AniMove
general R Reference Card

www.animove.org

last update: April 16, 2014

Getting help

`help(topic)` documentation on `topic`
`?topic` short alternative to `help`
`help.search("topic")` search the help system
`apropos("topic")` the names of all objects in the search list matching the regular expression "topic"
`help.start()` start the HTML version of help
`methods(a)` e.g. methods(summary) gives all summary commands

Information about your data

`str(a)` display the internal structure of an R object
`summary(a)` gives a "summary" of `a`, usually a statistical summary but it is *generic* meaning it has different operations for different classes of `a`
`ls()` show objects in the search path; specify `pat="pat"` to search on a pattern
`dir()` show files in the current directory

Input and output

`source("script.R")` includes and executes script.R in this place
`read.table(f)` reads a file in table format and creates a data frame from it; the default separator `sep=""` is any whitespace; use `header=TRUE` to read the first line as a header of column names; use `as.is=TRUE` to prevent character vectors from being converted to factors; use `comment.char=""` to prevent `"#"` from being interpreted as a comment; use `skip=n` to skip `n` lines before reading data; see the help for options on row naming, NA treatment, and others
`read.csv(f,header=TRUE)` id. but with defaults set for reading comma-delimited files
`print(a, ...)` prints its arguments; generic, meaning it can have different methods for different objects
`write.table(x, file=f,row.names=TRUE, col.names=TRUE, sep=" ")` prints `x` after converting to a data frame; if `quote` is `TRUE`, character or factor columns are surrounded by quotes ("); `sep` is the field separator; `eol` is the end-of-line separator; `na` is the string for missing values; use `col.names=NA` to add a blank column header to get the column headers aligned correctly for spreadsheet input
`data(f)` loads specified data sets

For database interaction, see packages `RODBC`, `DBI`, `RMySQL`, `RPgSQL`, `ROracle`, for other file formats see `XML`, `hdf5`, `netCDF`

Data creation & removal

`c(...)` generic function to combine arguments with the default forming a vector; with `recursive=TRUE` descends through lists combining all elements into one vector
`from:to` generates a sequence; ":" has operator priority; `1:4 + 1` returns `2 3 4 5`
`seq(from,to)` generates a sequence `by=` specifies increment; `length=` specifies desired length
`seq(along=x)` generates `1, 2, ..., length(along)`; useful for `for` loops
`rep(x,times)` replicate `x` `times`; use `each=` to repeat "each" element of `x` `each` times; `rep(c(1,2,3),2)` is 1 2 3 1 2 3; `rep(c(1,2,3),each=2)` is 1 1 2 2 3 3
`data.frame(...)` create a data frame of the named or unnamed arguments; `data.frame(v=1:4,ch=c("a","B","c","d"),n=10)`; shorter vectors are recycled to the length of the longest
`list(...)` create a list of the named or unnamed arguments; `list(a=c(1,2),b="hi",c=3i)`;
`array(x,dim=)` array with data `x`; specify dimensions like `dim=c(3,4,2)`; elements of `x` recycle if `x` is not long enough
`matrix(x,nrow=,ncol=)` matrix; elements of `x` recycle
`factor(x,levels=)` encodes a vector `x` as a factor
`expand.grid()` a data frame from all combinations of the supplied vectors or factors
`cbind(df1, df2)`, `rbind(df1,df2)` combine arguments by columns (rows) for data frames and the like

`rm(obj)` removes object
`rm(list = ls(all = TRUE))` removes all objects

Indexing your data

addressing vectors

`v[n]`	n^{th} element
`v[-n]`	all *but* the n^{th} element
`v[1:n]`	first `n` elements
`v[-(1:n)]`	elements from `n+1` to the end
`v[c(1,4,2)]`	specific elements
`v["name"]`	element named `"name"`
`v[x > 3]`	all elements greater than 3
`v[x > 3 & x < 5]`	all elements between 3 and 5
`v[x %in% c("a","and","the")]`	elements in the given set

addressing lists

`x[n]`	list with elements `n`
`x[[n]]`	n^{th} element of the list
`x[["name"]]`	element of the list named `"name"`
`x$name`	id.

addressing matrices

`x[i,j]`	element at row `i`, column `j`
`x[i,]`	row `i`
`x[,j]`	column `j`
`x[,c(1,3)]`	columns 1 and 3
`x["name",]`	row named `"name"`

adressing data frames

similar functions as in the matrix indexing plus:

`df[["name"]]`	column named `"name"`
`df$name`	column named `"name"`
`df[,"name"]`	column named `"name"`

Variable information

`is.na(x)`, `is.null(x)`, `is.array(x)`, `is.data.frame(x)`, `is.numeric(x)`, `is.complex(x)`, `is.character(x)`, ... test for type; for a complete list, use `methods(is)`
`length(x)` number of elements in `x`
`dim(x)` Retrieve or set the dimension of an object; `dim(x) <- c(3,2)`
`dimnames(x)` Retrieve or set the dimension names of an object
`nrow(x)` number of rows; `NROW(x)` is the same but treats a vector as a one-row matrix
`ncol(x)` and `NCOL(x)` id. for columns
`class(x)` get or set the class of `x`; `class(x) <- "myclass"`
`unclass(x)` remove the class attribute of `x`
`attr(x,which)` get or set the attribute `which` of `x`
`attributes(obj)` get or set the list of attributes of `obj`

Data selection and manipulation

`which.max(v)`, `which.min(v)` returns the index of the maximum (minimum) element of `v`
`rev(v)` reverses the elements of `v`

`sort(v)` sorts the elements of `v` in increasing order; to sort in decreasing order: `rev(sort(x))`
`cut(x,breaks)` divides `x` into intervals (factors); `breaks` is the number of cut intervals or a vector of cut points
`match(x, y)` returns a vector of the same length than `x` with the elements of `x` which are in `y` (`NA` otherwise)
`which(x == a)` returns a vector of the indices of `x` if the comparison operation is true (`TRUE`)
`na.omit(x)` suppresses the observations with missing data (`NA`)
`na.fail(x)` returns an error message if `x` contains at least one `NA`
`unique(x)` if `x` is a vector or a data frame, returns a similar object but with the duplicate elements suppressed
`table(x)` returns a table with the numbers of the differents values of `x` (typically for integers or factors)
`subset(x, ...)` returns a selection of `x` with respect to criteria (..., typically comparisons: `x$V1 < 10`); if `x` is a data frame, the option `select` gives the variables to be kept or dropped using a minus sign
`sample(x, size)` resample randomly and without replacement `size` elements in the vector `x`, the option `replace = TRUE` allows to resample with replacement

Math

`sin,cos,tan,asin,acos,atan,atan2,log,log10,exp`
`range(x)` id. then `c(min(x), max(x))`
`sum(x)` sum of the elements of `x`
`diff(x)` lagged and iterated differences of vector `x`
`prod(x)` product of the elements of `x`
`mean(x)` mean of the elements of `x`
`median(x)` median of the elements of `x`
`quantile(x,probs=)` sample quantiles corresponding to the given probabilities (defaults to 0,.25,.5,.75,1)
`weighted.mean(x, w)` mean of `x` with weights `w`
`rank(x)` ranks of the elements of `x`
`var(x)` or `cov(x)` variance of the elements of `x` (calculated on $n-1$); if `x` is a matrix or a data frame, the variance-covariance matrix is calculated
`sd(x)` standard deviation of `x`
`cor(x)` correlation matrix of `x` if it is a matrix or a data frame (1 if `x` is a vector)
`var(x, y)` or `cov(x, y)` covariance between `x` and `y`, or between the columns of `x` and those of `y` if they are matrices or data frames
`cor(x, y)` linear correlation between `x` and `y`, or correlation matrix if they are matrices or data frames
`round(x, n)` rounds the elements of `x` to `n` decimals
`log(v, base)` computes the logarithm of `x` with base `base` `log10(v)` `base` =10
`scale(x)` if `x` is a matrix, centers and reduces the data; to center only use the option `center=FALSE`, to reduce only `scale=FALSE` (by default `center=TRUE, scale=TRUE`)
`pmin(x,y,...)` a vector which ith element is the minimum of `x[i]`, `y[i]`, ...
`pmax(x,y,...)` id. for the maximum
`cumsum(v)` a vector which ith element is the sum from `x[1]` to `x[i]`
`cumprod(v)` $f_i = \Pi_{j=1..i} x_j = (x_1, x_1 \cdot x_2, \ldots)$
`cummin(v)` $f_i = \min(x_1 \ldots x_i)$
`cummax(v)` id. for the maximum
`union(x,y)`, `intersect(x,y)`, `setdiff(x,y)`, `setequal(x,y)`, `is.element(el,set)` "set" functions
`fft(v)` Fast Fourier Transform `mvfft(x)` FFT of each column of a matrix
`filter(x,filter)` applies linear filtering to a univariate time series or to each series separately of a multivariate time series

Matrices

`t(x)` transpose
`diag(x)` diagonal
`%*%` matrix multiplication and scalar product
`solve(a,b)` solves `a %*% x = b` for `x`
`solve(a)` matrix inverse of `a`
`rowsum(x)` sum of rows for a matrix-like object; `rowSums(x)` is a faster version
`colsum(x)`, `colSums(x)` id. for columns
`rowMeans(x)` fast version of row means `colMeans(x)` id. for columns

Advanced data processing

The apply family functions are very powerful and fast, they do replace a 'for loop' but are difficult to grasp.
`apply(X,INDEX,FUN=)` a vector or array or list of values obtained by applying a function `FUN` to margins (`INDEX`) of `X`
`lapply(X,FUN)` apply `FUN` to each element of the list `X`
`tapply(X,INDEX,FUN=)` apply `FUN` to each cell of a ragged array given by `X` with indexes `INDEX`
`by(data,INDEX,FUN)` apply `FUN` to data frame `data` subsetted by `INDEX`
`merge(a,b)` merge two data frames by common columns or row names
`xtabs(a b,data=x)` a contingency table from cross-classifying factors
`aggregate(df,by,FUN)` splits a data frame into subsets, computes summary statistics for each, and returns the result in a convenient form; `by` is a list of grouping elements, each as long as the variables in the data frame
`stack(x, ...)` transform data available as separate columns in a data frame or list into a single column
`unstack(x, ...)` inverse of `stack()`

Reshaping your data

`cast(x, ...)` reshapes a data frame between 'wide' format with repeated measurements in separate columns of the same record and 'long' format with the repeated measurements in separate records; use (direction="wide") or (direction="long")
`melt(x, ...)` melts an object into a form suitable for casting

Strings

`paste(s1,s2, sep=" ")` concatenate vectors after converting to character; `collapse=` is an optional string to separate "collapsed" results `paste0(s1,s2)` paste without seperator (since R 2.15)
`substr(s,start,stop)` substrings in a character vector; can also assign, as `substr(s, start, stop) <- value`
`strsplit(s,split)` split `s` according to the substring `split`
`grep(pattern,s)` search `pattern` in `s`; see `?regex`
`tolower(s)`, `toupper(s)` convert to lowercase (uppercase)
`match(x,table)` a vector of the positions of first matches for the elements of `x` among `table`
`x %in% table` id. but returns a logical vector

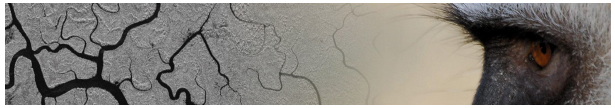
Dates and Times

All animal tracks come with a time stamp. The class `Date` has dates without times. `POSIXct` has dates and times, including time zones. Comparisons (e.g. >), `seq()`, and `difftime()` are useful. `Date` also allows + and −. `?DateTimeClasses` gives more information. See also package `chron`.

`as.Date(s)` and `as.POSIXct(s)` convert to the respective class; `format(dt)` converts to a string representation. The default string format is "2012-02-21". These accept a second argument to specify a format for conversion. Some common formats are:

`%a`, `%A` Abbreviated and full weekday name.
`%b`, `%B` Abbreviated and full month name.
`%d` Day of the month (01–31).
`%H` Hours (00–23).
`%I` Hours (01–12).
`%j` Day of year (001–366).
`%m` Month (01–12).
`%M` Minute (00–59).
`%p` AM/PM indicator.
`%S` Second as decimal number (00–61).
`%U` Week (00–53); the first Sunday as day 1 of week 1.
`%w` Weekday (0–6, Sunday is 0).
`%W` Week (00–53); the first Monday as day 1 of week 1.
`%y` Year without century (00–99). Avoid it.
`%Y` Year with century.
`%z` (read only) Offset from Greenwich; `-0800` is 8 hours west of.
`%Z` (read only) Time zone as a character string (empty if not available).

Where leading zeros are shown they will be used on output but are optional on input. See `?strftime`.



Plotting

Several plotting options exist in R to plot your results and these are constantly changing. Below you will find standard R plotting commands and further down more sophisticated options using e.g. ggplot2 functionality. Furthermore does R offer spatial data plotting options which can be found on the AniMove spatial cheat sheet.

`plot(y)` plot of the values of `y` (on the y-axis) ordered on the x-axis
`plot(x, y)` bivariate plot of `x` agains `y`
`hist(x)` histogram of the frequencies of `x`
`barplot(x)` histogram of the values of `x`; use `horiz=FALSE` for horizontal bars
`dotchart(x)` if `x` is a data frame, plots a Cleveland dot plot (stacked plots line-by-line and column-by-column)
`pie(x)` circular pie-chart
`boxplot(x)` "box-and-whiskers" plot
`sunflowerplot(x, y)` id. than `plot()` but the points with similar coordinates are drawn as flowers which petal number represents the number of points
`stripplot(x)` plot of the values of `x` on a line (an alternative to `boxplot()` for small sample sizes)
`coplot(x~y | z)` bivariate plot of `x` and `y` for each value or interval of values of `z`
`interaction.plot (f1, f2, y)` if `f1` and `f2` are factors, plots the means of `y` (on the y-axis) with respect to the values of `f1` (on the x-axis) and of `f2` (different curves); the option `fun` allows to choose the summary statistic of `y` (by default `fun=mean`)
`matplot(x,y)` bivariate plot of the first column of `x` *vs.* the first one of `y`, the second one of `x` *vs.* the second one of `y`, etc.
`fourfoldplot(x)` visualizes, with quarters of circles, the association between two dichotomous variables for different populations (`x` must be an array with `dim=c(2, 2, k)`, or a matrix with `dim=c(2, 2)` if $k = 1$)
`assocplot(x)` Cohen–Friendly graph showing the deviations from independence of rows and columns in a two dimensional contingency table
`mosaicplot(x)` 'mosaic' graph of the residuals from a log-linear regression of a contingency table
`pairs(x)` if `x` is a matrix or a data frame, draws all possible bivariate plots between the columns of `x`
`plot.ts(x)` if `x` is an object of class `"ts"`, plot of `x` with respect to time, `x` may be multivariate but the series must have the same frequency and dates
`ts.plot(x)` id. but if `x` is multivariate the series may have different dates and must have the same frequency
`qqnorm(x)` quantiles of `x` with respect to the values expected under a normal law
`qqplot(x, y)` quantiles of `y` with respect to the quantiles of `x`
`contour(x, y, z)` contour plot (data are interpolated to draw the curves), `x` and `y` must be vectors and `z` must be a matrix so that `dim(z)=c(length(x), length(y))` (`x` and `y` may be omitted)
`filled.contour(x, y, z)` id. but the areas between the contours are coloured, and a legend of the colours is drawn as well
`image(x, y, z)` id. but with colours (actual data are plotted)
`persp(x, y, z)` id. but in perspective (actual data are plotted)
`stars(x)` if `x` is a matrix or a data frame, draws a graph with segments or a star where each row of `x` is represented by a star and the columns are the lengths of the segments
`symbols(x, y, ...)` draws, at the coordinates given by `x` and `y`, symbols (circles, squares, rectangles, stars, thermometres or "boxplots") which sizes, colours ... are specified by supplementary arguments
`termplot(mod.obj)` plot of the (partial) effects of a regression model (`mod.obj`)

The following parameters are common to many plotting functions:
`add=FALSE` if `TRUE` superposes the plot on the previous one (if it exists)
`axes=TRUE` if `FALSE` does not draw the axes and the box
`type="p"` specifies the type of plot, `"p"`: points, `"l"`: lines, `"b"`: points connected by lines, `"o"`: id. but the lines are over the points, `"h"`: vertical lines, `"s"`: steps, the data are represented by the top of the vertical lines, `"S"`: id. but the data are represented by the bottom of the vertical lines
`xlim=, ylim=` specifies the lower and upper limits of the axes, for example with `xlim=c(1, 10)` or `xlim=range(x)`
`xlab=, ylab=` annotates the axes, must be variables of mode character
`main=` main title, must be a variable of mode character
`sub=` sub-title (written in a smaller font)

Low-level plotting commands

`points(x, y)` adds points (the option `type=` can be used)
`lines(x, y)` id. but with lines
`text(x, y, labels, ...)` adds text given by `labels` at coordinates (x,y); a typical use is: `plot(x, y, type="n"); text(x, y, names)`
`mtext(text, side=3, line=0, ...)` adds text given by `text` in the margin specified by `side` (see `axis()` below); `line` specifies the line from the plotting area
`segments(x0, y0, x1, y1)` draws lines from points (x0,y0) to points (x1,y1)
`arrows(x0, y0, x1, y1, angle= 30, code=2)` id. with arrows at points (x0,y0) if `code=2`, at points (x1,y1) if `code=1`, or both if `code=3`; `angle` controls the angle from the shaft of the arrow to the edge of the arrow head
`abline(a,b)` draws a line of slope `b` and intercept `a`
`abline(h=y)` draws a horizontal line at ordinate `y` (vertical line: =v)
`abline(lm.obj)` draws the regression line given by `lm.obj`
`rect(x1, y1, x2, y2)` draws a rectangle which left, right, bottom, and top limits are `x1`, `x2`, `y1`, and `y2`, respectively
`polygon(x, y)` draws a polygon linking the points with coordinates given by `x` and `y`
`legend(x, y, legend)` adds the legend at the point (x,y) with the symbols given by `legend`
`title()` adds a title and optionally a sub-title
`axis(side, vect)` adds an axis at the bottom (`side=1`), on the left (2), at the top (3), or on the right (4); `vect` (optional) gives the abcissa (or ordinates) where tick-marks are drawn
`locator(n, type="n", ...)` returns the coordinates (x, y) after the user has clicked `n` times on the plot with the mouse; also draws symbols (`type="p"`) or lines (`type="l"`) with respect to optional graphic parameters (`...`); by default nothing is drawn (`type="n"`)

Graphical parameters

These can be set globally with `par(...)`; many can be passed as parameters to plotting commands.
`adj` controls text justification (`0` left-justified, `0.5` centred, `1` right-justified)
`bg` specifies the colour of the background (ex. : `bg="red"`, `bg="blue"`, ... the list of the 657 available colours is displayed with `colors()`)
`bty` controls the type of box drawn around the plot, allowed values are: `"o"`, `"l"`, `"7"`, `"c"`, `"u"` ou `"]"` (the box looks like the corresponding character); if `bty="n"` the box is not drawn
`cex` a factor controlling the default size of texts and symbols; you can scale numbers on the axes, `cex.axis`, the axis labels, `cex.lab`, the title, `cex.main`, and the sub-title, `cex.sub`
`col` controls the color of symbols and lines; use color names: `"red"`, `"blue"` see `colors()` or as `"#RRGGBB"`; see `rgb()`, `hsv()`, `gray()`, and `rainbow()`; as for `cex` there are: `col.axis`, `col.lab`, `col.main`, `col.sub`
`font` an integer which controls the style of text (`1`: normal, `2`: italics, `3`: bold, `4`: bold italics); as for `cex` there are: `font.axis`, `font.lab`, `font.main`, `font.sub`
`las` an integer which controls the orientation of the axis labels (`0`: parallel to the axes, `1`: horizontal, `2`: perpendicular to the axes, `3`: vertical)
`lty` controls the type of lines, can be an integer or string (`1`: `"solid"`, `2`: `"dashed"`, `3`: `"dotted"`, `4`: `"dotdash"`, `5`: `"longdash"`, `6`: `"twodash"`, or a string of up to eight characters (between `"0"` and `"9"`) which specifies alternatively the length, in points or pixels, of the drawn elements and the blanks, for example `lty="44"` will have the same effect than `lty=2`
`lwd` a numeric which controls the width of lines, default `1`
`mar` a vector of 4 numeric values which control the space between the axes and the border of the graph of the form `c(bottom, left, top, right)`, the default values are `c(5.1, 4.1, 4.1, 2.1)`

`mfcol` a vector of the form `c(nr,nc)` which partitions the graphic window as a matrix of `nr` lines and `nc` columns, the plots are then drawn in columns
`mfrow` id. but the plots are drawn by row
`pch` controls the type of symbol, either an integer between 1 and 25, or any single character within `""`

1 ○ 2 △ 3 + 4 × 5 ◇ 6 ▽ 7 ⊠ 8 ✳ 9 ⊕ 10 ⊕ 11 ✡ 12 ⊞ 13 ⊠ 14 ⧄ 15 ■
16 ● 17 ▲ 18 ◆ 19 ● 20 ● 21 ○ 22 □ 23 ◇ 24 △ 25 ▽ * ⋆ . · X X a a ? ?

`ps` size in points of texts and symbols as integer
`pty` a character which specifies the type of the plotting region, `"s"`: square, `"m"`: maximal

ggplot2

ggplot2 comes with its own syntax which is different from normal R syntax. It takes quite a while to learn it but produces very fancy graphics.
`qplot(x=vx, y=vy, data=df)` plots columns df$vx and df$vy
`ggsave()` save the last plot

ggplot2 comes with a lot of more functions, please read the ggplot2 manual for further information. The reshape2 package is very handy for reshaping your data and RColorBrewer increases your color choices.

Lattice (Trellis) graphics

`xyplot(y~x)` bivariate plots (with many functionalities)
`barchart(y~x)` histogram of the values of `y` with respect to those of `x`
`dotplot(y~x)` Cleveland dot plot (stacked plots line-by-line and column-by-column)
`densityplot(~x)` density functions plot
`histogram(~x)` histogram of the frequencies of `x`
`bwplot(y~x)` "box-and-whiskers" plot
`qqmath(~x)` quantiles of `x` with respect to the values expected under a theoretical distribution
`stripplot(y~x)` single dimension plot, `x` must be numeric, `y` may be a factor
`qq(y~x)` quantiles to compare two distributions, `x` must be numeric, `y` may be numeric, character, or factor but must have two 'levels'
`splom(~x)` matrix of bivariate plots
`levelplot(z~x*y|g1*g2)` coloured plot of the values of `z` at the coordinates given by `x` and `y` (`x`, `y` and `z` are all of the same length)
`wireframe(z~x*y|g1*g2)` 3d surface plot
`cloud(z~x*y|g1*g2)` 3d scatter plot

Statistics, optimization and model fitting

`aov(formula)` analysis of variance model
`anova(fit,...)` analysis of variance (or deviance) tables for one or more fitted model objects
`lm(formula)` fit linear models; `formula` is typically of the form `response termA + termB + ...`; use `I(x*y) + I(x^2)` for terms made of nonlinear components
`glm(formula,family=)` fit generalized linear models, specified by giving a symbolic description of the linear predictor and a description of the error distribution; `family` is a description of the error distribution and link function to be used in the model; see `?family`
`nls(formula)` nonlinear least-squares estimates of the nonlinear model parameters
`glm()` generalized linear model
`gam()` generalized additive model
`kmeans()` kmeans clustering
`tree()` builds a decision tree
`rpart()` builds a decision tree
`randomForest()` random forest machine learning
`maxent()` Maximum Entropy model
`svm()` Support Vector Machines in the e1071 package, but other packages provide SVM as well such as: kernlab, klaR, svmpath, shogun
`approx(x,y=)` linearly interpolate given data points; `x` can be an xy plotting structure
`spline(x,y=)` cubic spline interpolation
`loess(formula)` fit a polynomial surface using local fitting
`predict(fit,...)` predictions from `fit` based on input data
`coef(fit)` returns the estimated coefficients (sometimes with their standard-errors)
`residuals(fit)` returns the residuals
`deviance(fit)` returns the deviance
`fitted(fit)` returns the fitted values
`logLik(fit)` computes the logarithm of the likelihood and the number of parameters
`AIC(fit)` computes the Akaike information criterion or AIC

Distributions

`rnorm(n, mean=0, sd=1)` Gaussian (normal)
`rexp(n, rate=1)` exponential
`rgamma(n, shape, scale=1)` gamma
`rpois(n, lambda)` Poisson
`rt(n, df)` 'Student' (t)
`rchisq(n, df)` Pearson
`rbinom(n, size, prob)` binomial
`rlogis(n, location=0, scale=1)` logistic
`rnbinom(n, size, prob)` negative binomial
`runif(n, min=0, max=1)` uniform
`rwilcox(nn, m, n)`, `rsignrank(nn, n)` Wilcoxon's statistics
All these functions can be used by replacing the letter `r` with `d`, `p` or `q` to get, respectively, the probability density (`dfunc(x, ...)`), the cumulative probability density (`pfunc(x, ...)`), and the value of quantile (`qfunc(p, ...)`, with $0 < p < 1$).

Programming

`function( arglist ) expr` function definition
`return(value)`
`if(cond) expr`
`if(cond) cons.expr else alt.expr`
`for(var in seq) expr`
`while(cond) expr`
`repeat expr`
`break`
`next`
Use braces {} around statements
`ifelse(test, yes, no)` a value with the same shape as `test` filled with elements from either `yes` or `no`

Examples in this document use the variables `df` = data frame object, `v` = vector, `s` = string, `f` = filename as string

Credits

This R reference card is adapted to AniMove needs by Martin Wegmann, Benjamin Leutner and Mirjana Bevanda but based on the reference card by Jonas Stein, Tom Short and Emmanuel Paradis.