE, random=FALSE, print.console=TRUE, ...)

Arguments

obj  object to view.

n  first (default)/last/random n elements/rows of obj to view.

last  logical: if TRUE, last n elements/rows of obj are displayed.

random  logical: if TRUE, n random elements/rows (without replacement) of obj are displayed.

print.console  logical: if TRUE, print the results to the console (default). The results are also returned invisibly should the user wish to assign the output to an object.

...  additional arguments (e.g., replace=TRUE if specifying random=TRUE).

Value

Invisibly returns the results of the call to view.

Note

If random=TRUE, random sampling will take place before the last operator is applied.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

Generic functions head and tail exist in the package utils.

Description

View the R code of all functions in a specified package installed on the user's system.

Usage

viewCode(pkg="PBSmodelling", funs, output=4, ...)
Arguments

pkg  string name of a package installed on the user’s computer.
funs string vector of explicit function names from pkg to view.
output numeric value: 1 = function names only, 2 = function names with brief description, 3 = functions and their arguments, and 4 = function R-code (default).

... allows user to specify two additional arguments for output=2:
remote - character string giving a valid URL for the R_HOME directory on a remote location;
update - logical: if TRUE, attempt to update the package index to reflect the currently available packages. (Not attempted if remote is non-NULL.)

Also, if user specifies pat=TRUE, then funs, if specified, are treated like patterns.

Details

If funs is not specified, then all functions, including hidden (dot) functions are displayed.
If the package has a namespace, functions there are also displayed.

Value

Invisibly returns source code of all functions in the specified package. The function invokes openfile to display the results.

Note

Output type 2 (function name with brief description) will now only work in R (>=3.2.0) or from SVN revision >= 67548. The CRAN gurus now disallow direct calls to tools:::httpdport.

Author(s)

Rowan Haigh, Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo BC

See Also

showHelp, view

---

writeList  Write a List to a File in PBS Modelling Format

Description

Write an ASCII text representation in either "D" format or "P" format. The "D" format makes use of dput and dget and produces an R representation of the list. The "P" format represents a simple list in an easy-to-read, ad hoc PBSmodelling format.
Usage

```
writeList(x, fname, format="D", comments="")
```

Arguments

- **x**: R list object to write to an ASCII text file.
- **fname**: file name of the text file to create.
- **format**: format of the file to create: "D" or "P".
- **comments**: vector of character strings to use as initial-line comments in the file.

Details

**The D Format**: The "D" format is equivalent to using R’s base functions `dput` and `dget`, which support all R objects.

**The P Format**: The "P" format only supports a list that may contain lists, vectors, matrices, arrays, and data frames. Scalars are treated like vectors. It writes each list element using the following conventions:

1. $ denotes the start of a list element, and the element’s name follows this character; for nested lists, $ separates each nesting level;
2. $$, on the next line, denotes a line used to describe the element’s structure, which includes object type, mode(s), names (if vector), rownames (if matrix or data), and colnames (if matrix or data); and
3. subsequent lines contain data (one line for a vector and multiple lines for a matrix or other data).

If a list’s elements are unnamed, have the name NA, or have the empty string as a name, this function generates names ("P" format only). If two list elements share the same name, the list will export correctly, but it will import incorrectly.

Arrays with three or more dimensions have `dim` and `dimnames` arguments. `dim` describes the dimension of the data (a vector as returned by `dim(some_array)`) and `dimnames` is a vector of length `sum(dim(some_array))+1` and is constructed as follows:

```
foreach dimension dL first append the name of the dimension d and then append all labels within that dimension
```

Multiple rows of data for matrices or data frames must have equal numbers of entries (separated by whitespace).

Note that array data are written the same format as they are displayed in the R console:

```
nrow=dim()[1], ncol=dim()[2]
```

repeated by scrolling through successively higher dimensions, increasing the index from left to right within each dimension. The flattened table will have `dim()[2]` columns.

For complete details, see “PBSmodelling-UG.pdf” at the location described when loading this package.

Value

String containing the file name.
writePBSoptions

Author(s)
Alex Couture-Beil, Vancouver Island University, Nanaimo BC

See Also
packList, readList, unpackList

Examples

```r
## Not run:
local(envir=.PBSmodEnv,expr={
  cwd = getwd(); setwd(tempdir())
  test <- list(a=10,b=10,c=view(WorldPhones),d=view(USArrests))
  writelist(test,"test.txt",format="P",
            comments=" Scalar, Vector, Matrix, Data Frame")
  openfile("test.txt")
  setwd(cwd)
})

## End(Not run)
local(envir=.PBSmodEnv,expr={
  cwd = getwd(); setwd(tempdir())
  ##Example of dimnames for Arrays
  dimnames(Titanic)
  writelist( list( Titanic ), format="P")
  setwd(cwd)
})
```

writePBSoptions

Write PBS Options to an External File

Description
Save options that were set using setPBSoptions, setPBSext, or interfaces such as loadC. These options can be reloaded using readPBSoptions.

Usage
```
writePBSoptions(fname="PBSoptions.txt")
```

Arguments
fname file name or full path of file to which the options will be saved.

Note
Options with names starting with "." will not be saved.
Author(s)

Anisa Egeli, Vancouver Island University, Nanaimo BC

See Also

readPBSoptions, setPBSoptions, setPBSext, promptWriteOptions
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