Package 'PBSresilate'

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Depends R (>= 2.7.0), PBSmodelling, PBSddesolve, deSolve, rgl

Description This package uses an interactive GUI to control solvers, calculate states, and display results in 2D or 3D plots for published 3-state models (specifically their derivative formulae). The current name reflects resilience theory and emphasizes a close association with other PBS packages, particularly 'PBSmodelling'.

License GPL (>= 2)

R topics documented:

`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

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

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, Nanaimo BC

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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, envir=.GlobalEnv)
```

Arguments

act	string representing an expression that can be executed
envir	the R environment in which to evaluate the action; the default is the global environment or user's workspace.

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()[1].

Due to parsing complications, the expression act must contain the backtick character ` wherever there is to be an internal double quote " character.
E.g., "editADfile(paste(getWinVal()$prefix,`.tpl`,sep="))"

Value

Invisibly returns the string expression act.

Author(s)

Rowan Haigh, Pacific Biological Station, Nanaimo, BC

`resilate` *Resilate 3-State Models*

Description

Display resilations controlled by an interactive GUI.

Usage

```
resilate(model=NULL, hnam=NULL)
```

Arguments

`model`	string name of a 3-state model.
`hnam`	string name of a history file.

Details

The function `resilate()` creates an interactive GUI that can be used to display resilations of a 3-state model over time.

The GUI controls:

Model	
`Lorenz`	Use the Lorenz (1963) model for atmospheric currents.
`Hastings`	Use the Hastings & Powell (1991) model for linear food chains.
`Edwards`	Use the Edwards & Brindley (1999) model for plankton dynamics.
`Ludwig`	Use the Ludwig, Jones & Holling (1978) model for spruce buzzworm outbreak systems.
Solver	
`deSolve`	Use Petzold & Hindmarsh's `lsoda` function for ordinary differential equations.
`PBSddesolve`	Use Couture-Beil & Wood's `dde` function for delay-differential equations.
Parameters	
`Model`	Parameter models (control parameters are different for each model).
`Time`	Time parameters.
`start`	First time value.
`stop`	Last time value.
`step`	Time step at which to evaluate `y1, y2, y3`.
Initial State Values	
`y1,y2,y3`	Initial values for `y1`, `y2`, and `y3`.
Plot 2D or 3D?	
`2D`	Two-dimensional (flat) `pairs` plot.
`3D`	Three-dimensional plot using the `rgl` package function `plot3d`.
`X-Y plane`	On the 3D plot, superimpose the plot coordinates on the *x*-*y* plane (flatten *z*).
`Y-Z plane`	On the 3D plot, superimpose the plot coordinates on the *y*-*z* plane (flatten *x*).
`X-Z plane`	On the 3D plot, superimpose the plot coordinates on the *x*-*z* plane (flatten *y*).
`size2d`	Size of points in 2D-panels of 3D plot.
`size3d`	Size of points/spheres in 3D plot.
`Display points`	Type of points to plot: s = spheres, p = points, l = lines.
`hist`	Histogram bar colour.
`states`	Choose states to plot (`time`, `y1`, `y2`, `y3`, `dy1`, `dy2`, `dy3`). Note: choose only 3 states for a 3D plot.
`Calc`	Button to recalculate the state values and derivatives given the input parameters and time values.

`Plot`	Button to plot the chosen states in the specified dimension.
History	History widget.

References

Edwards, A.M. and Brindley, J. (1999) Zooplankton mortality and the dynamical behaviour of plankton population models. *Bulletin of Mathematical Biology* **61**, 303–339.

Hastings, A. and Powell, T. (1991) Chaos in a three-species food chain. *Ecology* **72(3)**, 896–903.

Lorenz, E.N. (1963) Deterministic non-periodic flows. *Journal of Atmospheric Science* **20**, 130–141. http://planetmath.org/encyclopedia/LorenzEquation.html

Ludwig, D., Jones, D.D. and Holling, C.S. (1978) Qualitative analysis of insect outbreak systems: the spruce budworm and forest. *The Journal of Animal Ecology* **47(1)**, 315–332.

`runResilate` *Start a Menu of Models for Resilation*

Description

Start a GUI that controls which models to pass into the `resilate` function.

Usage

```
runResilate()
```

Details

Looks at the names of R-code (`*.r`) in the folder `...\PBSresilate\examples` and uses the prefixes as available models.

Value

No value returned.

Author(s)

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See Also

`resilate`

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

```
showPacks(packs=c("PBSmodelling","PBSmapping","PBSddesolve",
    "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), `Ipacks` (packages in `packs` that are installed), and `Mpacks` (packages that are missing).

Author(s)

Rowan Haigh, Pacific Biological Station, Nanaimo BC

viewCode *View Package R Code*

Description

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

Usage

```
viewCode(pkg="PBSresilate")
```

Arguments

pkg	string name of an installed package

Value

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

Author(s)

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