Package 'apsimr'

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Type Package

Title Edit, run and evaluate APSIM simulations from R easily

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Description The Agricultural Production Systems sIMulator (APSIM) is a widely used simulator of agricultural systems. This package includes a few basic functions to create, edit and run APSIM simulations then visualize the results. For more on APSIM including download instructions go to www.apsim.info.

License GPL (>= 3)

Imports lubridate, reshape2

Depends R (>= 3.0), ggplot2, XML

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R topics documented:

apsimr-package *Run, edit, visualize APSIM from R*

Description

The **A**gricultural **P**roduction **S**ystems s**IM**ulator (APSIM) is a widely used simulator of agricultural systems. This package includes a few basic functions to create, edit and run APSIM simulations then visualize the results. An installation of APSIM is required for this package to be of any use. Assuming non-commercial use, APSIM can be downloaded for free from http://www.apsim.info/Products/Downloads.aspx.

Details

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Author(s)

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References

See http://www.apsim.info/ for information about APSIM.

See Also

APSIMBatch

Examples

```
## Not run:
exe <-"C:/Program Files (x86)/Apsim76-r3376/Model/Apsim.exe"
wd <- "../APSIM"
results <- apsim(exe, wd, "Centro.apsim")
plot(results)

## End(Not run)
```

apsim *Run APSIM simulations from R*

Description

This function will run APSIM from R. The only required input is the file path to the APSIM executable. It is assumed the current working directory contains the .apsim file(s) to be run. If that is not the case then the directory containing the .apsim file(s) to be run can to be specified by `wd`. One can specify a list of .apsim files to be run within the directory `wd` using the `files` argument, otherwise all .apsim files within `wd` are run. The results for each .apsim file that is run is an element of the list that is returned. Each element of the list is of the class `"apsim"`.

Usage

```
apsim(exe, wd = getwd(), files = NULL)
```

Arguments

`exe`	path to the APSIM executable
`wd`	working directory containing the .apsim files to be run
`files`	.apsim files to be run; if left empty all .apsim files in `wd` will be run

Value

list of output files; each element corresponds to an .apsim file

Examples

```
## Not run:
exe <-"C:/Program Files (x86)/Apsim76-r3376/Model/Apsim.exe"
wd <- "~/APSIM"
to_run <- c("Centro.apsim", "Continuous Wheat.apsim")
results <- apsim(exe, wd, files = to_run)

## End(Not run)
```

edit_apsim *Edit an APSIM simulation*

Description

The variables specified by `var` within the .apsim file specified by `file` in the working directory `wd` are edited. The old values are replaced with `value`, which is a list that has the same number of elements as the length of the vector `var`. The current .apsim file will be overwritten if `overwrite` is set to `TRUE`; otherwise the file *file-edited.apsim* will be created.

Usage

```
edit_apsim(file, wd = getwd(), var, value, overwrite = FALSE)
```

Arguments

file	file ending in .apsim to be edited
wd	directory containing the .apsim file to be edited; defaults to the current wd
var	vector of variables to be edited
value	list of new values for the specified variables
overwrite	logical; if TRUE the old file is overwritten, a new file is written otherwise

Value

character string containing the resulting XML content

Examples

```
## Not run:
#The file I want to edit is called "Canopy.apsim" which is in the directory "~/APSIM"
file <- "Canopy.apsim"
wd <- "~/APSIM"

#I want to change the Thickness of the Soilwater, the SoilCN of the SoilOrganicMatter and
#the state at which the simulation is being run.
var <- c("SoilWater/Thickness", "SoilOrganicMatter/SoilCN", "State")

#Change SoilWater-Thickness to 200,200,300x9
#Change SoilCN to 10
#Change "State" to "NSW"
value <- list(c(rep(200, 2), rep(300, 9)), 10, "NSW")

#Edit the apsim file without overwriting it
edit_apsim(file, wd, var, value, overwrite = FALSE)

#Run the edited simulation
exe <-"C:/Program Files (x86)/Apsim76-r3376/Model/Apsim.exe"

results <- apsim(exe, wd, files = "Canopy-edited.apsim")

## End(Not run)
```

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edit_sim_file *Edit an APSIM module file*

Description

APSIM uses .xml files to dictate how certain processes are carried out. Similar to `edit_apsim` this function edits a file that will be used in an APSIM simulation. Unlike `edit_apsim` this function edits the .xml simulation files. The variables specified by `var` within the .xml file specified by `file` in the working directory `wd` are edited. The old values are replaced with `value`, which is a list that has the same number of elements as the vector `var` is long. The current .xml file will be overwritten if `overwrite` is set to `TRUE`; otherwise the file *file-edited.xml* will be created.

Usage

```
edit_sim_file(file, wd = getwd(), var, value, overwrite = FALSE)
```

Arguments

`file`	.xml module file to be edited
`wd`	directory containing the .xml file to be edited; defaults to the current wd
`var`	vector of variables to be edited
`value`	list of new values for the specified variables
`overwrite`	logical; if `TRUE` the old file is overwritten, a new file is written otherwise

Value

character string containing the resulting XML content

Examples

```
## Not run:
#The file I want to edit is called "Soil.xml" which is the the directory "~/APSIM"
file <- "Soil.xml"
wd <- "~/APSIM"

#I want to change the potential nitrification and N2O from nitrification
var <- c("nitrification_pot", "dnit_nitrf_loss")

#Change both to absolute values of random N(0,1)
value <- list(abs(rnorm(1)), abs(rnorm(1)))

#Edit the apsim file without overwriting it
edit_sim_file(file, wd, var, value, overwrite = FALSE)

## End(Not run)
```

`example_apsim` *Access example APSIM simulations*

Description

There are quite a few standard APSIM simulations provided in the default APSIM installation. `apsim_expample` moves those example files into the working directory `wd` so you can run them or edit them using `apsim` and `edit_apsim`, respectively. Generally the example simulations must be moved because the output file is written to the directory containing the .apsim file and the ability to write in the "Program Files" folder is limited in most cases.

Usage

```
example_apsim(path, wd = getwd(), files = NULL, ...)
```

Arguments

`path`	path to the APSIM installation
`wd`	working directory containing the .apsim files to be copied; defaults to the current working directory
`files`	files to extract from the "Examples" folder
`...`	additional arguments passed to `file.copy`

Value

logical; if `TRUE` the corresponding file was successfully copied, `FALSE` otherwise

Examples

```
## Not run:
path <-"C:/Program Files (x86)/Apsim76-r3376/"
wd <- "~/APSIM"
file <- "Canopy.apsim"
example_apsim(path = path, wd = wd, file) #TRUE

file <- c("Canopy.apsim", "Continuous Wheat.apsim")
example_apsim(path = path, wd = wd, file) #TRUE TRUE

exe <-"C:/Program Files (x86)/Apsim76-r3376/Model/Apsim.exe"
results <- apsim(exe, wd, files = file)

## End(Not run)
```

plot.apsim *Visualize the results of an APSIM simulation*

Description

Similar to the plot for lm objects, plot.apsim will plot each response in the results of an APSIM simulation on its own ggplot2 object. If the one_plot argument is set to TRUE then facet_wrap is used to plot all of the responses on one screen. Or only one response can be plotted by setting y to a column name in x.

Usage

```
## S3 method for class 'apsim'
plot(x, y = NULL, ask = TRUE, one_plot = FALSE, ...)
```

Arguments

x	data frame of class "apsim" including the results of an APSIM simulation
y	variable to plot on y-axis; if left empty all variables will be plotted on separate plots
ask	logical; if TRUE, the user is asked before each plot, see par(ask=.)
one_plot	logical; if TRUE all variables are plotted on one faceted plot
...	additional arguments passed to qplot

Examples

```
## Not run:
exe <- "C:/Program Files (x86)/Apsim76-r3376/Model/Apsim.exe"
wd <- "~/APSIM"
toRun <- c("Centro.apsim", "Continuous Wheat.apsim")
results <- apsim(exe, wd, files = toRun)

#Look at all of the results as a function of time in seperate plots
plot(results[[2]])

#Put all variables on one faceted plot
plot(results[[2]], one_plot = TRUE) + theme_bw()

#Plot just yield as a function of time
plot(results[[2]], y = 'yield') + geom_line(colour = 'red') + theme_bw()

## End(Not run)
```

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