

# BIOL 4800/6220\_Fall2022Tutorial

## R basic

### Introduction

#### R as a calculator

```
1+200
```

```
## [1] 201
```

```
2^2
```

```
## [1] 4
```

```
7/2
```

```
## [1] 3.5
```

```
3487525*4097520
```

```
## [1] 1.42902e+13
```

```
cos(1)
```

```
## [1] 0.5403023
```

```
exp(0)
```

```
## [1] 1
```

```
1 == 1 #asking a question, is 1=1?
```

```
## [1] TRUE
```

```
1 >= 1
```

```
## [1] TRUE
```

```
1>1
```

```
## [1] FALSE
```

```
1!= 2 #is 1 not equal to 2?
```

```
## [1] TRUE
```

```
x <- 10  
x
```

```
## [1] 10
```

```
y <- x+x  
y
```

```
## [1] 20
```

## Vectorization (list-making)

```
1:5
```

```
## [1] 1 2 3 4 5
```

```
2^(1:5)
```

```
## [1] 2 4 8 16 32
```

```
log10(1:5)
```

```
## [1] 0.0000000 0.3010300 0.4771213 0.6020600 0.6989700
```

## Environment

```
ls() #list of everything open/ created/ defined
```

```
## [1] "x" "y"
```

```
rm(x) #removes a variable, useful for clearing up memory space
```

## Package Management

```
installed.packages()
```

```
## Package
## abind "abind"
## afex "afex"
## alabama "alabama"
## askpass "askpass"
## assertthat "assertthat"
## backports "backports"
## base64enc "base64enc"
## basefun "basefun"
## BayesFactor "BayesFactor"
## bayestestR "bayestestR"
## BB "BB"
## bbmle "bbmle"
## bdsmatrix "bdsmatrix"
## BH "BH"
## bit "bit"
## bit64 "bit64"
## bitops "bitops"
## blob "blob"
## bridgesampling "bridgesampling"
## brio "brio"
## Brobdingnag "Brobdingnag"
## broom "broom"
## bslib "bslib"
## BWstest "BWstest"
## cachem "cachem"
## callr "callr"
## car "car"
## carData "carData"
## caTools "caTools"
## cellranger "cellranger"
## changepoint "changepoint"
## checkmate "checkmate"
## cli "cli"
## clipr "clipr"
## coda "coda"
## coin "coin"
## colorspace "colorspace"
## commonmark "commonmark"
## coneproj "coneproj"
## contfrac "contfrac"
## correlation "correlation"
## covr "covr"
## coxme "coxme"
## cpp11 "cpp11"
## crayon "crayon"
## curl "curl"
## cyclocomp "cyclocomp"
## data.table "data.table"
## datawizard "datawizard"
## DBI "DBI"
## dbplyr "dbplyr"
```

## deldir	"deldir"
## DEoptimR	"DEoptimR"
## desc	"desc"
## deSolve	"deSolve"
## dichromat	"dichromat"
## diffobj	"diffobj"
## digest	"digest"
## doParallel	"doParallel"
## doRNG	"doRNG"
## dplyr	"dplyr"
## dreamerr	"dreamerr"
## dtplyr	"dtplyr"
## effectsize	"effectsize"
## ellipsis	"ellipsis"
## elliptic	"elliptic"
## evaluate	"evaluate"
## extrafont	"extrafont"
## extrafontdb	"extrafontdb"
## fansi	"fansi"
## farver	"farver"
## fastGHQuad	"fastGHQuad"
## fastICA	"fastICA"
## fastmap	"fastmap"
## fBasics	"fBasics"
## feather	"feather"
## fGarch	"fGarch"
## fixest	"fixest"
## forcats	"forcats"
## foreach	"foreach"
## forecast	"forecast"
## Formula	"Formula"
## fracdiff	"fracdiff"
## fs	"fs"
## future	"future"
## future.apply	"future.apply"
## gapminder	"gapminder"
## gargle	"gargle"
## gcookbook	"gcookbook"
## gdtools	"gdtools"
## generics	"generics"
## ggcorrplot	"ggcorrplot"
## ggfortify	"ggfortify"
## ggplot2	"ggplot2"
## ggplot2movies	"ggplot2movies"
## ggrepel	"ggrepel"
## ggridges	"ggridges"
## ggside	"ggside"
## glmnet	"glmnet"
## globals	"globals"
## glue	"glue"
## gmp	"gmp"
## googledrive	"googledrive"

```
## googlesheets4 "googlesheets4"
## gower "gower"
## gplots "gplots"
## gridExtra "gridExtra"
## gss "gss"
## gtable "gtable"
## gtools "gtools"
## hardhat "hardhat"
## haven "haven"
## hexbin "hexbin"
## highr "highr"
## hms "hms"
## hrbrthemes "hrbrthemes"
## htmltools "htmltools"
## httr "httr"
## hunspell "hunspell"
## hypergeo "hypergeo"
## ids "ids"
## inline "inline"
## insight "insight"
## interp "interp"
## ipred "ipred"
## isoband "isoband"
## ISwR "ISwR"
## iterators "iterators"
## jpeg "jpeg"
## jquerylib "jquerylib"
## jsonlite "jsonlite"
## KFAS "KFAS"
## knitr "knitr"
## kSamples "kSamples"
## labeling "labeling"
## LaplacesDemon "LaplacesDemon"
## latticeExtra "latticeExtra"
## lava "lava"
## lazyeval "lazyeval"
## lfda "lfda"
## libcoin "libcoin"
## lifecycle "lifecycle"
## lintr "lintr"
## listenv "listenv"
## lme4 "lme4"
## lmerTest "lmerTest"
## lmtest "lmtest"
## logspline "logspline"
## loo "loo"
## lubridate "lubridate"
## magrittr "magrittr"
## mapdata "mapdata"
## mapproj "mapproj"
## maps "maps"
## markdown "markdown"
```

```
## mathjaxr      "mathjaxr"
## Matrix        "Matrix"
## MatrixModels  "MatrixModels"
## matrixStats   "matrixStats"
## mc2d           "mc2d"
## memoise        "memoise"
## metaBMA        "metaBMA"
## metadat        "metadat"
## metafor        "metafor"
## metaplust      "metaplust"
## mime           "mime"
## minqa          "minqa"
## mlt            "mlt"
## mnormt         "mnormt"
## modelr         "modelr"
## modeltools     "modeltools"
## mratios        "mratios"
## MSwM           "MSwM"
## multcomp       "multcomp"
## multcompView   "multcompView"
## munsell        "munsell"
## mvtnorm        "mvtnorm"
## nloptr          "nloptr"
## numDeriv       "numDeriv"
## openssl        "openssl"
## orthopolynom   "orthopolynom"
## palmerpenguins "palmerpenguins"
## parallelly     "parallelly"
## parameters     "parameters"
## patchwork      "patchwork"
## pbapply        "pbapply"
## pbkrtest       "pbkrtest"
## performance    "performance"
## permute        "permute"
## pillar         "pillar"
## pkgbuild       "pkgbuild"
## pkgconfig      "pkgconfig"
## pkgload        "pkgload"
## plyr           "plyr"
## PMCMRplus      "PMCMRplus"
## png            "png"
## polynom        "polynom"
## praise         "praise"
## prettyunits    "prettyunits"
## prismatic      "prismatic"
## processx       "processx"
## prodlim        "prodlim"
## progress       "progress"
## progressr      "progressr"
## ps             "ps"
## psych          "psych"
## purrr          "purrr"
```

## quadprog	"quadprog"
## quantmod	"quantmod"
## quantreg	"quantreg"
## R6	"R6"
## rappdirs	"rappdirs"
## rARPACK	"rARPACK"
## raster	"raster"
## rasterVis	"rasterVis"
## RColorBrewer	"RColorBrewer"
## Rcpp	"Rcpp"
## RcppArmadillo	"RcppArmadillo"
## RcppEigen	"RcppEigen"
## RcppGSL	"RcppGSL"
## RcppParallel	"RcppParallel"
## RcppZiggurat	"RcppZiggurat"
## readr	"readr"
## readxl	"readxl"
## rematch	"rematch"
## rematch2	"rematch2"
## remotes	"remotes"
## reprex	"reprex"
## reshape	"reshape"
## reshape2	"reshape2"
## rex	"rex"
## Rfast	"Rfast"
## rgdal	"rgdal"
## rlang	"rlang"
## rmarkdown	"rmarkdown"
## Rmpfr	"Rmpfr"
## rngtools	"rngtools"
## robustbase	"robustbase"
## ROCR	"ROCR"
## rprojroot	"rprojroot"
## RSpectra	"RSpectra"
## rstan	"rstan"
## rstantools	"rstantools"
## rstudioapi	"rstudioapi"
## Rttf2pt1	"Rttf2pt1"
## rvest	"rvest"
## sandwich	"sandwich"
## sass	"sass"
## scales	"scales"
## selectr	"selectr"
## shape	"shape"
## SimComp	"SimComp"
## sm	"sm"
## sp	"sp"
## SparseM	"SparseM"
## spelling	"spelling"
## SQUAREM	"SQUAREM"
## stabledist	"stabledist"
## StanHeaders	"StanHeaders"



```
## statsExpressions "statsExpressions"
## stringi          "stringi"
## stringr          "stringr"
## strucchange      "strucchange"
## SuppDists        "SuppDists"
## survPresmooth    "survPresmooth"
## svglite          "svglite"
## sys              "sys"
## systemfonts      "systemfonts"
## terra            "terra"
## testthat         "testthat"
## TH.data          "TH.data"
## tibble           "tibble"
## tidyr            "tidyr"
## tidyselect       "tidyselect"
## tidyverse        "tidyverse"
## timeDate         "timeDate"
## timeSeries       "timeSeries"
## tinytex          "tinytex"
## tram             "tram"
## tseries          "tseries"
## TTR              "TTR"
## tzdb             "tzdb"
## urca             "urca"
## utf8             "utf8"
## uuid            "uuid"
## variables        "variables"
## vars            "vars"
## vctrs           "vctrs"
## vdifffr         "vdifffr"
## vegan           "vegan"
## vioplot         "vioplot"
## viridis         "viridis"
## viridisLite     "viridisLite"
## vroom           "vroom"
## waldo           "waldo"
## withr           "withr"
## WRS2            "WRS2"
## xfun            "xfun"
## xml2            "xml2"
## xmlparsedata    "xmlparsedata"
## xtable          "xtable"
## xts             "xts"
## yaml           "yaml"
## zeallot         "zeallot"
## zoo             "zoo"
## base            "base"
## boot           "boot"
## class          "class"
## cluster        "cluster"
## codetools      "codetools"
## compiler       "compiler"
```

```

## datasets      "datasets"
## foreign      "foreign"
## graphics     "graphics"
## grDevices    "grDevices"
## grid         "grid"
## KernSmooth   "KernSmooth"
## lattice      "lattice"
## MASS         "MASS"
## Matrix       "Matrix"
## methods      "methods"
## mgcv         "mgcv"
## nlme         "nlme"
## nnet         "nnet"
## parallel     "parallel"
## rpart        "rpart"
## spatial      "spatial"
## splines      "splines"
## stats        "stats"
## stats4       "stats4"
## survival     "survival"
## tcltk        "tcltk"
## tools        "tools"
## translations "translations"
## utils        "utils"
##              LibPath
## abind        "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## afex         "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## alabama      "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## askpass      "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## assertthat   "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## backports    "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## base64enc    "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## basefun      "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## BayesFactor  "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bayestestR   "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## BB           "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bbmle        "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bdsmatrix    "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## BH           "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bit          "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bit64        "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bitops       "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## blob         "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bridgesampling "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## brio         "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## Brodningnag  "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## broom        "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## bslib        "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## BWStest      "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## cachem       "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## callr        "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## car          "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"

```

```
## carData "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## caTools "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## cellranger "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## changepoint "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## checkmate "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## cli "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## clipr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## coda "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## coin "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## colorspace "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## commonmark "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## coneproj "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## contfrac "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## correlation "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## covr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## coxme "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## cpp11 "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## crayon "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## curl "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## cyclocomp "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## data.table "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## datawizard "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## DBI "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## dbplyr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## deldir "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## DEoptimR "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## desc "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## deSolve "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## dichromat "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## diffobj "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## digest "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## doParallel "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## doRNG "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## dplyr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## dreamerr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## dtplyr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## effectsize "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ellipsis "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## elliptic "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## evaluate "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## extrafont "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## extrafontdb "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fansi "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## farver "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fastGHQuad "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fastICA "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fastmap "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fBasics "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## feather "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fGarch "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fixest "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## forcats "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
```

```
## foreach "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## forecast "C:/Users/Caro1's PC/AppData/Local/R/win-library/4.2"
## Formula "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fracdiff "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## fs "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## future "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## future.apply "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gapminder "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gargle "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gcookbook "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gdtools "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## generics "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggcorrplot "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggfortify "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggplot2 "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggplot2movies "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggrepel "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggridges "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ggside "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## glmnet "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## globals "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## glue "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gmp "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## googledrive "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## googlesheets4 "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gower "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gplots "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gridExtra "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gss "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gtable "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## gtools "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## hardhat "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## haven "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## hexbin "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## highr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## hms "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## hrbrthemes "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## htmltools "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## httr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## hunspell "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## hypergeo "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ids "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## inline "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## insight "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## interp "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ipred "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## isoband "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ISwR "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## iterators "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## jpeg "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## jquerylib "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## jsonlite "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
```

```
## KFA5 "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## knitr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## kSamples "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## labeling "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## LaplacesDemon "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## latticeExtra "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## lava "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## lazyeval "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## lfda "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## libcoin "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## lifecycle "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## lme4 "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## lmerTest "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## lmtest "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## loo "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## magrittr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## mapdata "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## mapproj "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## maps "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## markdown "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## mathjaxr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## Matrix "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## MatrixModels "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## matrixStats "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## mc2d "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## metaBMA "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## metadat "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## metafor "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## Rfast "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## rgdal "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## rlang "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## rmarkdown "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## robustbase "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## ROCR "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## rprojroot "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## stringr "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## systemfonts "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## terra "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## testthat "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## TH.data "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
## tibble "C:/Users/Carol's PC/AppData/Local/R/win-library/4.2"
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## stats4    "C:/Program Files/R/R-4.2.1/library"
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## alabama    "2022.4-1"    NA

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## metadat	"1.2-0"	NA
## metafor	"3.8-1"	NA
## metaplust	"1.0-4"	NA
## mime	"0.12"	NA
## minqa	"1.2.4"	NA
## mlt	"1.4-3"	NA
## mnormt	"2.1.1"	NA
## modelr	"0.1.9"	NA
## modeltools	"0.2-23"	NA
## mratios	"1.4.2"	NA
## MSwM	"1.5"	NA
## multcomp	"1.4-20"	NA
## multcompView	"0.1-8"	NA
## munsell	"0.5.0"	NA
## mvtnorm	"1.1-3"	NA
## nloptr	"2.0.3"	NA
## numDeriv	"2016.8-1.1"	NA
## openssl	"2.0.3"	NA
## orthopolynom	"1.0-6.1"	NA
## palmerpenguins	"0.1.1"	NA
## parallelly	"1.32.1"	NA
## parameters	"0.19.0"	NA
## patchwork	"1.1.2"	NA
## pbapply	"1.5-0"	NA
## pbkrtest	"0.5.1"	NA
## performance	"0.10.0"	NA
## permute	"0.9-7"	NA
## pillar	"1.7.0"	NA
## pkgbuild	"1.3.1"	NA
## pkgconfig	"2.0.3"	NA
## pkgload	"1.3.0"	NA
## plyr	"1.8.7"	NA
## PMCMRplus	"1.9.6"	NA
## png	"0.1-7"	NA
## polynom	"1.4-1"	NA
## praise	"1.0.0"	NA
## prettyunits	"1.1.1"	NA
## prismatic	"1.1.1"	NA
## processx	"3.7.0"	NA
## prodlim	"2019.11.13"	NA
## progress	"1.2.2"	NA
## progressr	"0.11.0"	NA
## ps	"1.7.1"	NA
## psych	"2.2.9"	NA
## purrr	"0.3.4"	NA
## quadprog	"1.5-8"	NA
## quantmod	"0.4.20"	NA
## quantreg	"5.94"	NA
## R6	"2.5.1"	NA

## rappdirs	"0.3.3"	NA
## rARPACK	"0.11-0"	NA
## raster	"3.6-3"	NA
## rasterVis	"0.51.2"	NA
## RColorBrewer	"1.1-3"	NA
## Rcpp	"1.0.9"	NA
## RcppArmadillo	"0.11.4.0.1"	NA
## RcppEigen	"0.3.3.9.2"	NA
## RcppGSL	"0.3.11"	NA
## RcppParallel	"5.1.5"	NA
## RcppZiggurat	"0.1.6"	NA
## readr	"2.1.3"	NA
## readxl	"1.4.1"	NA
## rematch	"1.0.1"	NA
## rematch2	"2.1.2"	NA
## remotes	"2.4.2"	NA
## reprex	"2.0.2"	NA
## reshape	"0.8.9"	NA
## reshape2	"1.4.4"	NA
## rex	"1.2.1"	NA
## Rfast	"2.0.6"	NA
## rgdal	"1.5-32"	NA
## rlang	"1.0.2"	NA
## rmarkdown	"2.16"	NA
## Rmpfr	"0.8-9"	NA
## rngtools	"1.5.2"	NA
## robustbase	"0.95-0"	NA
## ROCR	"1.0-11"	NA
## rprojroot	"2.0.3"	NA
## RSpectra	"0.16-1"	NA
## rstan	"2.21.7"	NA
## rstantools	"2.2.0"	NA
## rstudioapi	"0.14"	NA
## Rttf2pt1	"1.3.11"	NA
## rvest	"1.0.3"	NA
## sandwich	"3.0-2"	NA
## sass	"0.4.2"	NA
## scales	"1.2.0"	NA
## selectr	"0.4-2"	NA
## shape	"1.4.6"	NA
## SimComp	"3.3"	NA
## sm	"2.2-5.7.1"	NA
## sp	"1.5-0"	NA
## SparseM	"1.81"	NA
## spelling	"2.2"	NA
## SQUAREM	"2021.1"	NA
## stabledist	"0.7-1"	NA
## StanHeaders	"2.21.0-7"	NA
## statsExpressions	"1.3.4"	NA
## stringi	"1.7.8"	NA
## stringr	"1.4.1"	NA
## strucchange	"1.5-3"	NA

## SuppDists	"1.1-9.7"	NA
## survPresmooth	"1.1-11"	NA
## svglite	"2.1.0"	NA
## sys	"3.4"	NA
## systemfonts	"1.0.4"	NA
## terra	"1.6-17"	NA
## testthat	"3.1.5"	NA
## TH.data	"1.1-1"	NA
## tibble	"3.1.7"	NA
## tidyr	"1.2.1"	NA
## tidyselect	"1.2.0"	NA
## tidyverse	"1.3.2"	NA
## timeDate	"4021.106"	NA
## timeSeries	"4021.105"	NA
## tinytex	"0.42"	NA
## tram	"0.8-0"	NA
## tseries	"0.10-52"	NA
## TTR	"0.24.3"	NA
## tzdb	"0.3.0"	NA
## urca	"1.3-3"	NA
## utf8	"1.2.2"	NA
## uuid	"1.1-0"	NA
## variables	"1.1-1"	NA
## vars	"1.5-6"	NA
## vctrs	"0.4.1"	NA
## vdiff	"1.0.4"	NA
## vegan	"2.6-2"	NA
## vioplot	"0.3.7"	NA
## viridis	"0.6.2"	NA
## viridisLite	"0.4.0"	NA
## vroom	"1.6.0"	NA
## waldo	"0.4.0"	NA
## withr	"2.5.0"	NA
## WRS2	"1.1-4"	NA
## xfun	"0.33"	NA
## xml2	"1.3.3"	NA
## xmlparsedata	"1.0.5"	NA
## xtable	"1.8-4"	NA
## xts	"0.12.2"	NA
## yaml	"2.3.5"	NA
## zeallot	"0.1.0"	NA
## zoo	"1.8-11"	NA
## base	"4.2.1"	"base"
## boot	"1.3-28"	"recommended"
## class	"7.3-20"	"recommended"
## cluster	"2.1.3"	"recommended"
## codetools	"0.2-18"	"recommended"
## compiler	"4.2.1"	"base"
## datasets	"4.2.1"	"base"
## foreign	"0.8-82"	"recommended"
## graphics	"4.2.1"	"base"
## grDevices	"4.2.1"	"base"

```

## grid                "4.2.1"      "base"
## KernSmooth          "2.23-20"    "recommended"
## lattice             "0.20-45"    "recommended"
## MASS                "7.3-57"     "recommended"
## Matrix              "1.4-1"      "recommended"
## methods            "4.2.1"      "base"
## mgcv                "1.8-40"     "recommended"
## nlme                "3.1-157"    "recommended"
## nnet                "7.3-17"     "recommended"
## parallel           "4.2.1"      "base"
## rpart               "4.1.16"     "recommended"
## spatial             "7.3-15"     "recommended"
## splines             "4.2.1"      "base"
## stats               "4.2.1"      "base"
## stats4              "4.2.1"      "base"
## survival            "3.3-1"      "recommended"
## tcltk               "4.2.1"      "base"
## tools               "4.2.1"      "base"
## translations        "4.2.1"      NA
## utils               "4.2.1"      "base"
##                     Depends
## abind                "R (>= 1.5.0)"
## afex                 "R (>= 3.5.0), lme4 (>= 1.1-8)"
## alabama              "R (>= 2.10.1), numDeriv"
## askpass              NA
## assertthat           NA
## backports            "R (>= 3.0.0)"
## base64enc            "R (>= 2.9.0)"
## basefun              "variables (>= 1.1-0), R (>= 3.2.0)"
## BayesFactor          "R (>= 3.2.0), coda, Matrix (>= 1.1-1)"
## bayestestR           "R (>= 3.6)"
## BB                   "R (>= 2.6.1)"
## bbmle                "R (>= 3.0.0), stats4"
## bdsmatrix            "methods, R (>= 2.0.0)"
## BH                   NA
## bit                  "R (>= 2.9.2)"
## bit64                "R (>= 3.0.1), bit (>= 4.0.0), utils, methods, stats"
## bitops              NA
## blob                 NA
## bridgesampling       "R (>= 3.0.0)"
## brio                 NA
## Brodningnag          "R (>= 2.13.0), methods, Matrix (>= 1.5-0)"
## broom                "R (>= 3.1)"
## bslib                "R (>= 2.10)"
## BWStest              NA
## cachem               NA
## callr                "R (>= 3.4)"
## car                  "R (>= 3.5.0), carData (>= 3.0-0)"
## carData              "R (>= 3.5.0)"
## caTools              "R (>= 3.6.0)"
## cellranger           "R (>= 3.0.0)"
## changepoint          "R(>= 3.1), methods, stats, zoo(>= 0.9-1)"

```

```

## checkmate      "R (>= 3.0.0)"
## cli            "R (>= 3.4)"
## clipr         NA
## coda          "R (>= 2.14.0)"
## coin          "R (>= 3.6.0), survival"
## colorspace    "R (>= 3.0.0), methods"
## commonmark    NA
## coneproj      "R(>= 3.0.2)"
## contfrac      NA
## correlation    "R (>= 3.6)"
## covr          "R (>= 3.1.0), methods"
## coxme         "survival (>= 2.36.14), methods, bdsmatrix(>= 1.3), R(>= 2.10)"
## cpp11         NA
## crayon        NA
## curl          "R (>= 3.0.0)"
## cyclocomp     NA
## data.table    "R (>= 3.1.0)"
## datawizard    "R (>= 3.6)"
## DBI           "methods, R (>= 3.0.0)"
## dbplyr        "R (>= 3.1)"
## deldir        "R (>= 3.5.0)"
## DEoptimR      NA
## desc          "R (>= 3.4)"
## deSolve       "R (>= 3.3.0)"
## dichromat     "R (>= 2.10), stats"
## diffobj       "R (>= 3.1.0)"
## digest        "R (>= 3.3.0)"
## doParallel    "R (>= 2.14.0), foreach (>= 1.2.0), iterators (>= 1.0.0), \nparallel, utils"
## doRNG         "R (>= 3.0.0), foreach, rngtools (>= 1.5)"
## dplyr         "R (>= 3.4.0)"
## dreamerr      NA
## dtplyr        "R (>= 3.3)"
## effectsize    "R (>= 3.6)"
## ellipsis      "R (>= 3.2)"
## elliptic      "R (>= 2.5.0)"
## evaluate      "R (>= 3.0.2)"
## extrafont     "R (>= 2.15)"
## extrafontdb   "R (>= 2.14)"
## fansi         "R (>= 3.1.0)"
## farver        NA
## fastGHQuad    "Rcpp (>= 0.11.0)"
## fastICA       "R (>= 4.0.0)"
## fastmap       NA
## fBasics       "R (>= 2.15.1)"
## feather       NA
## fGarch        NA
## fixest        "R(>= 3.5.0)"
## forcats       "R (>= 3.4)"
## foreach       "R (>= 2.5.0)"
## forecast      "R (>= 3.5.0),"
## Formula       "R (>= 2.0.0), stats"
## fracdiff      NA

```



```
## fs "R (>= 3.1)"
## future NA
## future.apply "R (>= 3.2.0), future (>= 1.27.0)"
## gapminder "R (>= 3.1.0)"
## gargle "R (>= 3.5)"
## gcookbook "R (>= 2.10)"
## gdtools NA
## generics "R (>= 3.2)"
## ggcorrplot "R (>= 3.3), ggplot2 (>= 3.3.6)"
## ggfortify "methods, ggplot2 (>= 2.0.0)"
## ggplot2 "R (>= 3.3)"
## ggplot2movies "R (>= 2.10.0)"
## ggrepel "R (>= 3.0.0), ggplot2 (>= 2.2.0)"
## ggridges "R (>= 3.2)"
## ggside "ggplot2 (>= 3.0.0)"
## glmnet "R (>= 3.6.0), Matrix (>= 1.0-6)"
## globals "R (>= 3.1.2)"
## glue "R (>= 3.4)"
## gmp "R (>= 3.5.0)"
## googledrive "R (>= 3.3)"
## googlesheets4 "R (>= 3.4)"
## gower NA
## gplots "R (>= 3.0)"
## gridExtra NA
## gss "R (>= 3.0.0), stats"
## gtable "R (>= 3.0)"
## gtools "methods, stats, utils"
## hardhat "R (>= 3.4.0)"
## haven "R (>= 3.4)"
## hexbin "R (>= 2.0.1), methods"
## highr "R (>= 3.2.3)"
## hms NA
## hrbrthemes "R (>= 3.4.0)"
## htmltools "R (>= 2.14.1)"
## httr "R (>= 3.2)"
## hunspell "R (>= 3.0.2)"
## hypergeo "R (>= 3.1.0),"
## ids NA
## inline NA
## insight "R (>= 3.5)"
## interp "R (>= 3.5.0)"
## ipred "R (>= 2.10)"
## isoband NA
## ISwR "R (>= 2.6.0)"
## iterators "R (>= 2.5.0), utils"
## jpeg "R (>= 2.9.0)"
## jquerylib NA
## jsonlite "methods"
## KFAS "R (>= 3.1.0)"
## knitr "R (>= 3.3.0)"
## kSamples "SuppDists"
## labeling NA
```

```

## LaplacesDemon      "R (>= 3.0.0)"
## latticeExtra        "R (>= 3.6.0), lattice"
## lava                "R (>= 3.0)"
## lazyeval            "R (>= 3.1.0)"
## lfda                "R (>= 3.1.0)"
## libcoin             "R (>= 3.4.0)"
## lifecycle           "R (>= 3.4)"
## lintr               "R (>= 3.2)"
## listenv             "R (>= 3.1.2)"
## lme4                "R (>= 3.2.0), Matrix (>= 1.2-1), methods, stats"
## lmerTest            "R (>= 3.2.5), lme4 (>= 1.1-10), stats, methods"
## lmtest              "R (>= 3.0.0), stats, zoo"
## logspline           NA
## loo                 "R (>= 3.1.2)"
## lubridate           "methods, R (>= 3.2)"
## magrittr            "R (>= 3.4.0)"
## mapdata             "R (>= 2.14.0), maps (>= 2.0-7)"
## mapproj             "R (>= 3.0.0), maps (>= 2.3-0)"
## maps                "R (>= 3.5.0)"
## markdown            "R (>= 2.11.1)"
## mathjaxr            NA
## Matrix              "R (>= 3.5.0)"
## MatrixModels        "R (>= 3.6.0)"
## matrixStats         "R (>= 2.12.0)"
## mc2d                "R (>= 2.10.0), mvtnorm"
## memoise             NA
## metaBMA             "R (>= 3.4.0), Rcpp (>= 1.0.0), methods"
## metadat             "R (>= 4.0.0)"
## metafor             "R (>= 4.0.0), methods, Matrix, metadat"
## metaplus            "R(>= 3.2.0)"
## mime                NA
## minqa               NA
## mlt                 "basefun (>= 1.1-2), variables (>= 1.1-0)"
## mnormt              "R (>= 2.2.0)"
## modelr              "R (>= 3.2)"
## modeltools          "stats, stats4"
## mratios             "R (>= 2.12.0)"
## MSwM               "methods, graphics, parallel"
## multcomp            "stats, graphics, mvtnorm (>= 1.0-10), survival (>= 2.39-4),\nTH.data (>= 1.
0-2)"
## multcompView        NA
## munsell             NA
## mvtnorm             "R(>= 3.5.0)"
## nloptr              NA
## numDeriv            "R (>= 2.11.1)"
## openssl             NA
## orthopolynom        "R (>= 2.0.1)"
## palmerpenguins      "R (>= 2.10)"
## parallelly          NA
## parameters          "R (>= 3.6)"
## patchwork           NA
## pbapply             "R (>= 3.2.0)"

```

```
## pbkrtest      "R (>= 3.5.0), lme4 (>= 1.1.10)"
## performance   "R (>= 3.6)"
## permute       "R (>= 2.14.0)"
## pillar        NA
## pkgbuild      "R (>= 3.1)"
## pkgconfig     NA
## pkgload       "R (>= 3.4.0)"
## plyr          "R (>= 3.1.0)"
## PMCMRplus     "R (>= 3.5.0)"
## png           "R (>= 2.9.0)"
## polynom       NA
## praise        NA
## prettyunits   NA
## prismatic     "R (>= 3.2)"
## processx      "R (>= 3.4.0)"
## prodlim       "R (>= 2.9.0)"
## progress      NA
## progressr     "R (>= 3.5.0)"
## ps            "R (>= 3.4)"
## psych         NA
## purrr         "R (>= 3.2)"
## quadprog      "R (>= 3.1.0)"
## quantmod      "R (>= 3.2.0), xts(>= 0.9-0), zoo, TTR(>= 0.2), methods"
## quantreg      "R (>= 3.5), stats, SparseM"
## R6            "R (>= 3.0)"
## rappdirs      "R (>= 3.2)"
## rARPACK       NA
## raster        "sp (>= 1.4-5), R (>= 3.5.0)"
## rasterVis     "R (>= 3.0.0), methods, lattice (>= 0.20-41)"
## RColorBrewer  "R (>= 2.0.0)"
## Rcpp          NA
## RcppArmadillo "R (>= 3.3.0)"
## RcppEigen     NA
## RcppGSL       NA
## RcppParallel  "R (>= 3.0.2)"
## RcppZiggurat  "R (>= 3.0.0)"
## readr         "R (>= 3.4)"
## readxl        "R (>= 3.4)"
## rematch       NA
## rematch2      NA
## remotes       "R (>= 3.0.0)"
## reprex        "R (>= 3.4)"
## reshape       "R (>= 2.6.1)"
## reshape2      "R (>= 3.1)"
## rex           NA
## Rfast         "R (>= 3.5.0), Rcpp (>= 0.12.3), RcppZiggurat"
## rgdal         "R (>= 3.5.0), methods, sp (>= 1.1-0)"
## rlang         "R (>= 3.4.0)"
## rmarkdown     "R (>= 3.0)"
## Rmpfr         "gmp (>= 0.6-1), R (>= 3.5.0)"
## rngtools      "R (>= 3.2.0), methods"
## robustbase    "R (>= 3.5.0)"
```

```

## ROCR "R (>= 3.6)"
## rprojroot "R (>= 3.0.0)"
## RSpecra "R (>= 3.0.2)"
## rstan "R (>= 3.4.0), StanHeaders (>= 2.21.0), ggplot2 (>= 3.0.0)"
## rstantools NA
## rstudioapi NA
## Rttf2pt1 "R (>= 2.15)"
## rvest "R (>= 3.2)"
## sandwich "R (>= 3.0.0)"
## sass NA
## scales "R (>= 3.2)"
## selectr "R (>= 3.0)"
## shape "R (>= 2.01)"
## SimComp NA
## sm "R (>= 3.1.0)"
## sp "R (>= 3.0.0), methods"
## SparseM "R (>= 2.15), methods"
## spelling NA
## SQUAREM "R (>= 3.0)"
## stabledist "R (>= 3.1.0)"
## StanHeaders "R (>= 3.4.0)"
## statsExpressions "R (>= 4.0.0)"
## stringi "R (>= 3.1)"
## stringr "R (>= 3.1)"
## strucchange "R (>= 2.10.0), zoo, sandwich"
## SuppDists "R (>= 3.3.0)"
## survPresmooth "R(>= 3.0.1)"
## svglite "R (>= 3.0.0)"
## sys NA
## systemfonts "R (>= 3.2.0)"
## terra "R (>= 3.5.0)"
## testthat "R (>= 3.1)"
## TH.data "R (>= 3.5.0), survival, MASS"
## tibble "R (>= 3.1.0)"
## tidyr "R (>= 3.1)"
## tidyselect "R (>= 3.4)"
## tidyverse "R (>= 3.3)"
## timeDate "R (>= 3.6.0)"
## timeSeries "R (>= 2.10), timeDate (>= 2150.95)"
## tinytex NA
## tram "R (>= 3.5.0), mlt (>= 1.4-3)"
## tseries "R (>= 2.10.0)"
## TTR NA
## tzdb "R (>= 3.4.0)"
## urca "R (>= 2.0.0), methods"
## utf8 "R (>= 2.10)"
## uuid "R (>= 2.9.0)"
## variables NA
## vars "R (>= 2.0.0), MASS, strucchange, urca (>= 1.1-6), lmtest (>= 1.0.9-26), sandwich (>= 2.2-4)"
## vctrs "R (>= 3.3)"
## vdiff "R (>= 3.2.0)"

```

```

## vegan                "permute (>= 0.9-0), lattice, R (>= 3.4.0)"
## vioplot              "sm, zoo"
## viridis              "R (>= 2.10), viridisLite (>= 0.4.0)"
## viridisLite          "R (>= 2.10)"
## vroom                "R (>= 3.4)"
## waldo                NA
## withr                "R (>= 3.2.0)"
## WRS2                 "R (>= 3.2.0)"
## xfun                 NA
## xml2                 "R (>= 3.1.0)"
## xmlparsedata         "R (>= 3.0.0)"
## xtable               "R (>= 2.10.0)"
## xts                  "zoo (>= 1.7-12)"
## yaml                 NA
## zeallot              NA
## zoo                  "R (>= 3.1.0), stats"
## base                 NA
## boot                 "R (>= 3.0.0), graphics, stats"
## class                "R (>= 3.0.0), stats, utils"
## cluster              "R (>= 3.5.0)"
## codetools            "R (>= 2.1)"
## compiler             NA
## datasets             NA
## foreign              "R (>= 4.0.0)"
## graphics             NA
## grDevices            NA
## grid                 NA
## KernSmooth           "R (>= 2.5.0), stats"
## lattice              "R (>= 3.0.0)"
## MASS                 "R (>= 3.3.0), grDevices, graphics, stats, utils"
## Matrix               "R (>= 3.5.0)"
## methods              NA
## mgcv                 "R (>= 3.6.0), nlme (>= 3.1-64)"
## nlme                 "R (>= 3.5.0)"
## nnet                 "R (>= 3.0.0), stats, utils"
## parallel            NA
## rpart                "R (>= 2.15.0), graphics, stats, grDevices"
## spatial              "R (>= 3.0.0), graphics, stats, utils"
## splines              NA
## stats                NA
## stats4               NA
## survival             "R (>= 3.5.0)"
## tcltk               NA
## tools                NA
## translations         NA
## utils                NA
##                      Imports
## abind                 "methods, utils"
## afex                  "pbkrtest (>= 0.4-1), lmerTest (>= 3.0-0), car, reshape2,\nstats, methods, u
tils"
## alabama              NA
## askpass               "sys (>= 2.1)"

```

```

## assertthat      "tools"
## backports       NA
## base64enc       NA
## basefun         "stats, polynom, Matrix, orthopolynom, methods"
## BayesFactor     "pbapply, mvtnorm, stringr, utils, graphics, MatrixModels, Rcpp\n(>= 0.11.
2), methods, hypergeo"
## bayestestR      "insight (>= 0.18.2), datawizard (>= 0.5.1), graphics, methods,\nstats, util
s"
## BB              "stats, quadprog"
## bbmle           "stats, numDeriv, lattice, MASS, methods, bdsmatrix, Matrix,\nmvtnorm"
## bdsmatrix       NA
## BH              NA
## bit             NA
## bit64           NA
## bitops          NA
## blob            "methods, rlang, vctrs (>= 0.2.1)"
## bridgesampling  "mvtnorm, Matrix, Brodningnag, stringr, coda, parallel, scales,\nutils, meth
ods"
## brio            NA
## Brodningnag     NA
## broom           "backports, dplyr (>= 1.0.0), ellipsis, generics (>= 0.0.2),\nglue, purrr, r
lang, stringr, tibble (>= 3.0.0), tidyr (>=\n1.0.0), ggplot2"
## bslib           "grDevices, htmltools (>= 0.5.2), jsonlite, sass (>= 0.4.0),\nnjquerylib (>=
0.1.3), rlang, cachem, memoise"
## BWStest         "memoise, Rcpp (>= 0.12.3)"
## cachem          "rlang, fastmap"
## callr           "processx (>= 3.6.1), R6, utils"
## car             "abind, MASS, mgcv, nnet, pbkrtest (>= 0.4-4), quantreg,\ngrDevices, utils,
stats, graphics, lme4 (>= 1.1-27.1), nlme,\nnscales"
## carData         NA
## caTools         "bitops"
## cellranger      "rematch, tibble"
## changepoint     NA
## checkmate       "backports (>= 1.1.0), utils"
## cli             "glue (>= 1.6.0), utils"
## clipr           "utils"
## coda            "lattice"
## coin            "methods, parallel, stats, stats4, utils, libcoin (>= 1.0-9),\nmatrixStats
(>= 0.54.0), modeltools (>= 0.2-9), mvtnorm (>=\n1.0-5), multcomp"
## colorspace      "graphics, grDevices, stats"
## commonmark      NA
## coneproj        "Rcpp (>= 0.10.4)"
## contfrac        NA
## correlation     "bayestestR (>= 0.13.0), datasets, datawizard (>= 0.5.1),\nninsight (>= 0.18.
4), parameters (>= 0.18.2), stats"
## covr            "digest, stats, utils, jsonlite, rex, http, crayon, withr (>=\n1.0.2), yaml"
## coxme           "nlme, Matrix (>= 1.0)"
## cpp11           NA
## crayon          "grDevices, methods, utils"
## curl            NA
## cyclocomp       "callr, crayon, desc, remotes, withr"
## data.table      "methods"

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## datawizard      "insight (>= 0.18.5), stats, utils"
## DBI              NA
## dbplyr          "assertthat (>= 0.2.0), blob (>= 1.2.0), cli (>= 3.3.0), DBI\n(>= 1.0.0), dp
lyr (>= 1.0.9), glue (>= 1.2.0), lifecycle (>=\n1.0.0), magrittr, methods, pillar (>= 1.5.0), pu
rrr (>= 0.2.5),\nR6 (>= 2.2.2), rlang (>= 1.0.0), tibble (>= 1.4.2), tidyselect\n(>= 0.2.4), uti
ls, vctrs (>= 0.4.1), withr"
## deldir          "graphics, grDevices"
## DEoptimR        "stats"
## desc            "cli, R6, rprojroot, utils"
## deSolve         "methods, graphics, grDevices, stats"
## dichromat       NA
## diffobj         "crayon (>= 1.3.2), tools, methods, utils, stats"
## digest          "utils"
## doParallel      NA
## doRNG           "stats, utils, iterators"
## dplyr           "generics, glue (>= 1.3.2), lifecycle (>= 1.0.1), magrittr (>=\n1.5), method
s, R6, rlang (>= 1.0.2), tibble (>= 2.1.3),\ntidyselect (>= 1.1.1), utils, vctrs (>= 0.4.1), pil
lar (>=\n1.5.1)"
## dreamer        "Formula, utils"
## dtplyr         "crayon, data.table (>= 1.13.0), dplyr (>= 1.0.3), ellipsis,\nglue, lifecycl
e, rlang, tibble, tidyselect, vctrs"
## effectsize      "bayestestR (>= 0.13.0), insight (>= 0.18.4), parameters (>=\n0.19.0), perfo
rmance (>= 0.10.0), datawizard (>= 0.6.2), stats,\nutils"
## ellipsis        "rlang (>= 0.3.0)"
## elliptic        "MASS"
## evaluate        "methods"
## extrafont       "extrafontdb, grDevices, utils, Rttf2pt1"
## extrafontdb     NA
## fansi           "grDevices, utils"
## farver          NA
## fastGHQuad      NA
## fastICA         NA
## fastmap         NA
## fBasics         "timeDate, timeSeries, stats, grDevices, graphics, methods,\nutils, MASS, sp
atial, gss, stabledist"
## feather         "Rcpp, tibble (>= 2.0.0), hms"
## fGarch          "fBasics, timeDate, timeSeries, fastICA, Matrix (>= 1.5-0),\ngraphics, metho
ds, stats, utils"
## fixest          "stats, graphics, grDevices, tools, utils, methods, numDeriv,\nnlme, sandwic
h, Rcpp(>= 1.0.5), dreamer(>= 1.2.3)"
## forcats         "cli, ellipsis, glue, lifecycle, magrittr, rlang (>= 1.0.0),\ntibble, withr"
## foreach         "codetools, utils, iterators"
## forecast        "colorspace, fracdiff, generics (>= 0.1.2), ggplot2 (>= 2.2.1),\ngraphics, l
mtest, magrittr, nnet, parallel, Rcpp (>= 0.11.0),\nstats, timeDate, tseries, urca, zoo"
## Formula         NA
## fracdiff        "stats"
## fs              "methods"
## future          "digest, globals (>= 0.16.0), listenv (>= 0.8.0), parallel,\nparallelly (>=
1.32.1), tools, utils"
## future.apply    "globals (>= 0.16.1), parallel, utils"
## gapminder       "tibble"
## gargle          "cli (>= 3.0.0), fs (>= 1.3.1), glue (>= 1.3.0), http (>=\n1.4.0), jsonlite,

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rappdirs, rlang (>= 1.0.0), rstudioapi, \nstats, utils, withr"
## gcookbook          NA
## gdtools            "Rcpp (>= 0.12.12), systemfonts (>= 0.1.1)"
## generics           "methods"
## ggcorrplot         "reshape2, stats"
## ggfortify          "dplyr (>= 0.3), tidyr, gridExtra, grid, scales, stringr, \ntibble"
## ggplot2            "digest, glue, grDevices, grid, gtable (>= 0.1.1), isoband, \nMASS, mgcv, rla
ng (>= 0.4.10), scales (>= 0.5.0), stats, \ntibble, withr (>= 2.0.0)"
## ggplot2movies      NA
## ggrepel            "grid, Rcpp, rlang (>= 0.3.0), scales (>= 0.5.0)"
## ggribges           "ggplot2 (>= 3.0.0), grid (>= 3.0.0), scales (>= 0.4.1), withr\n(>= 2.1.1)"
## ggside             "grid, gtable, rlang, scales, glue, stats, tibble"
## glmnet             "methods, utils, foreach, shape, survival, Rcpp"
## globals            "codetools"
## glue               "methods"
## gmp                "methods"
## googledrive        "cli (>= 3.0.0), gargle (>= 1.2.0), glue (>= 1.4.2), httr, \njsonlite, lifecy
cle, magrittr, pillar, purrr (>= 0.2.3), rlang\n(>= 0.4.9), tibble (>= 2.0.0), utils, uuid, vctr
s (>= 0.3.0), \nwithr"
## googlesheets4      "cellranger, cli (>= 3.0.0), curl, gargle (>= 1.2.0), glue (>= \n1.3.0), goog
ledrive (>= 2.0.0), httr, ids, magrittr, methods, \npurrr, rematch2, rlang (>= 1.0.2), tibble (>=
2.1.1), utils, \nvctrs (>= 0.2.3)"
## gower              NA
## gplots             "gtools, stats, caTools, KernSmooth, methods"
## gridExtra          "gtable, grid, grDevices, graphics, utils"
## gss                NA
## gtable             "grid"
## gtools             NA
## hardhat            "glue (>= 1.6.2), rlang (>= 1.0.3), tibble (>= 3.1.7), vctrs\n(>= 0.4.1)"
## haven              "cli (>= 3.0.0), forcats (>= 0.2.0), hms, lifecycle, methods, \nreadr (>= 0.
1.0), rlang (>= 0.4.0), tibble, tidyselect, vctrs\n(>= 0.3.0)"
## hexbin             "lattice, grid, graphics, grDevices, stats, utils"
## highr              "xfun (>= 0.18)"
## hms                "ellipsis (>= 0.3.2), lifecycle, methods, pkgconfig, rlang, \nvctrs (>= 0.3.
8)"
## hrbrthemes         "ggplot2 (>= 3.3.0), grDevices, grid, scales, extrafont, knitr, \nrmarkdown,
htmltools, tools, magrittr, gdtools"
## htmltools          "utils, digest, grDevices, base64enc, rlang (>= 0.4.10), \nfastmap (>= 1.1.
0)"
## httr               "curl (>= 3.0.0), jsonlite, mime, openssl (>= 0.8), R6"
## hunspell           "Rcpp, digest"
## hypergeo           "elliptic (>= 1.3-5), contfrac (>= 1.1-9), deSolve"
## ids                "openssl, uuid"
## inline             "methods"
## insight            "methods, stats, utils"
## interp             "Rcpp (>= 0.12.9), deldir"
## ipred              "rpart (>= 3.1-8), MASS, survival, nnet, class, prodlim"
## isoband            "grid, utils"
## ISwR               NA
## iterators          NA
## jpeg               NA
## jquerylib          "htmltools"

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## jsonlite      NA
## KFAS          "stats"
## knitr         "evaluate (>= 0.15), highr, methods, stringr (>= 0.6), yaml (>= \n2.1.19), xf
un (>= 0.29), tools"
## kSamples      "methods, graphics, stats"
## labeling      "stats, graphics"
## LaplacesDemon "parallel, grDevices, graphics, stats, utils"
## latticeExtra  "grid, stats, utils, grDevices, png, jpeg, RColorBrewer, \ninterplot, MASS"
## lava          "future.apply, grDevices, graphics, methods, numDeriv, \nprogressr, stats, su
rvival, SQUAREM, utils"
## lazyeval      NA
## lfda          "plyr, grDevices, rARPACK"
## libcoin       "stats, mvtnorm"
## lifecycle     "cli (>= 3.4.0), glue, rlang (>= 1.0.6)"
## lintr         "backports, codetools, crayon, cyclocomp, digest, glue, \njsonlite, knitr, re
x, stats, utils, xml2 (>= 1.0.0), \nxmlparsedata (>= 1.0.5)"
## listenv       NA
## lme4          "graphics, grid, splines, utils, parallel, MASS, lattice, boot, \nnlme (>= 3.
1-123), minqa (>= 1.1.15), nloptr (>= 1.0.4)"
## lmerTest      "numDeriv, MASS, ggplot2"
## lmtest        "graphics"
## logspline     "stats, graphics"
## loo           "checkmate, matrixStats (>= 0.52), parallel, stats"
## lubridate     "generics"
## magrittr      NA
## mapdata       NA
## mapproj       "stats, graphics"
## maps          "graphics, utils"
## markdown      "utils, xfun, mime (>= 0.3)"
## mathjaxr      NA
## Matrix        "methods, graphics, grid, stats, utils, lattice"
## MatrixModels  "stats, methods, Matrix (>= 1.4-2)"
## matrixStats   NA
## mc2d          "stats, grDevices, graphics, utils"
## memoise       "rlang (>= 0.4.10), cachem"
## metaBMA       "bridgesampling, coda, LaplacesDemon, logspline, mvtnorm, \nRcppParallel (>=
5.0.1), rstan (>= 2.18.1), rstantools (>= \n2.1.1)"
## metadat       "utils, tools, mathjaxr"
## metafor       "stats, utils, graphics, grDevices, nlme, mathjaxr, pbapply"
## metaplas      "bbmle, metafor, boot, methods, numDeriv, MASS, graphics, \nstats, fastGHQua
d, lme4, Rfast, parallel, doParallel, foreach, \ndoRNG"
## mime          "tools"
## minqa         "Rcpp (>= 0.9.10)"
## mlt           "BB, alabama, stats, coneplot, graphics, methods, grDevices, \nsandwich, numD
eriv, survival, Matrix"
## mnormt        NA
## modelr        "broom, magrittr, purrr (>= 0.2.2), rlang (>= 0.2.0), tibble, \ntidyr (>= 0.
8.0), tidyselect, vctrs"
## modeltools    "methods"
## mratios       "mvtnorm, multcomp, survival, survPresmooth, stats"
## MSwM          "nlme"
## multcomp      "sandwich (>= 2.3-0), codetools"

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## multcompView      "grid"
## munsell           "colorspace, methods"
## mvtnorm           "stats, methods"
## nloptr            NA
## numDeriv          NA
## openssl           "askpass"
## orthopolynom      "polynom, stats"
## palmerpenguins    NA
## parallelly        "parallel, tools, utils"
## parameters        "bayestestR (>= 0.12.1), datawizard (>= 0.6.0), insight (>= 0.18.3), graphics, methods, stats, utils"
## patchwork         "ggplot2 (>= 3.0.0), gtable, grid, stats, grDevices, utils, \ngraphics"
## pbapply           "parallel"
## pbkrtest          "broom, dplyr, magrittr, MASS, Matrix (>= 1.2.3), methods, \nnumDeriv, parallel, knitr"
## performance       "bayestestR (>= 0.12.0), insight (>= 0.18.3), datawizard (>= 0.5.1), methods, stats, utils"
## permute           "stats"
## pillar            "cli (>= 2.3.0), crayon (>= 1.3.4), ellipsis (>= 0.3.2), fansi, \n glue, lifecycle, rlang (>= 0.3.0), utf8 (>= 1.1.0), utils, \nvctrs (>= 0.3.8)"
## pkgbuild          "callr (>= 3.2.0), cli, crayon, desc, prettyunits, R6, \nrprojroot, withr (>= 2.3.0)"
## pkgconfig         "utils"
## pkgload           "cli (>= 3.3.0), crayon, desc, fs, glue, methods, rlang (>= 1.0.3), rprojroot, utils, withr (>= 2.4.3)"
## plyr              "Rcpp (>= 0.11.0)"
## PMCMRplus         "mvtnorm (>= 1.0), multcompView, gmp, Rmpfr, SuppDists, \n kSamples (>= 1.2.7), BWS test (>= 0.2.1), MASS, stats"
## png              NA
## polynom           "stats, graphics"
## praise            NA
## prettyunits       NA
## prismatic         "graphics, farver (>= 2.0.1), grDevices"
## processx          "ps (>= 1.2.0), R6, utils"
## prodlim           "Rcpp (>= 0.11.5), stats, grDevices, graphics, survival, \n KernSmooth, lava"
## progress          "hms, prettyunits, R6, crayon"
## progressr         "digest, utils"
## ps                "utils"
## psych             "mnormt, parallel, stats, graphics, grDevices, methods, lattice, nlme"
## purrr             "magrittr (>= 1.5), rlang (>= 0.3.1)"
## quadprog          NA
## quantmod          "curl"
## quantreg          "methods, graphics, Matrix, MatrixModels, survival, MASS"
## R6                NA
## rappdirs          NA
## rARPACK           "RSpectra"
## raster            "Rcpp, methods, terra (>= 1.6-16)"
## rasterVis         "raster (>= 3.4-13), terra (>= 1.4-9), latticeExtra, stats, \n utils, parallel, grid, grDevices, RColorBrewer, hexbin, sp (>= 1.0-6), zoo, viridisLite"
## RColorBrewer      NA
## Rcpp              "methods, utils"
## RcppArmadillo     "Rcpp (>= 0.11.0), stats, utils, methods"

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## RcppEigen      "Matrix (>= 1.1-0), Rcpp (>= 0.11.0), stats, utils"
## RcppGSL        "Rcpp (>= 0.11.0), stats"
## RcppParallel   NA
## RcppZigurat    "Rcpp, parallel, graphics, stats, utils"
## readr          "cli (>= 3.2.0), clipr, crayon, hms (>= 0.4.1), lifecycle (>= 0.2.0), methods, R6, rlang, tibble, utils, vroom (>= 1.6.0)"
## readxl         "cellranger, tibble (>= 2.0.1), utils"
## rematch        NA
## rematch2       "tibble"
## remotes        "methods, stats, tools, utils"
## reprex         "callr (>= 3.6.0), cli (>= 3.2.0), clipr (>= 0.4.0), fs, glue, knitr (>= 1.23), lifecycle, rlang (>= 1.0.0), rmarkdown, rstudioapi, utils, withr (>= 2.3.0)"
## reshape        "plyr"
## reshape2       "plyr (>= 1.8.1), Rcpp, stringr"
## rex            "lazyeval"
## Rfast          NA
## rgdal          "grDevices, graphics, stats, utils"
## rlang          "utils"
## rmarkdown      "bslib (>= 0.2.5.1), evaluate (>= 0.13), htmltools (>= 0.5.1), jquerylib, jsonlite, knitr (>= 1.22), methods, stringr (>= 1.2.0), tinytex (>= 0.31), tools, utils, xfun (>= 0.30), yaml (>= 2.1.19)"
## Rmpfr          "stats, utils, methods"
## rngtools       "digest, utils, stats, parallel"
## robustbase     "stats, graphics, utils, methods, DEoptimR"
## ROCR           "methods, graphics, grDevices, gplots, stats"
## rprojroot      NA
## RSpectra       "Matrix (>= 1.1-0), Rcpp (>= 0.11.5)"
## rstan          "methods, stats4, inline, gridExtra (>= 2.0.0), Rcpp (>= 0.12.0), RcppParallel (>= 5.0.1), loo (>= 2.3.0), pkgbuild"
## rstantools     "desc, stats, utils, Rcpp (>= 0.12.16), RcppParallel (>= 5.0.1)"
## rstudioapi     NA
## Rttf2pt1       NA
## rvest          "glue, cli, httr (>= 0.5), lifecycle (>= 1.0.0), magrittr, rlang (>= 1.0.0), selectr, tibble, xml2 (>= 1.3), withr"
## sandwich       "stats, utils, zoo"
## sass           "fs, rlang (>= 0.4.10), htmltools (>= 0.5.1), R6, rappdirs"
## scales         "farver (>= 2.0.3), labeling, lifecycle, munsell (>= 0.5), R6, RColorBrewer, rlang (>= 1.0.0), viridisLite"
## selectr        "methods, stringr, R6"
## shape          "stats, graphics, grDevices"
## SimComp        "mvtnorm, multcomp, mratios, graphics, stats"
## sm             NA
## sp             "utils, stats, graphics, grDevices, lattice, grid"
## SparseM        "graphics, stats, utils"
## spelling       "commonmark, xml2, hunspell (>= 3.0), knitr"
## SQUAREM        NA
## stabledist     "stats"
## StanHeaders    "RcppParallel (>= 5.0.1)"
## statsExpressions "BayesFactor (>= 0.9.12-4.4), correlation (>= 0.8.3), datawizard (>= 0.6.2), dplyr, effectsize (>= 0.8.0), glue, insight (>= 0.18.4), magrittr, parameters (>= 0.19.0), performance (>= 0.10.0), rlang, stats, tibble, tidyr, WRS2 (>= 1.1-4), zeallot"
## stringi        "tools, utils, stats"

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## stringr      "glue (>= 1.2.0), magrittr, stringi (>= 1.1.7)"
## strucchange  "graphics, stats, utils"
## SuppDists    NA
## survPresmooth NA
## svglite      "systemfonts (>= 1.0.0)"
## sys          NA
## systemfonts  NA
## terra        "methods, Rcpp"
## testthat     "brio, callr (>= 3.5.1), cli (>= 3.4.0), desc, digest, ellipsis\n(>= 0.2.0),
evaluate, jsonlite, lifecycle, magrittr, methods,\npkgload, praise, processx, ps (>= 1.3.4), R6
(>= 2.2.0), rlang\n(>= 1.0.1), utils, waldo (>= 0.4.0), withr (>= 2.4.3)"
## TH.data      NA
## tibble       "ellipsis (>= 0.3.2), fansi (>= 0.4.0), lifecycle (>= 1.0.0),\nmagrittr, met
hods, pillar (>= 1.7.0), pkgconfig, rlang (>= 1.0.1), utils, vctrs (>= 0.3.8)"
## tidyr        "dplyr (>= 1.0.0), ellipsis (>= 0.1.0), glue, lifecycle,\nmagrittr, purrr, r
lang, tibble (>= 2.1.1), tidyselect (>= 1.1.0), utils, vctrs (>= 0.3.7)"
## tidyselect   "cli (>= 3.3.0), glue (>= 1.3.0), lifecycle (>= 1.0.3), rlang\n(>= 1.0.4), v
ctrs (>= 0.4.1), withr"
## tidyverse    "broom (>= 0.7.10), cli (>= 3.1.0), crayon (>= 1.4.2), dbplyr\n(>= 2.1.1), d
plyr (>= 1.0.7), dtplyr (>= 1.2.0), forcats (>= 0.5.1), ggplot2 (>= 3.3.5), googledrive (>= 2.
0.0),\ngooglesheets4 (>= 1.0.0), haven (>= 2.4.3), hms (>= 1.1.1),\nhrttr (>= 1.4.2), jsonlite (>
= 1.7.2), lubridate (>= 1.8.0),\nmagrittr (>= 2.0.1), modelr (>= 0.1.8), pillar (>= 1.6.4),\npur
rr (>= 0.3.4), readr (>= 2.1.1), readxl (>= 1.3.1), reprex\n(>= 2.0.1), rlang (>= 0.4.12), rstud
ioapi (>= 0.13), rvest (>= 1.0.2), stringr (>= 1.4.0), tibble (>= 3.1.6), tidyr (>= 1.1.4), xm
l2 (>= 1.3.3)"
## timeDate     "graphics, utils, stats, methods"
## timeSeries   "graphics, grDevices, stats, utils, methods"
## tinytex      "xfun (>= 0.29)"
## tram         "Formula, multcomp, variables (>= 1.0-4), basefun (>= 1.1-2),\nsandwich, sta
ts, survival, graphics, Matrix, methods, mvtnorm"
## tseries      "graphics, stats, utils, quadprog, zoo, quantmod (>= 0.4-9)"
## TTR          "xts (>= 0.10-0), zoo, curl"
## tzdb         NA
## urca         "nlme, graphics, stats"
## utf8         NA
## uuid         NA
## variables    "stats"
## vars         NA
## vctrs        "cli (>= 3.2.0), glue, rlang (>= 1.0.2)"
## vdiffrr      "diffobj, glue, grDevices, htmltools, lifecycle, rlang,\ntestthat (>= 3.0.
3), xml2 (>= 1.0.0)"
## vegan        "MASS, cluster, mgcv"
## vioplot      NA
## viridis      "stats, ggplot2 (>= 1.0.1), gridExtra"
## viridisLite  NA
## vroom        "bit64, cli (>= 3.2.0), crayon, glue, hms, lifecycle, methods,\nrlang (>= 0.
4.2), stats, tibble (>= 2.0.0), tidyselect, tzdb\n(>= 0.1.1), vctrs (>= 0.2.0), withr"
## waldo        "cli, diffobj (>= 0.3.4), fansi, glue, methods, rematch2, rlang\n(>= 1.0.0),
tibble"
## withr        "graphics, grDevices, stats"
## WRS2         "MASS, reshape, plyr, stats, graphics, grDevices, utils, mc2d"
## xfun         "stats, tools"

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## xml2                "methods"
## xmlparsedata         NA
## xtable               "stats, utils"
## xts                  "methods"
## yaml                 NA
## zeallot              NA
## zoo                  "utils, graphics, grDevices, lattice (>= 0.20-27)"
## base                 NA
## boot                 NA
## class                "MASS"
## cluster              "graphics, grDevices, stats, utils"
## codetools            NA
## compiler             NA
## datasets             NA
## foreign              "methods, utils, stats"
## graphics             "grDevices"
## grDevices            NA
## grid                  "grDevices, utils"
## KernSmooth           NA
## lattice              "grid, grDevices, graphics, stats, utils"
## MASS                 "methods"
## Matrix               "methods, graphics, grid, stats, utils, lattice"
## methods              "utils, stats"
## mgcv                 "methods, stats, graphics, Matrix, splines, utils"
## nlme                  "graphics, stats, utils, lattice"
## nnet                 NA
## parallel             "tools, compiler"
## rpart                NA
## spatial              NA
## splines              "graphics, stats"
## stats                "utils, grDevices, graphics"
## stats4               "graphics, methods, stats"
## survival             "graphics, Matrix, methods, splines, stats, utils"
## tcltk                "utils"
## tools                NA
## translations         NA
## utils                NA
##                      LinkingTo
## abind                NA
## afex                  NA
## alabama              NA
## askpass              NA
## assertthat           NA
## backports            NA
## base64enc            NA
## basefun              NA
## BayesFactor          "Rcpp (>= 0.11.2), RcppEigen (>= 0.3.2.2.0)"
## bayestestR           NA
## BB                   NA
## bbmle                NA
## bdsmatrix            NA
## BH                   NA

```

## bit	NA
## bit64	NA
## bitops	NA
## blob	NA
## bridgesampling	NA
## brio	NA
## Brobdingnag	NA
## broom	NA
## bslib	NA
## BWstest	"Rcpp"
## cachem	NA
## callr	NA
## car	NA
## carData	NA
## caTools	NA
## cellranger	NA
## changepoint	NA
## checkmate	NA
## cli	NA
## clipr	NA
## coda	NA
## coin	"libcoin (>= 1.0-9)"
## colorspace	NA
## commonmark	NA
## coneproj	"RcppArmadillo, Rcpp"
## contfrac	NA
## correlation	NA
## covr	NA
## coxme	"bdsmatrix"
## cpp11	NA
## crayon	NA
## curl	NA
## cyclocomp	NA
## data.table	NA
## datawizard	NA
## DBI	NA
## dbplyr	NA
## deldir	NA
## DEoptimR	NA
## desc	NA
## deSolve	NA
## dichromat	NA
## diffobj	NA
## digest	NA
## doParallel	NA
## doRNG	NA
## dplyr	NA
## dreamerr	NA
## dtplyr	NA
## effectsize	NA
## ellipsis	NA
## elliptic	NA

```
## evaluate      NA
## extrafont     NA
## extrafontdb   NA
## fansi         NA
## farver        NA
## fastGHQuad    "Rcpp"
## fastICA       NA
## fastmap       NA
## fBasics       NA
## feather       "Rcpp"
## fGarch        NA
## fixest        "Rcpp"
## forcats       NA
## foreach       NA
## forecast      "Rcpp (>= 0.11.0), RcppArmadillo (>= 0.2.35)"
## Formula       NA
## fracdiff      NA
## fs            NA
## future        NA
## future.apply  NA
## gapminder     NA
## gargle        NA
## gcookbook     NA
## gdtools       "Rcpp"
## generics      NA
## ggcorrplot    NA
## ggfortify     NA
## ggplot2       NA
## ggplot2movies NA
## ggrepel       "Rcpp"
## ggridges      NA
## ggside        NA
## glmnet        "RcppEigen, Rcpp"
## globals       NA
## glue          NA
## gmp           NA
## googledrive   NA
## googlesheets4 NA
## gower        NA
## gplots        NA
## gridExtra     NA
## gss           NA
## gtable        NA
## gtools        NA
## hardhat       NA
## haven         "cpp11"
## hexbin        NA
## highr         NA
## hms           NA
## hrbrthemes    NA
## htmltools     NA
## httr          NA
```

```
## hunsPELL      "Rcpp (>= 0.12.12)"
## hypergeo      NA
## ids           NA
## inline        NA
## insight       NA
## interp        "Rcpp, RcppEigen"
## ipred         NA
## isoband       NA
## ISwR          NA
## iterators     NA
## jpeg          NA
## jquerylib     NA
## jsonlite      NA
## KFAS          NA
## knitr         NA
## kSamples      NA
## labeling      NA
## LaplacesDemon NA
## latticeExtra  NA
## lava          NA
## lazyeval      NA
## lfda          NA
## libcoin       "mvtnorm"
## lifecycle     NA
## lintr         NA
## listenv       NA
## lme4          "Rcpp (>= 0.10.5), RcppEigen"
## lmerTest      NA
## lmtest        NA
## logspline     NA
## loo           NA
## lubridate     "cpp11 (>= 0.2.7)"
## magrittr      NA
## mapdata       NA
## mapproj       NA
## maps          NA
## markdown      NA
## mathjaxr      NA
## Matrix        NA
## MatrixModels  NA
## matrixStats   NA
## mc2d          NA
## memoise       NA
## metaBMA       "BH (>= 1.66.0), Rcpp (>= 1.0.0), RcppEigen (>= 0.3.3.3.0),\nRcppParallel (>= 5.0.1), rstan (>= 2.18.1), StanHeaders (>= 2.18.0)"
## metadat       NA
## metafor       NA
## metaplust     NA
## mime          NA
## minqa         "Rcpp"
## mlt           NA
## mnormt        NA
```



## modelr	NA
## modeltools	NA
## mratios	NA
## MSwM	NA
## multcomp	NA
## multcompView	NA
## munsell	NA
## mvtnorm	NA
## nloptr	"testthat"
## numDeriv	NA
## openssl	NA
## orthopolynom	NA
## palmerpenguins	NA
## parallelly	NA
## parameters	NA
## patchwork	NA
## pbapply	NA
## pbkrtest	NA
## performance	NA
## permute	NA
## pillar	NA
## pkgbuild	NA
## pkgconfig	NA
## pkgload	NA
## plyr	"Rcpp"
## PMCMRplus	NA
## png	NA
## polynom	NA
## praise	NA
## prettyunits	NA
## prismatic	NA
## processx	NA
## prodlim	"Rcpp"
## progress	NA
## progressr	NA
## ps	NA
## psych	NA
## purrr	NA
## quadprog	NA
## quantmod	NA
## quantreg	NA
## R6	NA
## rappdirs	NA
## rARPACK	NA
## raster	"Rcpp"
## rasterVis	NA
## RColorBrewer	NA
## Rcpp	NA
## RcppArmadillo	"Rcpp"
## RcppEigen	"Rcpp"
## RcppGSL	"Rcpp"
## RcppParallel	NA

```

## RcppZiggurat      "Rcpp, RcppGSL"
## readr             "cpp11, tzdb (>= 0.1.1)"
## readxl            "cpp11 (>= 0.4.0), progress"
## rematch           NA
## rematch2          NA
## remotes           NA
## reprex            NA
## reshape           NA
## reshape2          "Rcpp"
## rex               NA
## Rfast             "Rcpp (>= 0.12.3), RcppArmadillo"
## rgdal             "sp"
## rlang             NA
## rmarkdown         NA
## Rmpfr             NA
## rngtools          NA
## robustbase        NA
## ROCR              NA
## rprojroot         NA
## RSpectra          "Rcpp, RcppEigen (>= 0.3.3.3.0)"
## rstan             "Rcpp (>= 0.12.0), RcppEigen (>= 0.3.3.3.0), BH (>= \n1.72.0-2), StanHeaders
  (>= 2.21.0), RcppParallel"
## rstantools        NA
## rstudioapi        NA
## Rttf2pt1          NA
## rvest             NA
## sandwich          NA
## sass              NA
## scales            NA
## selectr           NA
## shape             NA
## SimComp           NA
## sm                NA
## sp                NA
## SparseM           NA
## spelling          NA
## SQUAREM           NA
## stabledist        NA
## StanHeaders       "RcppEigen, RcppParallel (>= 5.0.1)"
## statsExpressions  NA
## stringi           NA
## stringr           NA
## strucchange       NA
## SuppDists         NA
## survPresmooth     NA
## svglite           "cpp11, systemfonts"
## sys               NA
## systemfonts       "cpp11 (>= 0.2.1)"
## terra             "Rcpp"
## testthat          NA
## TH.data           NA
## tibble            NA

```

```
## tidyr                "cpp11 (>= 0.4.0)"
## tidyselect           NA
## tidyverse            NA
## timeDate             NA
## timeSeries           NA
## tinytex              NA
## tram                 NA
## tseries              NA
## TTR                  "xts"
## tzdb                 "cpp11 (>= 0.4.2)"
## urca                 NA
## utf8                 NA
## uuid                 NA
## variables            NA
## vars                 NA
## vctrs                NA
## vdiffr               "cpp11"
## vegan                NA
## vioplot              NA
## viridis              NA
## viridisLite          NA
## vroom                "cpp11 (>= 0.2.0), progress (>= 1.2.1), tzdb (>= 0.1.1)"
## waldo                NA
## withr                NA
## WRS2                 NA
## xfun                 NA
## xml2                 NA
## xmlparsedata         NA
## xtable               NA
## xts                  "zoo"
## yaml                 NA
## zeallot              NA
## zoo                  NA
## base                 NA
## boot                 NA
## class                NA
## cluster              NA
## codetools            NA
## compiler             NA
## datasets             NA
## foreign              NA
## graphics             NA
## grDevices            NA
## grid                 NA
## KernSmooth           NA
## lattice              NA
## MASS                 NA
## Matrix               NA
## methods              NA
## mgcv                 NA
## nlme                  NA
## nnet                  NA
```

```

## parallel      NA
## rpart         NA
## spatial      NA
## splines      NA
## stats        NA
## stats4       NA
## survival     NA
## tcltk        NA
## tools        NA
## translations NA
## utils        NA
##              Suggests
## abind         NA
## afex          "emmeans (>= 1.4), coin, xtable, parallel, plyr, optimx,\nnloptr, knitr, rma
rkdown, R.rsp, lattice, latticeExtra,\nmultcomp, testthat, mlmRev, dplyr, tidyr, dfoptim, Matri
x,\npsychTools, ggplot2, MEMSS, effects, carData, ggbeeswarm, nlme,\ncowplot, jtools, ggpubr, gg
pol, MASS, glmmTMB, brms, rstanarm,\nstatmod, performance (>= 0.7.2), see (>= 0.6.4), ez,\nggRes
idpanel"
## alabama      NA
## askpass      "testthat"
## assertthat   "testthat, covr"
## backports    NA
## base64enc    NA
## basefun      "coneproj"
## BayesFactor  "doMC, foreach, testthat, knitr, markdown, arm, lme4, xtable,\nlanguageR"
## bayestestR   "BayesFactor, bayesQR, bayesplot, BH, blavaan, bridgesampling,\nbrms, effect
size, emmeans, gamm4, ggdist, ggplot2, glmmTMB,\nhttr, KernSmooth, knitr, lavaan, lme4, logsplin
e, MASS, mclust,\nmediation, modelbased, parameters, patchwork, performance,\nquadprog, posterio
r, RcppEigen, rmarkdown, rstan, rstanarm,\nsee, testthat, tweedie"
## BB           "setRNG, survival, Hmisc, numDeriv"
## bbmle        "emdbook, rms, ggplot2, RUnit, MuMIn, AICcmodavg, Hmisc,\noptimx (>= 2013.8.
6), knitr, testthat"
## bdsmatrix    NA
## BH           NA
## bit          "testthat (>= 0.11.0), roxygen2, knitr, rmarkdown,\nmicrobenchmark, bit64 (>
= 4.0.0), ff (>= 4.0.0)"
## bit64        NA
## bitops       NA
## blob         "covr, crayon, pillar (>= 1.2.1), testthat"
## bridgesampling "testthat, Rcpp, RcppEigen, R2jags, rjags, runjags, knitr,\nrmarkdown, R.rs
p, BayesFactor, rstan, rstanarm, nimble,\nMCMCpack"
## brio         "covr, testthat (>= 2.1.0)"
## Brobdingnag  "cubature, testthat"
## broom        "AER, AUC, bbmle, betareg, biglm, binGroup, boot, btergm (>= \n1.10.6), car,
carData, caret, cluster, cmprsk, coda, covr, drc,\ne1071, emmeans, epiR, ergm (>= 3.10.4), fixe
st (>= 0.9.0), gam\n(>= 1.15), gee, geepack, glmnet, glmnetUtils, gmm, Hmisc,\nirlba, interp, jo
ineRML, Kendall, knitr, ks, Lahman, lavaan,\nleaps, lfe, lm.beta, lme4, lmodel2, lmtest (>= 0.9.
38),\nlsmeans, maps, maptools, margins, MASS, mclust, mediation,\nmetafor, mfx, mgcv, mlogit, mo
deldata, modeltests, muhaz,\nmultcomp, network, nnet, orcutt (>= 2.2), ordinal, plm, polCA,\npsy
ch, quantreg, rgeos, rmarkdown, robust, robustbase, rsample,\nsandwich, sp, spdep (>= 1.1), spat
ialreg, speedglm, spelling,\nsurvey, survival, systemfit, testthat (>= 2.1.0), tseries,\nvars, z
oo"

```

```

## bslib          "shiny (>= 1.6.0), rmarkdown (>= 2.7), thematic, knitr,\ntestthat, withr, ra
ppdirs, curl, magrittr"
## BWstest        "testthat"
## cachem         "testthat"
## callr          "cli (>= 1.1.0), covr, mockery, ps, rprojroot, spelling,\ntestthat (>= 3.0.
0), withr (>= 2.3.0)"
## car            "alr4, boot, coxme, effects, knitr, leaps, lmtest, Matrix,\nMatrixModels, mv
tnorm, rgl (>= 0.93.960), rio, sandwich,\nSparseM, survival, survey"
## carData        "car (>= 3.0-0)"
## caTools        "MASS, rpart"
## cellranger     "covr, testthat (>= 1.0.0), knitr, rmarkdown"
## changepoint    "testthat"
## checkmate      "R6, fastmatch, data.table (>= 1.9.8), devtools, ggplot2,\nknitr, magrittr,
microbenchmark, rmarkdown, testthat (>=\n3.0.4), tinytest (>= 1.1.0), tibble"
## cli            "asciicast, callr, covr, digest, grDevices, htmltools,\nhtmlwidgets, knitr,
methods, mockery, processx, ps (>=\n1.3.4.9000), rlang, rmarkdown, rstudioapi, shiny, testtha
t,\ntibble, whoami, withr"
## clipr          "covr, knitr, rmarkdown, rstudioapi (>= 0.5), testthat (>=\n2.0.0)"
## coda           NA
## coin           "xtable, e1071, vcd, TH.data (>= 1.0-7)"
## colorspace     "datasets, utils, KernSmooth, MASS, kernlab, mvtnorm, vcd,\nntcltk, shiny, sh
inyjs, ggplot2, dplyr, scales, grid, png, jpeg,\nknitr, rmarkdown, RColorBrewer, rcartocolor, sc
ico, viridis,\nwesanderson"
## commonmark     "curl, testthat, xml2"
## coneproject    "stats, graphics, grDevices, utils"
## contfrac       NA
## correlation     "BayesFactor, poorman, energy, ggplot2, ggraph, gt, Hmisc,\nknitr, lme4, mbe
nd, polycor, ppcor, psych, rmarkdown, rmcrr,\nrrstanarm, see, testthat (>= 3.1.0), tidygraph, wd
m, WRS2"
## covr           "R6, curl, knitr, rmarkdown, htmltools, DT (>= 0.2), testthat,\nrrlang, rstud
ioapi (>= 0.2), xml2 (>= 1.0.0), parallel, memoise,\nmockery, covr"
## coxme          "mvtnorm, kinship2"
## cpp11          "bench, brio, callr, cli, covr, decor, desc, ggplot2, glue,\nknitr, lobster,
mockery, progress, rmarkdown, scales, Rcpp,\ntestthat, tibble, utils, vctrs, withr"
## crayon         "mockery, rstudioapi, testthat, withr"
## curl           "spelling, testthat (>= 1.0.0), knitr, jsonlite, rmarkdown,\nrmagrittr, httpu
v (>= 1.4.4), webutils"
## cyclocomp      "testthat"
## data.table     "bit64 (>= 4.0.0), bit (>= 4.0.4), curl, R.utils, xts,\nnanotime, zoo (>= 1.
8-1), yaml, knitr, rmarkdown"
## datawizard     "bayestestR, boot, brms, data.table, dplyr (>= 1.0),\neffectsize, gamm4, ggp
lot2, haven, htmltools, httr, knitr,\nlme4, mediation, parameters, poorman (>= 0.2.6), psych, re
adxl,\nreadr, rio, rmarkdown, rstanarm, see, testthat (>= 3.1.0),\ntidyr, withr"
## DBI            "blob, covr, DBItest, dbplyr, downlit, dplyr, glue, hms,\nknitr, magrittr, R
MariaDB, rmarkdown, rprojroot, RSQLite (>=\n1.1-2), testthat, xml2"
## dbplyr         "bit64, covr, knitr, Lahman, nycflights13, odbc, RMariaDB (>=\n1.0.2), rmark
down, RPostgres (>= 1.1.3), RPostgreSQL, RSQLite\n(>= 2.1.0), testthat (>= 3.0.2), tidyr (>= 1.
2.0)"
## deldir         "polyclip"
## DEoptimR       NA
## desc           "callr, covr, gh, spelling, testthat, whoami, withr"
## deSolve        "scatterplot3d, FME"

```

```

## dichromat      NA
## diffobj        "knitr, rmarkdown"
## digest         "tinytest, simplermarkdown"
## doParallel     "caret, mlbench, rpart, RUnit"
## doRNG          "doParallel, doMPI, doRedis, rbenchmark, devtools, knitr,\nbibtex, testthat, pkgmaker (>= 0.31)"
## dplyr          "bench, broom, callr, covr, DBI, dbplyr (>= 1.4.3), ggplot2,\nknitr, Lahman, lobstr, microbenchmark, nycflights13, purrr,\nrmmarkdown, RMySQL, RPostgreSQL, RSQLite, testthat (>= 3.1.1),\ntidyr, withr"
## dreamerr       "knitr, rmarkdown, stats, graphics"
## dtplyr         "bench, covr, knitr, rmarkdown, testthat (>= 3.0.0), tidyr (>=\n1.1.0)"
## effectsize     "correlation (>= 0.8.2), see (>= 0.7.3), afex, BayesFactor,\nboot, brms, ca r, emmeans, knitr, lavaan, lme4, lmerTest, MASS,\nmgcv, parsnip, rmarkdown, rms, rstanarm, rstan tools, testthat\n(>= 3.1.0)"
## ellipsis       "covr, testthat"
## elliptic       "emulator, calibrator (>= 1.2-8)"
## evaluate       "covr, ggplot2, lattice, testthat"
## extrafont      "fontcm"
## extrafontdb    NA
## fansi          "unitizer, knitr, rmarkdown"
## farver         "testthat (>= 2.1.0), covr"
## fastGHQuad     NA
## fastICA        "MASS"
## fastmap        "testthat (>= 2.1.1)"
## fBasics        "interp, RUnit, tcltk"
## feather        "testthat"
## fGarch         "RUnit, tcltk"
## fixest         "knitr, rmarkdown, data.table, plm, MASS, pander, ggplot2,\nlf, tinytex, pd ftools"
## forcats        "covr, dplyr, ggplot2, knitr, readr, rmarkdown, testthat (>=\n3.0.0)"
## foreach        "randomForest, doMC, doParallel, testthat, knitr, rmarkdown"
## forecast       "forecTheta, knitr, methods, rmarkdown, rticles, seasonal,\ntestthat, uroot"
## Formula        NA
## fracdiff       "longmemo, forecast, urca"
## fs             "testthat, covr, pillar (>= 1.0.0), tibble (>= 1.1.0), crayon,\nrmmarkdown, k nitr, withr, spelling, vctrs (>= 0.3.0)"
## future         "methods, RhpcBLASctl, R.rsp, markdown"
## future.apply   "datasets, stats, tools, listen (>= 0.8.0), R.rsp, markdown"
## gapminder      "dplyr, ggplot2, testthat"
## gargle         "aws.ec2metadata, aws.signature, covr, httpuv, knitr, mockr,\nrmmarkdown, sod ium, spelling, testthat (>= 3.1.2)"
## gcookbook      NA
## gdtools        "htmltools, testthat, fontquiver (>= 0.2.0), curl"
## generics       "covr, pkgload, testthat (>= 3.0.0), tibble, withr"
## ggcorrplot     "testthat (>= 3.0.0), knitr, spelling, vdiff (>= 1.0.0)"
## ggfortify      "testthat, cluster, changepoint, dlm, fGarch, forecast,\ngggregel, glmnet, gr Devices, KFAS, knitr, lintr, mapdata,\nrmmarkdown, MASS, MSwM, nlme, raster, ROCR, sp, stats,\nstr ucchange, survival, timeSeries, tseries, utils, vars, xts,\nzoo, lfda"
## ggplot2        "covr, ragg, dplyr, ggplot2movies, hexbin, Hmisc, interp,\nknitr, lattice, m approj, maps, maptools, multcomp, munsell,\nnlme, profvis, quantreg, RColorBrewer, rgeos, rmarkd own, rpart,\nsf (>= 0.7-3), svglite (>= 1.2.0.9001), testthat (>= 2.1.0),\nvdiff (>= 1.0.0), xm 12"

```

```

## ggplot2movies      NA
## ggrepel            "knitr, rmarkdown, testthat, gridExtra, devtools, prettydoc,\nggbeeswarm, dplyr, magrittr, readr, stringr"
## ggridges           "covr, dplyr, patchwork, ggplot2movies, forcats, knitr,\nrmarkdown, testthat, vdiffr"
## ggside             "tidyr, dplyr, testthat (>= 3.0.3), knitr, rmarkdown, vdiffr\n(>= 1.0.0), gg  
dendro, viridis"
## glmnet             "knitr, lars, testthat, xfun, rmarkdown"
## globals            NA
## glue               "covr, crayon, DBI, dplyr, forcats, ggplot2, knitr, magrittr,\nrmicrobenchmark, R.utils, rmarkdown, rprintf, RSQLite, stringr,\ntestthat (>= 3.0.0), vctrs (>= 0.3.0), waldo (>= 0.3.0), withr"
## gmp                "Rmpfr, MASS, round"
## googledrive         "covr, curl, downlit, dplyr (>= 1.0.0), knitr, mockr,\nrmarkdown, roxygen2, sodium, spelling, testthat (>= 3.0.0)"
## googlesheets4       "covr, readr, rmarkdown, sodium, spelling, testthat (>=\n3.1.3), withr"
## gower              "tinytest (>= 0.9.3),"
## gplots             "grid, MASS, knitr, r2d2"
## gridExtra          "ggplot2, egg, lattice, knitr, testthat"
## gss                NA
## gtable             "covr, testthat, knitr, rmarkdown, ggplot2, profvis"
## gtools             "car, gplots, knitr, rstudioapi, SGP, taxize"
## hardhat            "covr, crayon, devtools, knitr, Matrix, modeldata (>= 0.0.2),\nnrecipes (>= 0.1.8), rmarkdown (>= 2.3), roxygen2, testthat (>=\n3.0.0), usethis (>= 2.1.5)"
## haven              "covr, crayon, fs, knitr, pillar (>= 1.4.0), rmarkdown,\ntestthat (>= 3.0.0)"
## hexbin             "marray, affy, Biobase, limma, knitr"
## highr              "knitr, markdown, testit"
## hms                "crayon, lubridate, pillar (>= 1.1.0), testthat (>= 3.0.0)"
## hrbrthemes         "testthat, dplyr, gridExtra, hunspell, stringi, gcookbook,\nnclipr, vdiffr, svglite"
## htmltools          "markdown, testthat, withr, Cairo, ragg, shiny"
## httr               "covr, httpuv, jpeg, knitr, png, readr, rmarkdown, testthat\n(>= 0.8.0), xml2"
## hunspell           "spelling, testthat, pdftools, janeaustenr, wordcloud2, knitr,\n\nstopwords, rmarkdown"
## hypergeo           NA
## ids                "knitr, rcorpora, rmarkdown, testthat"
## inline             "Rcpp (>= 0.11.0), tinytest"
## insight            "AER, afex, aod, BayesFactor, bayestestR, bbmle, bdsmatrix,\n\nbetareg, bife, biglm, blavaan, blme, boot, brms, censReg, cgam,\n\nclubSandwich, coxme, cplm, crch, datawizard, effectsize,\n\nemmeans, epiR, estimatr, feisr, fixest, fungible, gam, gamlss,\n\nngamm4, gbm, gee, geeepack, GLMMadaptive, glmmTMB, gmn1, gt,\n\nhttprr, ivreg, JM, knitr, lavaan, lavaSearch2, lfe, lme4,\n\nlmerTest, lmtest, logistf, logitr, MASS, marginaeffects,\n\nMatrix, mclogit, mclust, MCMCglmm, merTools, metaBMA, mgcv,\n\nmice, mlogit, mhurdle, multgee, nlme, nnet, nonnest2, ordinal,\n\npannelr, parameters, parsnip, pbkrtest, performance, plm,\n\nnpoorman, pscl, psych, quantreg, rmarkdown, rms, robustbase,\n\nrobustlmm, rstanarm (>= 2.21.1), rstantools, rstudioapi,\n\nsandwich, speedglm, splines, statmod, survey, survival,\n\nntestthat, truncreg, tweedie, VGAM"
## interp            "sp, Deriv, Ryacas, ggplot2, gridExtra, lattice, stringi,\n\nstringr"
## ipred              "mvtnorm, mlbench, TH.data, randomForest, party"
## isoband            "covr, ggplot2, knitr, magick, microbenchmark, rmarkdown, sf,\n\nntestthat, xml2"

```

```

## ISwR                "survival,MASS"
## iterators           "RUnit, foreach"
## jpeg                NA
## jquerylib           "testthat"
## jsonlite            "httr, curl, vctrs, testthat, knitr, rmarkdown, R.rsp, sf"
## KFA                 "knitr, lme4, MASS, Matrix, testthat"
## knitr               "markdown, formatR, testit, digest, rgl (>= 0.95.1201),\ncodetools, rmarkdow
n, htmlwidgets (>= 0.7), webshot, tikzDevice\n(>= 0.10), tinytex, reticulate (>= 1.4), JuliaCall
(>= 0.11.1),\nmagick, png, jpeg, gifski, xml2 (>= 1.2.0), httr, DBI (>=\n0.4-1), showtext, tibbl
e, sass, bslib, ragg, gridSVG, styler\n(>= 1.2.0), targets (>= 0.6.0)"
## kSamples            NA
## labeling            NA
## LaplacesDemon       "KernSmooth"
## latticeExtra        "maps, mapproj, deldir, quantreg, zoo, mgcv"
## lava                "KernSmooth, Matrix, Rgraphviz, data.table, ellipse, fields,\ngeepack, gof
(>= 0.9), graph, knitr, bookdown, rmarkdown,\nigraph (>= 0.6), lava.tobit (>= 0.4.7), lavaSearc
h2, lme4, mets\n(>= 1.1), nlme, optimx, polycor, quantreg, rgl, R.rsp (>=\n0.40), targeted (>=
0.2), testthat (>= 0.11), visNetwork, zoo"
## lazyeval            "knitr, rmarkdown (>= 0.2.65), testthat, covr"
## lfda                "testthat, rgl"
## libcoin             "coin"
## lifecycle           "covr, crayon, knitr, lintr, rmarkdown, testthat (>= 3.0.1),\ntibble, tidyve
rse, tools, vctrs, withr"
## lintr               "covr, httr (>= 1.2.1), mockery, patrick, pkgdown, rmarkdown,\nrstudioapi (>
= 0.2), testthat (>= 3.0.0), tibble, withr (>=\n2.5.0)"
## listenv             "R.utils, R.rsp, markdown"
## lme4               "knitr, rmarkdown, MEMSS, testthat (>= 0.8.1), ggplot2,\nmlmRev, optimx (>=
2013.8.6), gamm4, pbkrtest, HSAUR3,\nnumDeriv, car, dfoptim, mgcv, statmod, rr2, semEff, tibbl
e,\nmerDeriv"
## lmerTest            "pbkrtest (>= 0.4-3), tools"
## lmtest              "car, strucchange, sandwich, dynlm, stats4, survival, AER"
## logspline          NA
## loo                "bayesplot (>= 1.7.0), brms (>= 2.10.0), ggplot2, graphics,\nknitr, rmarkdow
n, rstan, rstanarm (>= 2.19.0), rstantools,\nspdep, testthat (>= 2.1.0)"
## lubridate           "covr, knitr, testthat (>= 2.1.0), vctrs (>= 0.3.0), rmarkdown"
## magrittr           "covr, knitr, rlang, rmarkdown, testthat"
## mapdata            NA
## mapproj            NA
## maps               "mapproj (>= 1.2-0), mapdata (>= 2.3.0), sp, rnaturalearth"
## markdown           "knitr, Rcurl"
## mathjaxr           "js"
## Matrix             "expm, MASS"
## MatrixModels       NA
## matrixStats        "base64enc, ggplot2, knitr, markdown, microbenchmark,\nR.devices, R.rsp"
## mc2d               "fitdistrplus, survival, testthat (>= 3.0.0)"
## memoise            "digest, aws.s3, covr, googleAuthR, googleCloudStorageR, httr,\ntestthat"
## metaBMA            "testthat, knitr, rmarkdown, spelling"
## metadat            "metafor, numDeriv, BiasedUrn, dfoptim, igraph, ape, testthat,\ndigest, lme
4, clubSandwich, meta, netmeta, mvtnorm, gridExtra,\nrms"
## metafor            "lme4, numDeriv, pracma, minqa, nloptr, dfoptim, ucminf,\nlfgsb3c, subplex,
BB, Rsolnp, alabama, optimParallel,\nCompQuadForm, mvtnorm, BiasedUrn, Epi, survival, GLMMadapti
ve,\nglmmTMB, multcomp, gsl, sp, ape, boot, clubSandwich, crayon,\nR.rsp, testthat, rmarkdown, w

```



```

ildmeta"
## metaplus      "R.rsp"
## mime          NA
## minqa         NA
## mlt           "MASS, nnet, TH.data, multcomp"
## mnormt        NA
## modelr         "compiler, covr, ggplot2, testthat"
## modeltools     NA
## mratios        "nlme"
## MSwM          NA
## multcomp       "lme4 (>= 0.999375-16), nlme, robustbase, coin, MASS, foreign,\nxtable, lmtest, coxme (>= 2.2-1), SimComp, ISwR, tram (>=\n0.2-5), fixest (>= 0.10)"
## multcompView   "multcomp, pgirmess, MASS"
## munsell        "ggplot2, testthat"
## mvtnorm        NA
## nloptr         "knitr, rmarkdown, xml2, testthat (>= 3.0.0), covr"
## numDeriv       NA
## openssl        "curl, testthat (>= 2.1.0), digest, knitr, rmarkdown,\njsonlite, jose, sodium"
## orthopolynom   NA
## palmerpenguins "knitr, rmarkdown, tibble, ggplot2, dplyr, tidyr, recipes"
## parallelly     NA
## parameters     "AER, afex, aod, BayesFactor, BayesFM, bbmle, betareg, biglm,\nblme, boot, brglm2, brms, broom, cAIC4, car, cgam,\nClassDiscovery, clubSandwich, cluster, cplm, dbscan, dominr (>=\n0.2.0), drc, DRR, effectsize (>= 0.6.0), EGAnet (>= 0.7),\nemmeans (>= 1.7.0), factoextra, FactoMineR, fastICA, fixest,\nfpc, gam, gamlss, gee, geepack, ggplot2, GLMMadaptive, glmmTMB,\nGPArotation, gt, haven, httr, Hmisc, ivprobit, ivreg, knitr,\nlavaan, lavaSearch2, lfe, lme4, lmerTest, lmtest,\nlogspline, lqmm, M3C, magrittr, marginaleffects, MASS, Matrix,\nmclust, MCMCglmm, mediation, merDeriv, metaBMA, metafor, mfx,\nmgcv, mice, multcomp, MuMIn, NbClust, nFactors, nlme, nnet,\nopenxlsx, ordinal, panelr, pbkrtest, PCDimension, performance\n(>= 0.10.0), plm, PMCMRplus, poorman, posterior, PROreg, pscl,\npsych, pvclust, quantreg, randomForest, rmarkdown, rms,\nrstanarm, rsvd, sandwich, see (>= 0.6.9), sparsepca, survey,\nsurvival, testthat, TMB, truncreg, VGAM, WRS2"
## patchwork      "knitr, rmarkdown, gridGraphics, gridExtra, ragg, testthat (>=\n2.1.0), vdiffr, covr, png"
## pbapply        "shiny"
## pbkrtest       NA
## performance    "AER, afex, BayesFactor, bayesplot, betareg, bigutilsr,\nblavaan, brms, car, CompQuadForm, correlation, cplm, dbscan,\nestimatr, fixest, forecast, gamm4, ggplot2, glmmTMB, httr, ICS,\nICSOutlier, ISLR, lavaan, lme4, lmtest, loo, magrittr, MASS,\nMatrix, mclust, metafor, mgcv, mlogit, multimode, nlme,\nnonnest2, ordinal, parallel, parameters, patchwork, poorman,\npsych, randomForest, rmarkdown, rstanarm, rstantools,\nsandwich, see, survey, survival, testthat, tweedie, VGAM"
## permute        "vegan (>= 2.0-0), testthat (>= 0.5), parallel, knitr,\nrmarkdown, bookdown, sessioninfo"
## pillar         "bit64, debugme, DiagrammeR, dplyr, formattable, ggplot2,\nknitr, lubridate, nanotime, nycflights13, palmerpenguins,\nrmarkdown, scales, stringi, survival, testthat (>= 3.1.1),\ntibble, units (>= 0.7.2), vdiffr, withr"
## pkgbuild       "Rcpp, cpp11, testthat, covr"
## pkgconfig      "covr, testthat, disposables (>= 1.0.3)"
## pkgload        "bitops, covr, mathjaxr, pak, pkgbuild, Rcpp, remotes,\nrstudioapi, testthat (>= 3.1.0)"

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## plyr                "abind, covr, doParallel, foreach, iterators, itertools,\ntcltk, testthat"
## PMCMRplus           "xtable, graphics, knitr, rmarkdown, car, e1071, multcomp,\npwr, NSM3"
## png                 NA
## polynom             "knitr, rmarkdown"
## praise              "testthat"
## prettyunits         "codetools, covr, testthat"
## prismatic           "covr, crayon, testthat (>= 3.0.0)"
## processx            "callr (>= 3.7.0), cli (>= 3.3.0), codetools, covr, curl,\ndebugme, parallel, rlang (>= 1.0.2), testthat (>= 3.0.0), withr"
## prodlim             NA
## progress            "Rcpp, testthat, withr"
## progressr           "graphics, tcltk, beeper, crayon, pbmcapply, progress, purrr,\nforeach, plyr, doFuture, future, future.apply, furrr,\nrstudioapi, shiny, commonmark, base64enc, tools"
## ps                  "callr, covr, curl, pillar, pingr, processx (>= 3.1.0), R6,\nrlang, testthat (>= 3.0.0),"
## psych               "psychTools, GPArotation, lavaan, lme4, Rcsdp, graph, knitr,\nRgraphviz"
## purrr               "covr, crayon, dplyr (>= 0.7.8), knitr, rmarkdown, testthat,\nntibble, tidyselect"
## quadprog            NA
## quantmod            "DBI,RMySQL,RSQLite,timeSeries,xml2,downloader,jsonlite(>=\n1.1)"
## quantreg            "tripack, interp, rgl, logspline, nor1mix, Formula, zoo,\nR.rsp, conquer"
## R6                  "testthat, pryr"
## rappdirs            "roxygen2, testthat (>= 3.0.0), covr, withr"
## rARPACK             "Matrix (>= 1.1-0)"
## raster              "ncdf4, igraph, tcltk, parallel, rasterVis, MASS, sf,\nntinytest, gstat, fields, exactextractr"
## rasterVis           "rgl, ggplot2, colorspace, dichromat, sf"
## RColorBrewer        NA
## Rcpp                "tinytest, inline, rbenchmark, pkgKitten (>= 0.1.2)"
## RcppArmadillo       "tinytest, Matrix (>= 1.3.0), pkgKitten, reticulate, slam"
## RcppEigen           "inline, tinytest, pkgKitten, microbenchmark"
## RcppGSL             "tinytest"
## RcppParallel        "Rcpp, RUnit, knitr, rmarkdown"
## RcppZigurat         "rbenchmark, microbenchmark, lattice, knitr, rmarkdown, pinp"
## readr               "covr, curl, datasets, knitr, rmarkdown, spelling, stringi,\nntestthat (>= 3.1.2), tzdb (>= 0.1.1), waldo, withr, xml2"
## readxl              "knitr, rmarkdown, testthat (>= 3.0.0)"
## rematch             "covr, testthat"
## rematch2            "covr, testthat"
## remotes             "brew, callr, codetools, curl, covr, git2r (>= 0.23.0), knitr,\nmockery, pkgbuild (>= 1.0.1), pingr, rmarkdown, rprojroot,\nntestthat, webfakes, withr"
## reprex              "covr, fortunes, miniUI, mockr, rprojroot, sessioninfo, shiny,\nnsPELLING, styler (>= 1.2.0), testthat (>= 3.0.2)"
## reshape            NA
## reshape2            "covr, lattice, testthat (>= 0.8.0)"
## rex                 "covr, dplyr, ggplot2, Hmisc, knitr, magrittr, rmarkdown,\nnoxygen2, rvest, stringr, testthat"
## Rfast               NA
## rgdal               "knitr, DBI, RSQLite, maptools, mapview, rmarkdown, curl,\n\nrgeos"
## rlang               "cli (>= 3.1.0), covr, crayon, fs, glue, knitr, magrittr,\n\nmethods, pillar, rmarkdown, stats, testthat (>= 3.0.0), tibble,\n\nusethis, vctrs (>= 0.2.3), withr"
## rmarkdown           "digest, dygraphs, fs, rsconnect, downlit (>= 0.4.0), katex\n\n(>= 1.4.0), sas

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s (>= 0.4.0), shiny (>= 1.6.0), testthat (>= \n3.0.3), tibble, tufte, vctrs, withr (>= 2.4.2)"
## Rmpfr                "MASS, Bessel, polynom, sfsmisc (>= 1.0-20), Matrix"
## rngtools             "covr, RUnit, testthat"
## robustbase          "grid, MASS, lattice, boot, cluster, Matrix, robust, \nfit.models, MPV, xtable, ggplot2, GGally, RColorBrewer, \nreshape2, sfsmisc, catdata, doParallel, foreach, skewt"
## ROCR                "testthat, knitr, rmarkdown"
## rprojroot           "covr, knitr, lifecycle, mockr, rmarkdown, testthat (>= \n3.0.0), withr"
## RSpectra            "knitr, rmarkdown, prettydoc"
## rstan               "RUnit, RcppEigen (>= 0.3.3.3.0), BH (>= 1.72.0-2), parallel, \nKernSmooth, shiny, rstan (>= 2.3.0), bayesplot (>= 1.5.0), \nrmarkdown, rstantools, rstudioapi, Matrix, knitr (>= 1.15.1), \nV8"
## rstantools          "rstan (>= 2.17.2), usethis (>= 1.5.1), testthat (>= 2.0.0), \nknitr, pkgbuild, pkgload, roxygen2 (>= 6.0.1), rmarkdown, \nrstudioapi"
## rstudioapi          "testthat, knitr, rmarkdown, clipr, covr"
## Rttf2pt1            NA
## rvest               "covr, knitr, readr, repurrrsive, rmarkdown, spelling, stringi \n(>= 0.3.1), testthat (>= 3.0.2), webfakes"
## sandwich            "AER, car, geepack, lattice, lme4, lmtest, MASS, multiwayvcov, \nparallel, pcase, plm, pscl, scatterplot3d, stats4, strucchange, \nsurvival"
## sass                "testthat, knitr, rmarkdown, withr, shiny, curl"
## scales              "bit64, covr, dichromat, ggplot2, hms (>= 0.5.0), stringi, \ntestthat (>= 3.0.0), waldo (>= 0.4.0)"
## selectr             "testthat, XML, xml2"
## shape               NA
## SimComp             NA
## sm                  "rgl, misc3d, interp, gam, tkrplot, rpanel (>= 1.1-4), tcltk"
## sp                  "RColorBrewer, rgdal (>= 1.2-3), rgeos (>= 0.3-13), gstat, \nmaptools, deldir, knitr, rmarkdown, sf"
## SparseM            NA
## spelling            "pdftools"
## SQUAREM             "setRNG"
## stabledist          "Matrix, fBasics, FMStable, RUnit, Rmpfr, sfsmisc"
## StanHeaders         "Rcpp, BH, knitr (>= 1.15.1), rmarkdown, Matrix, methods, \nrstan"
## statsExpressions    "afex, ggplot2, knitr, metaBMA, metafor, metaplan, PMCMRplus, \npurrr, rmarkdown, spelling, survival, testthat (>= 3.1.4), \nutils, withr"
## stringi             NA
## stringr             "covr, htmltools, htmlwidgets, knitr, rmarkdown, testthat"
## strucchange         "stats4, car, dynlm, e1071, foreach, lmtest, mvtnorm, tseries"
## SuppDists           "RcppZigurat"
## survPresmooth       NA
## svglite             "htmltools, testthat, xml2 (>= 1.0.0), covr, fontquiver (>= \n0.2.0), knitr, rmarkdown"
## sys                 "unix (>= 1.4), spelling, testthat"
## systemfonts         "testthat (>= 2.1.0), covr, knitr, rmarkdown, tools"
## terra               "parallel, tinytest, ncd4, sf (>= 0.9-8), deldir, XML, \nleaflet"
## testthat            "covr, curl (>= 0.9.5), diffviewer (>= 0.1.0), knitr, mockery, \nrmarkdown, rstudioapi, shiny, usethis, vctrs (>= 0.1.0), xml2"
## TH.data             "dplyr, gdata, plyr, trtf, tram, rms, coin, ATR, multcomp, \ngridExtra, vcd, colorspace, lattice, knitr"
## tibble              "bench, bit64, blob, brio, callr, cli, covr, crayon (>= \n1.3.4), DiagrammeR, dplyr, evaluate, formattable, ggplot2, hms, \nhtmltools, knitr, lubridate, mockr, nycflights13, pkgbuild, \npkgload, purrr, rmarkdown, stringi, testthat (>= 3.0.2), tidyr, \nwithr"

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```

## tidyr                "covr, data.table, jsonlite, knitr, readr, repurrrsive (>=\n1.0.0), rmarkdow
n, testthat (>= 3.0.0)"
## tidyselect           "covr, crayon, dplyr, knitr, magrittr, rmarkdown, stringr,\ntestthat (>= 3.
1.1), tibble (>= 2.1.3)"
## tidyverse            "covr, feather, glue, knitr, rmarkdown, testthat"
## timeDate             "date, RUnit"
## timeSeries           "RUnit, robustbase, xts, PerformanceAnalytics, fTrading"
## tinytex              "testit, rstudioapi"
## tram                 "MASS, TH.data, trtf (>= 0.3-3), mlbench, knitr, quantreg,\ncolorspace, ATR,
lme4, merDeriv, SparseGrid, alabama, numDeriv,\ngridExtra, lattice, latticeExtra, HSAUR3, ordina
lCont, coxme,\nmlt.dcreg, ordinal, coin, asht, gamlss"
## tseries              NA
## TTR                  "RUnit"
## tzdb                 "covr, testthat (>= 3.0.0)"
## urca                 NA
## utf8                 "cli, covr, knitr, rlang, rmarkdown, testthat (>= 3.0.0),\nwithr"
## uuid                 NA
## variables            NA
## vars                 NA
## vctrs                "bit64, covr, crayon, dplyr (>= 0.8.5), generics, knitr,\nnpillar (>= 1.4.4),
pkgdown (>= 2.0.1), rmarkdown, testthat (>=\n3.0.0), tibble (>= 3.1.3), withr, xml2, waldo (>=
0.2.0),\nzeallot"
## vdiffr               "covr, ggplot2 (>= 3.2.0), roxygen2, withr"
## vegan                "parallel, tcltk, knitr, markdown"
## vioplot              "base, ggplot2, RColorBrewer, knitr, rmarkdown, testthat"
## viridis              "hexbin (>= 1.27.0), scales, MASS, knitr, dichromat,\ncolorspace, raster, ra
sterVis, httr, mapproj, vdiffr, svglite\n(>= 1.2.0), testthat, covr, rmarkdown, rgdal, maps"
## viridisLite          "hexbin (>= 1.27.0), ggplot2 (>= 1.0.1), testthat, covr"
## vroom                "archive, bench (>= 1.1.0), covr, curl, dplyr, forcats, fs,\nggplot2, knitr,
patchwork, prettyunits, purrr, rmarkdown,\nrstudioapi, scales, spelling, testthat (>= 2.1.0), ti
dyr,\nutils, waldo, xml2"
## waldo                "covr, R6, testthat (>= 3.0.0), withr, xml2"
## withr                "callr, covr, DBI, knitr, lattice, methods, rlang, rmarkdown\n(>= 2.12), RSQ
Lite, testthat (>= 3.0.0)"
## WRS2                 "knitr, car, ggplot2, colorspace, mediation, GGally, codetools"
## xfun                 "testit, parallel, codetools, rstudioapi, tinytex (>= 0.30),\nmime, markdow
n, knitr, htmltools, remotes, pak, rhub, renv,\ncurl, jsonlite, magick, rmarkdown"
## xml2                 "covr, curl, httr, knitr, magrittr, mockery, rmarkdown,\ntestthat (>= 2.1.
0)"
## xmlparsedata         "covr, testthat, xml2"
## xtable               "knitr, plm, zoo, survival"
## xts                  "timeSeries, timeDate, tseries, chron, tis, RUnit"
## yaml                 "RUnit"
## zeallot              "testthat, knitr, rmarkdown, purrr, magrittr"
## zoo                  "AER, coda, chron, ggplot2 (>= 3.0.0), mondate, scales,\nstinepack, struccha
nge, timeDate, timeSeries, tis, tseries, xts"
## base                 "methods"
## boot                 "MASS, survival"
## class                NA
## cluster              "MASS, Matrix"
## codetools            NA
## compiler             NA

```

```

## datasets      NA
## foreign       NA
## graphics      NA
## grDevices     "KernSmooth"
## grid          NA
## KernSmooth    "MASS, carData"
## lattice       "KernSmooth, MASS, latticeExtra"
## MASS          "lattice, nlme, nnet, survival"
## Matrix        "expm, MASS"
## methods       "codetools"
## mgcv          "parallel, survival, MASS"
## nlme          "Hmisc, MASS, SASmixed"
## nnet          "MASS"
## parallel      "methods"
## rpart         "survival"
## spatial       "MASS"
## splines       "Matrix, methods"
## stats         "MASS, Matrix, SuppDists, methods, stats4"
## stats4        NA
## survival      NA
## tcltk         NA
## tools         "codetools, methods, xml2, curl, commonmark, knitr, xfun,\nmathjaxr"
## translations  NA
## utils         "methods, xml2, commonmark, knitr"
##              Enhances
## abind         NA
## afex          NA
## alabama       NA
## askpass       NA
## assertthat    NA
## backports     NA
## base64enc     "png"
## basefun       NA
## BayesFactor   NA
## bayestestR    NA
## BB            NA
## bbmle         NA
## bdsmatrix     NA
## BH            NA
## bit           NA
## bit64         NA
## bitops        NA
## blob          NA
## bridgesampling NA
## brio          NA
## Brobdingnag   NA
## broom         NA
## bslib         NA
## BWStest       NA
## cachem        NA
## callr         NA
## car           NA

```

## carData	NA
## caTools	NA
## cellranger	NA
## changepoint	NA
## checkmate	NA
## cli	NA
## clipr	NA
## coda	NA
## coin	NA
## colorspace	NA
## commonmark	NA
## coneproj	NA
## contfrac	NA
## correlation	NA
## covr	NA
## coxme	NA
## cpp11	NA
## crayon	NA
## curl	NA
## cyclocomp	NA
## data.table	NA
## datawizard	NA
## DBI	NA
## dbplyr	NA
## deldir	NA
## DEoptimR	"robustbase"
## desc	NA
## deSolve	NA
## dichromat	NA
## diffobj	NA
## digest	NA
## doParallel	"compiler"
## doRNG	NA
## dplyr	NA
## dreamerr	NA
## dtplyr	NA
## effectsize	NA
## ellipsis	NA
## elliptic	NA
## evaluate	NA
## extrafont	NA
## extrafontdb	NA
## fansi	NA
## farver	NA
## fastGHQuad	NA
## fastICA	NA
## fastmap	NA
## fBasics	NA
## feather	NA
## fGarch	NA
## fixest	NA
## forcats	NA

## foreach	NA
## forecast	NA
## Formula	NA
## fracdiff	NA
## fs	NA
## future	NA
## future.apply	NA
## gapminder	NA
## gargle	NA
## gcookbook	NA
## gdtools	NA
## generics	NA
## ggcorrplot	NA
## ggfortify	NA
## ggplot2	"sp"
## ggplot2movies	NA
## ggrepel	NA
## ggridges	NA
## ggside	NA
## glmnet	NA
## globals	NA
## glue	NA
## gmp	NA
## googledrive	NA
## googlesheets4	NA
## gower	NA
## gplots	NA
## gridExtra	NA
## gss	NA
## gtable	NA
## gtools	NA
## hardhat	NA
## haven	NA
## hexbin	NA
## highr	NA
## hms	NA
## hrbrthemes	NA
## htmltools	"knitr"
## httr	NA
## hunspell	NA
## hypergeo	NA
## ids	NA
## inline	NA
## insight	NA
## interp	"RcppEigen"
## ipred	NA
## isoband	NA
## ISwR	NA
## iterators	NA
## jpeg	NA
## jquerylib	NA
## jsonlite	NA

```
## KFAS NA
## knitr NA
## kSamples NA
## labeling NA
## LaplacesDemon NA
## latticeExtra NA
## lava NA
## lazyeval NA
## lfda NA
## libcoin NA
## lifecycle NA
## lintr NA
## listenv NA
## lme4 NA
## lmerTest NA
## lmtest NA
## logspline NA
## loo NA
## lubridate "chron, timeDate, tis, zoo"
## magrittr NA
## mapdata NA
## mapproj NA
## maps NA
## markdown NA
## mathjaxr NA
## Matrix "MatrixModels, graph, SparseM, sfsmisc, igraph, maptools, sp,\nspdep"
## MatrixModels NA
## matrixStats NA
## mc2d NA
## memoise NA
## metaBMA NA
## metadat NA
## metafor NA
## metaplas NA
## mime NA
## minqa NA
## mlt NA
## mnormt NA
## modelr NA
## modeltools NA
## mratios NA
## MSwM NA
## multcomp NA
## multcompView NA
## munsell NA
## mvtnorm NA
## nloptr NA
## numDeriv NA
## openssl NA
## orthopolynom NA
## palmerpenguins NA
## parallelly NA
```



## parameters	NA
## patchwork	NA
## pbapply	NA
## pbkrtest	NA
## performance	NA
## permute	NA
## pillar	NA
## pkgbuild	NA
## pkgconfig	NA
## pkgload	NA
## plyr	NA
## PMCMRplus	NA
## png	NA
## polynom	NA
## praise	NA
## prettyunits	NA
## prismatic	NA
## processx	NA
## prodlim	NA
## progress	NA
## progressr	NA
## ps	NA
## psych	NA
## purrr	NA
## quadprog	NA
## quantmod	NA
## quantreg	NA
## R6	NA
## rappdirs	NA
## rARPACK	NA
## raster	NA
## rasterVis	NA
## RColorBrewer	NA
## Rcpp	NA
## RcppArmadillo	NA
## RcppEigen	NA
## RcppGSL	NA
## RcppParallel	NA
## RcppZigurat	NA
## readr	NA
## readxl	NA
## rematch	NA
## rematch2	NA
## remotes	NA
## reprex	NA
## reshape	NA
## reshape2	NA
## rex	NA
## Rfast	NA
## rgdal	NA
## rlang	"winch"
## rmarkdown	NA

```
## Rmpfr                "dfoptim, pracma"
## rngtools              NA
## robustbase            "robustX, rrcov, matrixStats, quantreg, Hmisc"
## ROCR                  NA
## rprojroot              NA
## RSpectra              NA
## rstan                  NA
## rstantools            NA
## rstudioapi            NA
## Rttf2pt1              NA
## rvest                  NA
## sandwich              NA
## sass                   NA
## scales                NA
## selectr               NA
## shape                  NA
## SimComp               NA
## sm                     NA
## sp                     NA
## SparseM               NA
## spelling              NA
## SQUAREM               NA
## stabledist            NA
## StanHeaders           NA
## statsExpressions      NA
## stringi               NA
## stringr               NA
## strucchange           NA
## SuppDists             NA
## survPresmooth        NA
## svglite               NA
## sys                    NA
## systemfonts           NA
## terra                 NA
## testthat              NA
## TH.data               NA
## tibble                NA
## tidyr                 NA
## tidyselect            NA
## tidyverse             NA
## timeDate              NA
## timeSeries            NA
## tinytex               NA
## tram                  NA
## tseries               NA
## TTR                   "quantmod"
## tzdb                  NA
## urca                   NA
## utf8                   NA
## uuid                  NA
## variables             NA
## vars                  NA
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## vctrs	NA	
## vdiffr	NA	
## vegan	NA	
## vioplot	NA	
## viridis	NA	
## viridisLite	NA	
## vroom	NA	
## waldo	NA	
## withr	NA	
## WRS2	NA	
## xfun	NA	
## xml2	NA	
## xmlparsedata	NA	
## xtable	NA	
## xts	NA	
## yaml	NA	
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## zoo	NA	
## base	NA	
## boot	NA	
## class	NA	
## cluster	NA	
## codetools	NA	
## compiler	NA	
## datasets	NA	
## foreign	NA	
## graphics	NA	
## grDevices	NA	
## grid	NA	
## KernSmooth	NA	
## lattice	"chron"	
## MASS	NA	
## Matrix	"MatrixModels, graph, SparseM, sfsmisc, igraph, maptools, sp,\nspdep"	
## methods	NA	
## mgcv	NA	
## nlme	NA	
## nnet	NA	
## parallel	"snow, nws, Rmpi"	
## rpart	NA	
## spatial	NA	
## splines	NA	
## stats	NA	
## stats4	NA	
## survival	NA	
## tcltk	NA	
## tools	NA	
## translations	NA	
## utils	NA	
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## abind	"LGPL (>= 2)"	NA
## afex	"GPL (>= 2)"	NA
## alabama	"GPL (>= 2)"	NA

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## assertthat	"GPL-3"	NA
## backports	"GPL-2   GPL-3"	NA
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## bayestestR	"GPL-3"	NA
## BB	"GPL-3"	NA
## bbmle	"GPL"	NA
## bdsmatrix	"LGPL-2"	NA
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## bit	"GPL-2   GPL-3"	NA
## bit64	"GPL-2   GPL-3"	NA
## bitops	"GPL (>= 2)"	NA
## blob	"MIT + file LICENSE"	NA
## bridgesampling	"GPL (>= 2)"	NA
## brio	"MIT + file LICENSE"	NA
## Brodingtonag	"GPL"	NA
## broom	"MIT + file LICENSE"	NA
## bslib	"MIT + file LICENSE"	NA
## BWStest	"LGPL-3"	NA
## cachem	"MIT + file LICENSE"	NA
## callr	"MIT + file LICENSE"	NA
## car	"GPL (>= 2)"	NA
## carData	"GPL (>= 2)"	NA
## caTools	"GPL-3"	NA
## cellranger	"MIT + file LICENSE"	NA
## changepoint	"GPL"	NA
## checkmate	"BSD_3_clause + file LICENSE"	NA
## cli	"MIT + file LICENSE"	NA
## clipr	"GPL-3"	NA
## coda	"GPL (>= 2)"	NA
## coin	"GPL-2"	NA
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## correlation	"GPL-3"	NA
## covr	"MIT + file LICENSE"	NA
## coxme	"LGPL-2"	NA
## cpp11	"MIT + file LICENSE"	NA
## crayon	"MIT + file LICENSE"	NA
## curl	"MIT + file LICENSE"	NA
## cyclocomp	"MIT + file LICENSE"	NA
## data.table	"MPL-2.0   file LICENSE"	NA
## datawizard	"GPL (>= 3)"	NA
## DBI	"LGPL (>= 2.1)"	NA
## dbplyr	"MIT + file LICENSE"	NA
## deldir	"GPL (>= 2)"	NA
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## desc	"MIT + file LICENSE"	NA
## deSolve	"GPL (>= 2)"	NA

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## diffobj	"GPL-2   GPL-3"	NA
## digest	"GPL (>= 2)"	NA
## doParallel	"GPL-2"	NA
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## dreamerr	"GPL-3"	NA
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## evaluate	"MIT + file LICENSE"	NA
## extrafont	"GPL-2"	NA
## extrafontdb	"GPL-2"	NA
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## farver	"MIT + file LICENSE"	NA
## fastGHQuad	"MIT + file LICENSE"	NA
## fastICA	"GPL-2   GPL-3"	NA
## fastmap	"MIT + file LICENSE"	NA
## fBasics	"GPL (>= 2)"	NA
## feather	"Apache License 2.0"	NA
## fGarch	"GPL (>= 2)"	NA
## fixest	"GPL-3"	NA
## forcats	"MIT + file LICENSE"	NA
## foreach	"Apache License (== 2.0)"	NA
## forecast	"GPL-3"	NA
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## fs	"MIT + file LICENSE"	NA
## future	"LGPL (>= 2.1)"	NA
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## gapminder	"CC0"	NA
## gargle	"MIT + file LICENSE"	NA
## gcookbook	"GPL-2"	NA
## gdttools	"GPL-3   file LICENSE"	NA
## generics	"MIT + file LICENSE"	NA
## ggcorrplot	"GPL-2"	NA
## ggfortify	"MIT + file LICENSE"	NA
## ggplot2	"MIT + file LICENSE"	NA
## ggplot2movies	"GPL-3"	NA
## ggrepel	"GPL-3   file LICENSE"	NA
## ggridges	"GPL-2   file LICENSE"	NA
## ggside	"MIT + file LICENSE"	NA
## glmnet	"GPL-2"	NA
## globals	"LGPL (>= 2.1)"	NA
## glue	"MIT + file LICENSE"	NA
## gmp	"GPL (>= 2)"	NA
## googledrive	"MIT + file LICENSE"	NA
## googlesheets4	"MIT + file LICENSE"	NA
## gower	"GPL-3"	NA
## gplots	"GPL-2"	NA
## gridExtra	"GPL (>= 2)"	NA

## gss	"GPL (>= 2)"	NA
## gtable	"GPL-2"	NA
## gtools	"GPL-2"	NA
## hardhat	"MIT + file LICENSE"	NA
## haven	"MIT + file LICENSE"	NA
## hexbin	"GPL-2"	NA
## highr	"GPL"	NA
## hms	"MIT + file LICENSE"	NA
## hrbrthemes	"MIT + file LICENSE"	NA
## htmltools	"GPL (>= 2)"	NA
## httr	"MIT + file LICENSE"	NA
## hunspell	"GPL-2   LGPL-2.1   MPL-1.1"	NA
## hypergeo	"GPL-2"	NA
## ids	"MIT + file LICENSE"	NA
## inline	"LGPL"	NA
## insight	"GPL-3"	NA
## interp	"GPL (>= 2)"	NA
## ipred	"GPL (>= 2)"	NA
## isoband	"MIT + file LICENSE"	NA
## ISwR	"GPL (>= 2)"	NA
## iterators	"Apache License (== 2.0)"	NA
## jpeg	"GPL-2   GPL-3"	NA
## jquerylib	"MIT + file LICENSE"	NA
## jsonlite	"MIT + file LICENSE"	NA
## KFAS	"GPL (>= 2)"	NA
## knitr	"GPL"	NA
## kSamples	"GPL (>= 2)"	NA
## labeling	"MIT + file LICENSE   Unlimited"	NA
## LaplacesDemon	"MIT + file LICENSE"	NA
## latticeExtra	"GPL (>= 2)"	NA
## lava	"GPL-3"	NA
## lazyeval	"GPL-3"	NA
## lfda	"MIT + file LICENSE"	NA
## libcoin	"GPL-2"	NA
## lifecycle	"MIT + file LICENSE"	NA
## lintr	"MIT + file LICENSE"	NA
## listenv	"LGPL (>= 2.1)"	NA
## lme4	"GPL (>= 2)"	NA
## lmerTest	"GPL (>= 2)"	NA
## lmtest	"GPL-2   GPL-3"	NA
## logspline	"Apache License 2.0"	NA
## loo	"GPL (>= 3)"	NA
## lubridate	"GPL (>= 2)"	NA
## magrittr	"MIT + file LICENSE"	NA
## mapdata	"GPL-2"	NA
## mapproj	"Lucent Public License"	NA
## maps	"GPL-2"	NA
## markdown	"GPL-2"	NA
## mathjaxr	"GPL-3"	NA
## Matrix	"GPL (>= 2)   file LICENCE"	NA
## MatrixModels	"GPL (>= 2)"	NA
## matrixStats	"Artistic-2.0"	NA

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## memoise	"MIT + file LICENSE"	NA
## metaBMA	"GPL-3"	NA
## metadat	"GPL (>= 2)"	NA
## metafor	"GPL (>= 2)"	NA
## metaplus	"GPL (>= 2)"	NA
## mime	"GPL"	NA
## minqa	"GPL-2"	NA
## mlt	"GPL-2"	NA
## mnormt	"GPL-2   GPL-3"	NA
## modelr	"GPL-3"	NA
## modeltools	"GPL-2"	NA
## mratios	"GPL-2"	NA
## MSwM	"GPL (>= 2.0)"	NA
## multcomp	"GPL-2"	NA
## multcompView	"GPL"	NA
## munsell	"MIT + file LICENSE"	NA
## mvtnorm	"GPL-2"	NA
## nloptr	"LGPL (>= 3)"	NA
## numDeriv	"GPL-2"	NA
## openssl	"MIT + file LICENSE"	NA
## orthopolynom	"GPL (>= 2)"	NA
## palmerpenguins	"CC0"	NA
## parallelly	"LGPL (>= 2.1)"	NA
## parameters	"GPL-3"	NA
## patchwork	"MIT + file LICENSE"	NA
## pbapply	"GPL-2"	NA
## pbkrtest	"GPL (>= 2)"	NA
## performance	"GPL-3"	NA
## permute	"GPL-2"	NA
## pillar	"MIT + file LICENSE"	NA
## pkgbuild	"MIT + file LICENSE"	NA
## pkgconfig	"MIT + file LICENSE"	NA
## pkgload	"GPL-3"	NA
## plyr	"MIT + file LICENSE"	NA
## PMCMRplus	"GPL (>= 3)"	NA
## png	"GPL-2   GPL-3"	NA
## polynom	"GPL-2"	NA
## praise	"MIT + file LICENSE"	NA
## prettyunits	"MIT + file LICENSE"	NA
## prismatic	"MIT + file LICENSE"	NA
## processx	"MIT + file LICENSE"	NA
## prodlim	"GPL (>= 2)"	NA
## progress	"MIT + file LICENSE"	NA
## progressr	"GPL (>= 3)"	NA
## ps	"MIT + file LICENSE"	NA
## psych	"GPL (>= 2)"	NA
## purrr	"GPL-3   file LICENSE"	NA
## quadprog	"GPL (>= 2)"	NA
## quantmod	"GPL-3"	NA
## quantreg	"GPL (>= 2)"	NA
## R6	"MIT + file LICENSE"	NA

## rappdirs	"MIT + file LICENSE"	NA
## rARPACK	"BSD_3_clause + file LICENSE"	NA
## raster	"GPL (>= 3)"	NA
## rasterVis	"GPL-3"	NA
## RColorBrewer	"Apache License 2.0"	NA
## Rcpp	"GPL (>= 2)"	NA
## RcppArmadillo	"GPL (>= 2)"	NA
## RcppEigen	"GPL (>= 2)   file LICENSE"	NA
## RcppGSL	"GPL (>= 2)"	NA
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## readr	"MIT + file LICENSE"	NA
## readxl	"MIT + file LICENSE"	NA
## rematch	"MIT + file LICENSE"	NA
## rematch2	"MIT + file LICENSE"	NA
## remotes	"MIT + file LICENSE"	NA
## reprex	"MIT + file LICENSE"	NA
## reshape	"MIT + file LICENSE"	NA
## reshape2	"MIT + file LICENSE"	NA
## rex	"MIT + file LICENSE"	NA
## Rfast	"GPL (>= 2.0)"	NA
## rgdal	"GPL (>= 2)"	NA
## rlang	"MIT + file LICENSE"	NA
## rmarkdown	"GPL-3"	NA
## Rmpfr	"GPL (>= 2)"	NA
## rngtools	"GPL-3"	NA
## robustbase	"GPL (>= 2)"	NA
## ROCR	"GPL (>= 2)"	NA
## rprojroot	"MIT + file LICENSE"	NA
## RSpectra	"MPL (>= 2)"	NA
## rstan	"GPL (>= 3)"	NA
## rstantools	"GPL (>= 3)"	NA
## rstudioapi	"MIT + file LICENSE"	NA
## Rttf2pt1	"file LICENSE"	"yes"
## rvest	"MIT + file LICENSE"	NA
## sandwich	"GPL-2   GPL-3"	NA
## sass	"MIT + file LICENSE"	NA
## scales	"MIT + file LICENSE"	NA
## selectr	"BSD_3_clause + file LICENSE"	NA
## shape	"GPL (>= 3)"	NA
## SimComp	"GPL"	NA
## sm	"GPL (>= 2)"	NA
## sp	"GPL (>= 2)"	NA
## SparseM	"GPL (>= 2)"	NA
## spelling	"MIT + file LICENSE"	NA
## SQUAREM	"GPL (>= 2)"	NA
## stabledist	"GPL (>= 2)"	NA
## StanHeaders	"BSD_3_clause + file LICENSE"	NA
## statsExpressions	"GPL-3   file LICENSE"	NA
## stringi	"file LICENSE"	NA
## stringr	"GPL-2   file LICENSE"	NA
## strucchange	"GPL-2   GPL-3"	NA



## SuppDists	"GPL (>= 2)"	NA
## survPresmooth	"GPL (>= 2)"	NA
## svglite	"GPL (>= 2)"	NA
## sys	"MIT + file LICENSE"	NA
## systemfonts	"MIT + file LICENSE"	NA
## terra	"GPL (>= 3)"	NA
## testthat	"MIT + file LICENSE"	NA
## TH.data	"GPL-3"	NA
## tibble	"MIT + file LICENSE"	NA
## tidyr	"MIT + file LICENSE"	NA
## tidyselect	"MIT + file LICENSE"	NA
## tidyverse	"MIT + file LICENSE"	NA
## timeDate	"GPL (>= 2)"	NA
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## tinytex	"MIT + file LICENSE"	NA
## tram	"GPL-2"	NA
## tseries	"GPL-2"	NA
## TTR	"GPL (>= 2)"	NA
## tzdb	"MIT + file LICENSE"	NA
## urca	"GPL (>= 2)"	NA
## utf8	"Apache License (== 2.0)   file LICENSE"	NA
## uuid	"MIT + file LICENSE"	NA
## variables	"GPL-2"	NA
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## vctrs	"MIT + file LICENSE"	NA
## vdiff	"MIT + file LICENSE"	NA
## vegan	"GPL-2"	NA
## vioplot	"BSD_3_clause + file LICENSE"	NA
## viridis	"MIT + file LICENSE"	NA
## viridisLite	"MIT + file LICENSE"	NA
## vroom	"MIT + file LICENSE"	NA
## waldo	"MIT + file LICENSE"	NA
## withr	"MIT + file LICENSE"	NA
## WRS2	"GPL-3"	NA
## xfun	"MIT + file LICENSE"	NA
## xml2	"MIT + file LICENSE"	NA
## xmlparsedata	"MIT + file LICENSE"	NA
## xtable	"GPL (>= 2)"	NA
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## yaml	"BSD_3_clause + file LICENSE"	NA
## zeallot	"MIT + file LICENSE"	NA
## zoo	"GPL-2   GPL-3"	NA
## base	"Part of R 4.2.1"	NA
## boot	"Unlimited"	NA
## class	"GPL-2   GPL-3"	NA
## cluster	"GPL (>= 2)"	NA
## codetools	"GPL"	NA
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## datasets	"Part of R 4.2.1"	NA
## foreign	"GPL (>= 2)"	NA
## graphics	"Part of R 4.2.1"	NA
## grDevices	"Part of R 4.2.1"	NA

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## MASS	"GPL-2   GPL-3"	NA
## Matrix	"GPL (>= 2)   file LICENCE"	NA
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## mgcv	"GPL (>= 2)"	NA
## nlme	"GPL (>= 2)"	NA
## nnet	"GPL-2   GPL-3"	NA
## parallel	"Part of R 4.2.1"	NA
## rpart	"GPL-2   GPL-3"	NA
## spatial	"GPL-2   GPL-3"	NA
## splines	"Part of R 4.2.1"	NA
## stats	"Part of R 4.2.1"	NA
## stats4	"Part of R 4.2.1"	NA
## survival	"LGPL (>= 2)"	NA
## tcltk	"Part of R 4.2.1"	NA
## tools	"Part of R 4.2.1"	NA
## translations	"Part of R 4.2.1"	NA
## utils	"Part of R 4.2.1"	NA
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## afex	NA NA NA	"no" "4.2.1"
## alabama	NA NA NA	"no" "4.2.0"
## askpass	NA NA NA	"yes" "4.2.1"
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## basefun	NA NA NA	"yes" "4.2.2"
## BayesFactor	NA NA NA	"yes" "4.2.1"
## bayestestR	NA NA NA	"no" "4.2.1"
## BB	NA NA NA	"no" "4.2.2"
## bbmle	NA NA NA	"no" "4.2.1"
## bdsmatrix	NA NA NA	"yes" "4.2.0"
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## bit	NA NA NA	"yes" "4.2.1"
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## brio	NA NA NA	"yes" "4.2.1"
## Brodningnag	NA NA NA	"no" "4.2.1"
## broom	NA NA NA	"no" "4.2.1"
## bslib	NA NA NA	"no" "4.2.1"
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## callr	NA NA NA	"no" "4.2.1"
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## carData	NA NA NA	"no" "4.2.1"
## caTools	NA NA NA	"yes" "4.2.2"
## cellranger	NA NA NA	"no" "4.2.1"
## changepoint	NA NA NA	"yes" "4.2.2"

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## coda	NA	NA	NA	"no"	"4.2.1"
## coin	NA	NA	NA	"yes"	"4.2.2"
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## commonmark	NA	NA	NA	"yes"	"4.2.1"
## coneproj	NA	NA	NA	"yes"	"4.2.2"
## contfrac	NA	NA	NA	"yes"	"4.2.0"
## correlation	NA	NA	NA	"no"	"4.2.1"
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## coxme	NA	NA	NA	"yes"	"4.2.2"
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## crayon	NA	NA	NA	"no"	"4.2.0"
## curl	NA	NA	NA	"yes"	"4.2.1"
## cyclocomp	NA	NA	NA	"no"	"4.2.2"
## data.table	NA	NA	NA	"yes"	"4.2.1"
## datawizard	NA	NA	NA	"no"	"4.2.1"
## DBI	NA	NA	NA	"no"	"4.2.1"
## dbplyr	NA	NA	NA	"no"	"4.2.1"
## deldir	NA	NA	NA	"yes"	"4.2.0"
## DEoptimR	NA	NA	NA	"no"	"4.2.0"
## desc	NA	NA	NA	"no"	"4.2.1"
## deSolve	NA	NA	NA	"yes"	"4.2.1"
## dichromat	NA	NA	NA	"no"	"4.2.0"
## diffobj	NA	NA	NA	"yes"	"4.2.1"
## digest	NA	NA	NA	"yes"	"4.2.0"
## doParallel	NA	NA	NA	"no"	"4.2.1"
## doRNG	NA	NA	NA	"no"	"4.2.1"
## dplyr	NA	NA	NA	"yes"	"4.2.0"
## dreamerr	NA	NA	NA	"no"	"4.2.2"
## dtplyr	NA	NA	NA	"no"	"4.2.1"
## effectsize	NA	NA	NA	"no"	"4.2.1"
## ellipsis	NA	NA	NA	"yes"	"4.2.0"
## elliptic	NA	NA	NA	"no"	"4.2.1"
## evaluate	NA	NA	NA	"no"	"4.2.1"
## extrafont	NA	NA	NA	"no"	"4.2.1"
## extrafontdb	NA	NA	NA	NA	"4.2.0"
## fansi	NA	NA	NA	"yes"	"4.2.0"
## farver	NA	NA	NA	"yes"	"4.2.0"
## fastGHQuad	NA	NA	NA	"yes"	"4.2.1"
## fastICA	NA	NA	NA	"yes"	"4.2.2"
## fastmap	NA	NA	NA	"yes"	"4.2.1"
## fBasics	NA	NA	NA	"yes"	"4.2.2"
## feather	NA	NA	NA	"yes"	"4.2.1"
## fGarch	NA	NA	NA	"yes"	"4.2.2"
## fixest	NA	NA	NA	"yes"	"4.2.2"
## forcats	NA	NA	NA	"no"	"4.2.1"
## foreach	NA	NA	NA	"no"	"4.2.1"
## forecast	NA	NA	NA	"yes"	"4.2.2"
## Formula	NA	NA	NA	"no"	"4.2.0"
## fracdiff	NA	NA	NA	"yes"	"4.2.2"

## fs	NA	NA	NA	"yes"	"4.2.1"
## future	NA	NA	NA	"no"	"4.2.1"
## future.apply	NA	NA	NA	"no"	"4.2.1"
## gapminder	NA	NA	NA	"no"	"4.2.1"
## gargle	NA	NA	NA	"no"	"4.2.1"
## gcookbook	NA	NA	NA	"no"	"4.2.0"
## gdtools	NA	NA	NA	"yes"	"4.2.1"
## generics	NA	NA	NA	"no"	"4.2.0"
## ggcorrplot	NA	NA	NA	"no"	"4.2.1"
## ggfortify	NA	NA	NA	"no"	"4.2.2"
## ggplot2	NA	NA	NA	"no"	"4.2.1"
## ggplot2movies	NA	NA	NA	"no"	"4.2.0"
## ggrepel	NA	NA	NA	"yes"	"4.2.1"
## ggridges	NA	NA	NA	"no"	"4.2.1"
## ggside	NA	NA	NA	"no"	"4.2.1"
## glmnet	NA	NA	NA	"yes"	"4.2.2"
## globals	NA	NA	NA	"no"	"4.2.1"
## glue	NA	NA	NA	"yes"	"4.2.0"
## gmp	NA	NA	NA	"yes"	"4.2.1"
## googledrive	NA	NA	NA	"no"	"4.2.1"
## googlesheets4	NA	NA	NA	"no"	"4.2.1"
## gower	NA	NA	NA	"yes"	"4.2.0"
## gplots	NA	NA	NA	"no"	"4.2.2"
## gridExtra	NA	NA	NA	"no"	"4.2.1"
## gss	NA	NA	NA	"yes"	"4.2.0"
## gtable	NA	NA	NA	"no"	"4.2.0"
## gtools	NA	NA	NA	"yes"	"4.2.2"
## hardhat	NA	NA	NA	"no"	"4.2.1"
## haven	NA	NA	NA	"yes"	"4.2.1"
## hexbin	NA	NA	NA	"yes"	"4.2.1"
## highr	NA	NA	NA	"no"	"4.2.1"
## hms	NA	NA	NA	"no"	"4.2.1"
## hrbrthemes	NA	NA	NA	"no"	"4.2.1"
## htmltools	NA	NA	NA	"yes"	"4.2.1"
## httr	NA	NA	NA	"no"	"4.2.1"
## hunspell	NA	NA	NA	"yes"	"4.2.1"
## hypergeo	NA	NA	NA	"no"	"4.2.1"
## ids	NA	NA	NA	"no"	"4.2.1"
## inline	NA	NA	NA	"no"	"4.2.1"
## insight	NA	NA	NA	"no"	"4.2.1"
## interp	NA	NA	NA	"yes"	"4.2.1"
## ipred	NA	NA	NA	"yes"	"4.2.1"
## isoband	NA	NA	NA	"yes"	"4.2.0"
## ISwR	NA	NA	NA	"no"	"4.2.2"
## iterators	NA	NA	NA	"no"	"4.2.1"
## jpeg	NA	NA	NA	"yes"	"4.2.0"
## jquerylib	NA	NA	NA	"no"	"4.2.1"
## jsonlite	NA	NA	NA	"yes"	"4.2.1"
## KFAS	NA	NA	NA	"yes"	"4.2.2"
## knitr	NA	NA	NA	"no"	"4.2.1"
## kSamples	NA	NA	NA	"yes"	"4.2.1"
## labeling	NA	NA	NA	"no"	"4.2.0"

## LaplacesDemon	NA	NA	NA	"no"	"4.2.1"
## latticeExtra	NA	NA	NA	"no"	"4.2.1"
## lava	NA	NA	NA	"no"	"4.2.1"
## lazyeval	NA	NA	NA	"yes"	"4.2.1"
## lfda	NA	NA	NA	"no"	"4.2.2"
## libcoin	NA	NA	NA	"yes"	"4.2.2"
## lifecycle	NA	NA	NA	"no"	"4.2.1"
## lintr	NA	NA	NA	"no"	"4.2.2"
## listenv	NA	NA	NA	"no"	"4.2.1"
## lme4	NA	NA	NA	"yes"	"4.2.1"
## lmerTest	NA	NA	NA	"no"	"4.2.1"
## lmtest	NA	NA	NA	"yes"	"4.2.2"
## logspline	NA	NA	NA	"yes"	"4.2.0"
## loo	NA	NA	NA	"no"	"4.2.1"
## lubridate	NA	NA	NA	"yes"	"4.2.1"
## magrittr	NA	NA	NA	"yes"	"4.2.0"
## mapdata	NA	NA	NA	"yes"	"4.2.2"
## mapproj	NA	NA	NA	"yes"	"4.2.1"
## maps	NA	NA	NA	"yes"	"4.2.1"
## markdown	NA	NA	NA	"yes"	"4.2.1"
## mathjaxr	NA	NA	NA	"yes"	"4.2.1"
## Matrix	NA	NA	NA	"yes"	"4.2.1"
## MatrixModels	NA	NA	NA	"no"	"4.2.1"
## matrixStats	NA	NA	NA	"yes"	"4.2.1"
## mc2d	NA	NA	NA	"no"	"4.2.1"
## memoise	NA	NA	NA	"no"	"4.2.1"
## metaBMA	NA	NA	NA	"yes"	"4.2.1"
## metadat	NA	NA	NA	"no"	"4.2.1"
## metafor	NA	NA	NA	"no"	"4.2.1"
## metaplas	NA	NA	NA	"no"	"4.2.1"
## mime	NA	NA	NA	"yes"	"4.2.0"
## minqa	NA	NA	NA	"yes"	"4.2.1"
## mlt	NA	NA	NA	"yes"	"4.2.2"
## mnormt	NA	NA	NA	"yes"	"4.2.1"
## modelr	NA	NA	NA	"no"	"4.2.1"
## modeltools	NA	NA	NA	"no"	"4.2.0"
## mratios	NA	NA	NA	"no"	"4.2.2"
## MSwM	NA	NA	NA	"no"	"4.2.2"
## multcomp	NA	NA	NA	"no"	"4.2.2"
## multcompView	NA	NA	NA	"no"	"4.2.1"
## munsell	NA	NA	NA	"no"	"4.2.0"
## mvtnorm	NA	NA	NA	"yes"	"4.2.0"
## nloptr	NA	NA	NA	"yes"	"4.2.1"
## numDeriv	NA	NA	NA	"no"	"4.2.0"
## openssl	NA	NA	NA	"yes"	"4.2.1"
## orthopolynom	NA	NA	NA	"no"	"4.2.2"
## palmerpenguins	NA	NA	NA	"no"	"4.2.1"
## parallelly	NA	NA	NA	"no"	"4.2.1"
## parameters	NA	NA	NA	"no"	"4.2.1"
## patchwork	NA	NA	NA	"no"	"4.2.1"
## pbapply	NA	NA	NA	"no"	"4.2.1"
## pbkrtest	NA	NA	NA	"no"	"4.2.1"

## performance	NA	NA	NA	"no"	"4.2.1"
## permute	NA	NA	NA	"no"	"4.2.1"
## pillar	NA	NA	NA	"no"	"4.2.0"
## pkgbuild	NA	NA	NA	"no"	"4.2.1"
## pkgconfig	NA	NA	NA	"no"	"4.2.0"
## pkgload	NA	NA	NA	"no"	"4.2.1"
## plyr	NA	NA	NA	"yes"	"4.2.1"
## PMCMRplus	NA	NA	NA	"yes"	"4.2.1"
## png	NA	NA	NA	"yes"	"4.2.0"
## polynom	NA	NA	NA	"no"	"4.2.2"
## praise	NA	NA	NA	"no"	"4.2.1"
## prettyunits	NA	NA	NA	"no"	"4.2.1"
## prismatic	NA	NA	NA	"no"	"4.2.1"
## processx	NA	NA	NA	"yes"	"4.2.1"
## prodlim	NA	NA	NA	"yes"	"4.2.1"
## progress	NA	NA	NA	"no"	"4.2.1"
## progressr	NA	NA	NA	"no"	"4.2.1"
## ps	NA	NA	NA	"yes"	"4.2.1"
## psych	NA	NA	NA	"no"	"4.2.1"
## purrr	NA	NA	NA	"yes"	"4.2.0"
## quadprog	NA	NA	NA	"yes"	"4.2.0"
## quantmod	NA	NA	NA	"no"	"4.2.2"
## quantreg	NA	NA	NA	"yes"	"4.2.1"
## R6	NA	NA	NA	"no"	"4.2.0"
## rappdirs	NA	NA	NA	"yes"	"4.2.1"
## rARPACK	NA	NA	NA	"no"	"4.2.2"
## raster	NA	NA	NA	"yes"	"4.2.1"
## rasterVis	NA	NA	NA	"no"	"4.2.1"
## RColorBrewer	NA	NA	NA	"no"	"4.2.0"
## Rcpp	NA	NA	NA	"yes"	"4.2.1"
## RcppArmadillo	NA	NA	NA	"yes"	"4.2.1"
## RcppEigen	NA	NA	NA	"yes"	"4.2.1"
## RcppGSL	NA	NA	NA	"yes"	"4.2.1"
## RcppParallel	NA	NA	NA	"yes"	"4.2.1"
## RcppZiggurat	NA	NA	NA	"yes"	"4.2.1"
## readr	NA	NA	NA	"yes"	"4.2.1"
## readxl	NA	NA	NA	"yes"	"4.2.1"
## rematch	NA	NA	NA	"no"	"4.2.1"
## rematch2	NA	NA	NA	"no"	"4.2.1"
## remotes	NA	NA	NA	"no"	"4.2.2"
## reprex	NA	NA	NA	"no"	"4.2.1"
## reshape	NA	NA	NA	"yes"	"4.2.1"
## reshape2	NA	NA	NA	"yes"	"4.2.1"
## rex	NA	NA	NA	"no"	"4.2.1"
## Rfast	NA	NA	NA	"yes"	"4.2.1"
## rgdal	NA	NA	NA	"yes"	"4.2.1"
## rlang	NA	NA	NA	"yes"	"4.2.0"
## rmarkdown	NA	NA	NA	"no"	"4.2.1"
## Rmpfr	NA	NA	NA	"yes"	"4.2.1"
## rngtools	NA	NA	NA	"no"	"4.2.1"
## robustbase	NA	NA	NA	"yes"	"4.2.2"
## ROCR	NA	NA	NA	"no"	"4.2.2"

## rprojroot	NA	NA	NA	"no"	"4.2.1"
## RSpecra	NA	NA	NA	"yes"	"4.2.2"
## rstan	NA	NA	NA	"yes"	"4.2.1"
## rstantools	NA	NA	NA	"no"	"4.2.1"
## rstudioapi	NA	NA	NA	"no"	"4.2.1"
## Rttf2pt1	NA	NA	NA	"yes"	"4.2.1"
## rvest	NA	NA	NA	"no"	"4.2.1"
## sandwich	NA	NA	NA	"no"	"4.2.2"
## sass	NA	NA	NA	"yes"	"4.2.1"
## scales	NA	NA	NA	"no"	"4.2.0"
## selectr	NA	NA	NA	"no"	"4.2.1"
## shape	NA	NA	NA	"no"	"4.2.0"
## SimComp	NA	NA	NA	"no"	"4.2.2"
## sm	NA	NA	NA	"yes"	"4.2.1"
## sp	NA	NA	NA	"yes"	"4.2.1"
## SparseM	NA	NA	NA	"yes"	"4.2.0"
## spelling	NA	NA	NA	"no"	"4.2.1"
## SQUAREM	NA	NA	NA	"no"	"4.2.0"
## stabledist	NA	NA	NA	"no"	"4.2.2"
## StanHeaders	NA	NA	NA	"yes"	"4.2.1"
## statsExpressions	NA	NA	NA	"no"	"4.2.1"
## stringi	NA	NA	NA	"yes"	"4.2.1"
## stringr	NA	NA	NA	"no"	"4.2.1"
## strucchange	NA	NA	NA	"yes"	"4.2.2"
## SuppDists	NA	NA	NA	"yes"	"4.2.1"
## survPresmooth	NA	NA	NA	"yes"	"4.2.0"
## svglite	NA	NA	NA	"yes"	"4.2.1"
## sys	NA	NA	NA	"yes"	"4.2.1"
## systemfonts	NA	NA	NA	"yes"	"4.2.1"
## terra	NA	NA	NA	"yes"	"4.2.1"
## testthat	NA	NA	NA	"yes"	"4.2.1"
## TH.data	NA	NA	NA	"no"	"4.2.2"
## tibble	NA	NA	NA	"yes"	"4.2.0"
## tidyr	NA	NA	NA	"yes"	"4.2.1"
## tidyselect	NA	NA	NA	"no"	"4.2.1"
## tidyverse	NA	NA	NA	"no"	"4.2.1"
## timeDate	NA	NA	NA	"no"	"4.2.1"
## timeSeries	NA	NA	NA	"no"	"4.2.2"
## tinytex	NA	NA	NA	"no"	"4.2.1"
## tram	NA	NA	NA	"yes"	"4.2.2"
## tseries	NA	NA	NA	"yes"	"4.2.2"
## TTR	NA	NA	NA	"yes"	"4.2.2"
## tzdb	NA	NA	NA	"yes"	"4.2.1"
## urca	NA	NA	NA	"yes"	"4.2.2"
## utf8	NA	NA	NA	"yes"	"4.2.0"
## uuid	NA	NA	NA	"yes"	"4.2.0"
## variables	NA	NA	NA	"no"	"4.2.0"
## vars	NA	NA	NA	"no"	"4.2.2"
## vctrs	NA	NA	NA	"yes"	"4.2.0"
## vdiff	NA	NA	NA	"yes"	"4.2.1"
## vegan	NA	NA	NA	"yes"	"4.2.1"
## vioplot	NA	NA	NA	"no"	"4.2.1"

## viridis	NA	NA	NA	"no"	"4.2.1"
## viridisLite	NA	NA	NA	"no"	"4.2.0"
## vroom	NA	NA	NA	"yes"	"4.2.1"
## waldo	NA	NA	NA	"no"	"4.2.1"
## withr	NA	NA	NA	"no"	"4.2.0"
## WRS2	NA	NA	NA	"yes"	"4.2.1"
## xfun	NA	NA	NA	"yes"	"4.2.1"
## xml2	NA	NA	NA	"yes"	"4.2.1"
## xmlparsedata	NA	NA	NA	"no"	"4.2.2"
## xtable	NA	NA	NA	"no"	"4.2.2"
## xts	NA	NA	NA	"yes"	"4.2.2"
## yaml	NA	NA	NA	"yes"	"4.2.1"
## zeallot	NA	NA	NA	"no"	"4.2.1"
## zoo	NA	NA	NA	"yes"	"4.2.1"
## base	NA	NA	NA	NA	"4.2.1"
## boot	NA	NA	NA	"no"	"4.2.1"
## class	NA	NA	NA	"yes"	"4.2.1"
## cluster	NA	NA	NA	"yes"	"4.2.1"
## codetools	NA	NA	NA	"no"	"4.2.1"
## compiler	NA	NA	NA	NA	"4.2.1"
## datasets	NA	NA	NA	NA	"4.2.1"
## foreign	NA	NA	NA	"yes"	"4.2.1"
## graphics	NA	NA	NA	"yes"	"4.2.1"
## grDevices	NA	NA	NA	"yes"	"4.2.1"
## grid	NA	NA	NA	"yes"	"4.2.1"
## KernSmooth	NA	NA	NA	"yes"	"4.2.1"
## lattice	NA	NA	NA	"yes"	"4.2.1"
## MASS	NA	NA	NA	"yes"	"4.2.1"
## Matrix	NA	NA	NA	"yes"	"4.2.1"
## methods	NA	NA	NA	"yes"	"4.2.1"
## mgcv	NA	NA	NA	"yes"	"4.2.1"
## nlme	NA	NA	NA	"yes"	"4.2.1"
## nnet	NA	NA	NA	"yes"	"4.2.1"
## parallel	NA	NA	NA	"yes"	"4.2.1"
## rpart	NA	NA	NA	"yes"	"4.2.1"
## spatial	NA	NA	NA	"yes"	"4.2.1"
## splines	NA	NA	NA	"yes"	"4.2.1"
## stats	NA	NA	NA	"yes"	"4.2.1"
## stats4	NA	NA	NA	NA	"4.2.1"
## survival	NA	NA	NA	"yes"	"4.2.1"
## tcltk	NA	NA	NA	"yes"	"4.2.1"
## tools	NA	NA	NA	"yes"	"4.2.1"
## translations	NA	NA	NA	NA	"4.2.1"
## utils	NA	NA	NA	"yes"	"4.2.1"

```
#install a package
#install.packages("Rtools", dependencies=TRUE)
```

# Project management



1. set up management structure
2. Discuss avoiding redundancy of files 3. Make sure to use version control

```
```## Getting Help
?plot
```

```
```r
help(plot)
```

```
## starting httpd help server ... done
```

```
vignette("FAQ-vegan")
```

```
citation("vegan")
```

```
##
## To cite package 'vegan' in publications use:
##
##   Oksanen J, Simpson G, Blanchet F, Kindt R, Legendre P, Minchin P,
##   O'Hara R, Solymos P, Stevens M, Szoecs E, Wagner H, Barbour M,
##   Bedward M, Bolker B, Borcard D, Carvalho G, Chirico M, De Caceres M,
##   Durand S, Evangelista H, FitzJohn R, Friendly M, Furneaux B, Hannigan
##   G, Hill M, Lahti L, McGlinn D, Ouellette M, Ribeiro Cunha E, Smith T,
##   Stier A, Ter Braak C, Weedon J (2022). _vegan: Community Ecology
##   Package_. R package version 2.6-2,
##   <https://CRAN.R-project.org/package=vegan>.
##
## A BibTeX entry for LaTeX users is
##
##   @Manual{,
##     title = {vegan: Community Ecology Package},
##     author = {Jari Oksanen and Gavin L. Simpson and F. Guillaume Blanchet and Roeland Kindt and
## nd Pierre Legendre and Peter R. Minchin and R.B. O'Hara and Peter Solymos and M. Henry H. Steven
## s and Eduard Szoecs and Helene Wagner and Matt Barbour and Michael Bedward and Ben Bolker and Da
## niel Borcard and Gustavo Carvalho and Michael Chirico and Miquel {De Caceres} and Sebastien Dura
## nd and Heloisa Beatriz Antoniazzi Evangelista and Rich FitzJohn and Michael Friendly and Brendan
## Furneaux and Geoffrey Hannigan and Mark O. Hill and Leo Lahti and Dan McGlinn and Marie-Helene O
## uellette and Eduardo {Ribeiro Cunha} and Tyler Smith and Adrian Stier and Cajo J.F. {Ter Braak}
## and James Weedon},
##     year = {2022},
##     note = {R package version 2.6-2},
##     url = {https://CRAN.R-project.org/package=vegan},
##   }
```

## Data and their formats

```
cats <- data.frame(coat = c ("callico","tabby","black"),
                  weight = c(2.1,5,3.2),
                  likes_string = c(1,0,1))
```

```
write.csv(cats,file = "./cats.csv")
```

```
cats
```

<b>coat</b> <chr>	<b>weight</b> <dbl>	<b>likes_string</b> <dbl>
callico	2.1	1
tabby	5.0	0
black	3.2	1
3 rows		

```
cats$coat
```

```
## [1] "callico" "tabby"   "black"
```

```
paste("my cat is", cats$coat, ", and it weighs" , cats$weight, " kg.", sep=" ")
```

```
## [1] "my cat is callico , and it weighs 2.1  kg."
## [2] "my cat is tabby , and it weighs 5  kg."
## [3] "my cat is black , and it weighs 3.2  kg."
```

## DATA TYPES

```
typeof(cats$coat)
```

```
## [1] "character"
```

```
typeof(cats$weight)
```

```
## [1] "double"
```

```
typeof(cats$likes_string)
```

```
## [1] "double"
```

```
typeof(1i)
```

```
## [1] "complex"
```

```
typeof(FALSE)
```

```
## [1] "logical"
```

```
typeof(TRUE)
```

```
## [1] "logical"
```

```
typeof(T)
```

```
## [1] "logical"
```

```
typeof(F)
```

```
## [1] "logical"
```

```
typeof(cats)
```

```
## [1] "list"
```

```
file.show("./cats.csv")
```

```
cats$likes_string <- as.logical(cats$likes_string)
```

```
typeof(cats$likes_string)
```

```
## [1] "logical"
```

```
cats$likes_string
```

```
## [1] TRUE FALSE TRUE
```

```
z <- seq(10)
```

```
class(z)
```

```
## [1] "integer"
```

```
seq(1,100, by=5)
```

```
## [1] 1 6 11 16 21 26 31 36 41 46 51 56 61 66 71 76 81 86 91 96
```

```
cats
```

<b>coat</b> <chr>	<b>weight</b> <dbl>	<b>likes_string</b> <lgl>
callico	2.1	TRUE
tabby	5.0	FALSE
black	3.2	TRUE

3 rows

```
str(cats$coat)
```

```
## chr [1:3] "callico" "tabby" "black"
```

```
coats <- c("tabby","tortoiseshell","black","tabby")
coats
```

```
## [1] "tabby"          "tortoiseshell" "black"          "tabby"
```

```
factor(coats)
```

```
## [1] tabby          tortoiseshell black          tabby
## Levels: black tabby tortoiseshell
```

```
categories <- factor(coats)
class(categories)
```

```
## [1] "character"
```

```
class(categories)
```

```
## [1] "factor"
```

```
str(categories)
```

```
## Factor w/ 3 levels "black","tabby",...: 2 3 1 2
```

## Lists

```
list_example <- list("numbers", numbers=1:10, data=TRUE)
list_example
```

```
## [[1]]
## [1] "numbers"
##
## $numbers
## [1] 1 2 3 4 5 6 7 8 9 10
##
## $data
## [1] TRUE
```

```
another_list<-list(1,"a",TRUE,1+1i)
another_list
```

```
## [[1]]
## [1] 1
##
## [[2]]
## [1] "a"
##
## [[3]]
## [1] TRUE
##
## [[4]]
## [1] 1+1i
```

```
typeof(cats)
```

```
## [1] "list"
```

```
class(cats)
```

```
## [1] "data.frame"
```

```
data.frame(list_example)
```

<b>X.numbers.</b> <chr>	<b>numbers</b> <int>	<b>data</b> <lgl>
numbers	1	TRUE
numbers	2	TRUE
numbers	3	TRUE
numbers	4	TRUE
numbers	5	TRUE
numbers	6	TRUE
numbers	7	TRUE
numbers	8	TRUE
numbers	9	TRUE
numbers	10	TRUE
1-10 of 10 rows		

cats

<b>coat</b> <chr>	<b>weight</b> <dbl>	<b>likes_string</b> <lgl>
callico	2.1	TRUE
tabby	5.0	FALSE
black	3.2	TRUE
3 rows		

cats[,3]

## [1] TRUE FALSE TRUE

cats[3,]

<b>coat</b> <chr>	<b>weight</b> <dbl>	<b>likes_string</b> <lgl>
3 black	3.2	TRUE
1 row		

cats[2:3,c(1,3)]

	<b>coat</b> <chr>	<b>likes_string</b> <lgl>
2	tabby	FALSE
3	black	TRUE
2 rows		

## Matrices

```
#a matrix is made for math
matrix_example <- matrix(0, ncol=5, nrow=3)
```

```
matrix_example
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    0    0    0    0    0
## [2,]    0    0    0    0    0
## [3,]    0    0    0    0    0
```

```
typeof(matrix_example)
```

```
## [1] "double"
```

```
str(matrix_example) #turns into string
```

```
##  num [1:3, 1:5] 0 0 0 0 0 0 0 0 0 0 ...
```

```
dim(matrix_example)
```

```
## [1] 3 5
```

```
class(data.frame(matrix_example))
```

```
## [1] "data.frame"
```

```
#save as data frame:
df_example <- data.frame(matrix_example)
df_example
```

**X1**  
<dbl>

**X2**  
<dbl>

**X3**  
<dbl>

**X4**  
<dbl>

**X5**  
<dbl>

<b>X1</b> <dbl>	<b>X2</b> <dbl>	<b>X3</b> <dbl>	<b>X4</b> <dbl>	<b>X5</b> <dbl>
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

3 rows

### ###Subsetting

```
p <- c(2.3,6.9,4.0,23,12)
p
```

```
## [1]  2.3  6.9  4.0 23.0 12.0
```

```
names(p) <- c('a','b','c','d','e')
p
```

```
##    a    b    c    d    e
##  2.3  6.9  4.0 23.0 12.0
```

```
p[2:4]
```

```
##    b    c    d
##  6.9  4.0 23.0
```

```
p[c(1,5)]
```

```
##    a    e
##  2.3 12.0
```

```
p[c(1,1,1,3,5,5)]
```

```
##    a    a    a    c    e    e
##  2.3  2.3  2.3  4.0 12.0 12.0
```

```
p[6]
```

```
## <NA>
##    NA
```



```
p[-3] #everything but 3
```

```
##      a      b      d      e
##  2.3   6.9 23.0 12.0
```

```
p[c(-1,-5)]
```

```
##      b      c      d
##  6.9   4.0 23.0
```

```
p[-(2:4)]
```

```
##      a      e
##  2.3 12.0
```

```
p[c('a','c')]
```

```
##      a      c
##  2.3  4.0
```

```
p[c(T,F,T,F,T)]
```

```
##      a      c      e
##  2.3   4.0 12.0
```

```
#search
p[names(p) != 'c']
```

```
##      a      b      d      e
##  2.3   6.9 23.0 12.0
```

## Factors

```
f <- factor(c('a','b','c','d','e'))
f
```

```
## [1] a b c d e
## Levels: a b c d e
```

```
#search
f[f == 'a']
```

```
## [1] a
## Levels: a b c d e
```

```
f[1:3]
```

```
## [1] a b c
## Levels: a b c d e
```

```
f[f %in% c('b','c')]
```

```
## [1] b c
## Levels: a b c d e
```

*## is a special operator*

```
f[-3]
```

```
## [1] a b d e
## Levels: a b c d e
```

```
f2 <- factor(c('a','a','d','c','c'))
f2
```

```
## [1] a a d c c
## Levels: a c d
```

```
f2[f2=='a']
```

```
## [1] a a
## Levels: a c d
```

```
f2[f2 %in% c('a','c')]
```

```
## [1] a a c c
## Levels: a c d
```

*#git pull*

## Matrices Cont.

```
set.seed(65)
m<-matrix(rnorm(6*4), ncol=4, nrow=6)
m
```

```
##           [,1]      [,2]      [,3]      [,4]
## [1,] -1.1968205 -0.3943568  0.4232027 -2.34367583
## [2,] -0.9516674 -1.2484030 -1.8461725 -0.77605977
## [3,]  0.2786364 -0.6521289 -0.2456747 -2.16173144
## [4,] -1.4449411 -1.1707346  1.2538299  0.05701057
## [5,]  0.8216518  0.3604497  1.5633419 -0.24867199
## [6,]  1.2470188  1.2302708 -1.2644661 -0.07830796
```

```
m[3:4, c(3,1)]
```

```
##           [,1]      [,2]
## [1,] -0.2456747  0.2786364
## [2,]  1.2538299 -1.4449411
```

```
m[c(93,4)]
```

```
## [1]      NA -1.444941
```

## Lists

```
#xlist <-(a="BIOL6220" , b= seq(1 , 10 , by=0.5) , data="grade")
#data
```

```
gp<- read.csv('~/.BIOL6220_Fall122/practcomp2022/data/population_total.csv')
```

```
head(gp, n=10L)
```

	<b>country</b> <chr>	<b>X1799</b> <chr>	<b>X1800</b> <chr>	<b>X1801</b> <chr>	<b>X1802</b> <chr>	<b>X1803</b> <chr>	<b>X1804</b> <chr>	<b>X1805</b> <chr>	<b>X1806</b> <chr>
1	Afghanistan	3.28M	3.28M	3.28M	3.28M	3.28M	3.28M	3.28M	3.28M
2	Angola	1.57M	1.57M	1.57M	1.57M	1.57M	1.57M	1.57M	1.57M
3	Albania	400k	402k	404k	405k	407k	409k	411k	413k
4	Andorra	2650	2650	2650	2650	2650	2650	2650	2650
5	United Arab Emirates	40.2k	40.2k	40.2k	40.2k	40.2k	40.2k	40.2k	40.2k
6	Argentina	534k	520k	506k	492k	479k	466k	453k	441k
7	Armenia	413k	413k	413k	413k	413k	413k	413k	413k

	country <chr>	X1799 <chr>	X1800 <chr>	X1801 <chr>	X1802 <chr>	X1803 <chr>	X1804 <chr>	X1805 <chr>	X1806 <chr>	
8	Antigua and Barbuda	37k	37k	37k	37k	37k	37k	37k	37k	
9	Australia	200k	205k	211k	216k	222k	227k	233k	239k	
10	Austria	3M	3.02M	3.04M	3.05M	3.07M	3.09M	3.11M	3.12M	

1-10 of 10 rows | 1-10 of 303 columns

```
head(gp[3], n=10L)
```

	X1800 <chr>
1	3.28M
2	1.57M
3	402k
4	2650
5	40.2k
6	520k
7	413k
8	37k
9	205k
10	3.02M

1-10 of 10 rows

```
nrow(gp)
```

```
## [1] 197
```

```
gp$X1799
```

```
## [1] "3.28M" "1.57M" "400k" "2650" "40.2k" "534k" "413k" "37k" "200k"
## [10] "3M" "880k" "899k" "3.25M" "637k" "1.67M" "19.2M" "2.25M" "64.5k"
## [19] "27.4k" "852k" "2.36M" "25.5k" "887k" "2.5M" "81.7k" "2260" "392k"
## [28] "121k" "479k" "500k" "1.75M" "771k" "330M" "1.09M" "1.86M" "5.16M"
## [37] "314k" "1.21M" "56.3k" "55.7k" "53k" "272k" "184k" "5.52M" "18M"
## [46] "22.8k" "19.9k" "1M" "150k" "2.5M" "500k" "3.5M" "205k" "11.5M"
## [55] "334k" "12M" "800k" "131k" "29M" "16.4k" "158k" "10.8M" "1.07M"
## [64] "2.02M" "984k" "103k" "218k" "80.4k" "2.25M" "29.4k" "463k" "166k"
## [73] "20k" "130k" "905" "1.23M" "500k" "3.25M" "16.1M" "201M" "5.25M"
## [82] "6M" "1M" "61.4k" "210k" "19M" "300k" "200k" "28M" "2.04M"
## [91] "2.57M" "530k" "2.09M" "17.9k" "17.2k" "9.39M" "81.3k" "470k" "300k"
## [100] "314k" "230k" "24k" "5800" "1.75M" "276k" "779k" "127k" "591k"
## [109] "2.5M" "7790" "713k" "1.5M" "42.4k" "5.1M" "5830" "392k" "1.4M"
## [118] "134k" "6M" "127k" "600k" "2M" "383k" "59k" "737k" "287k"
## [127] "229k" "853k" "12.1M" "186k" "2M" "900k" "4M" "1830" "200k"
## [136] "300k" "13.1M" "75.6k" "1.27M" "2.5M" "3880" "755k" "9M" "4.34M"
## [145] "2.75M" "300k" "166k" "14.1k" "5.5M" "31.3M" "928k" "2M" "3.99M"
## [154] "1.01M" "30k" "57k" "794k" "248k" "5490" "989k" "2.15M" "1.03M"
## [163] "22.7k" "80.7k" "2.14M" "470k" "2.5M" "86k" "12.5k" "1.25M" "1.43M"
## [172] "446k" "3M" "467k" "367k" "137k" "18.7k" "20k" "800k" "9.76M"
## [181] "2500" "2M" "3M" "2.5M" "11.2M" "55k" "6M" "1.92M" "25.8k"
## [190] "1M" "4M" "27.8k" "47.3k" "2.59M" "1.45M" "747k" "1.09M"
```

```
gp[1:3,2:5]
```

	<b>X1799</b> <chr>	<b>X1800</b> <chr>	<b>X1801</b> <chr>	<b>X1802</b> <chr>
1	3.28M	3.28M	3.28M	3.28M
2	1.57M	1.57M	1.57M	1.57M
3	400k	402k	404k	405k
3 rows				

```
gp[c(1,3), 2:5]
```

	<b>X1799</b> <chr>	<b>X1800</b> <chr>	<b>X1801</b> <chr>	<b>X1802</b> <chr>
1	3.28M	3.28M	3.28M	3.28M
3	400k	402k	404k	405k
2 rows				

```
gp[which(gp$X2059 <= 2 & gp$X2019 >=2)]
```

<b>X1802</b> <chr>	<b>X1805</b> <chr>	<b>X1828</b> <chr>	<b>X1834</b> <chr>	<b>X1836</b> <chr>	<b>X1843</b> <chr>	<b>X1855</b> <chr>	<b>X1871</b> <chr>	<b>X1879</b> <chr>	<b>X1882</b> <chr>	
3.28M	3.28M	3.41M	3.51M	3.54M	3.65M	3.86M	4.18M	4.35M	4.42M	
1.57M	1.57M	1.79M	1.95M	2.01M	2.23M	2.55M	2.91M	3.06M	3.12M	
405k	411k	455k	467k	472k	487k	530k	618k	667k	687k	
2650	2650	2830	2950	2990	3140	3420	3820	4030	4120	
40.2k	40.2k	40.2k	40.2k	40.2k	40.2k	40k	40.1k	41.8k	42.5k	
492k	453k	624k	698k	725k	888k	1.22M	1.91M	2.46M	2.7M	
413k	413k	449k	474k	483k	515k	574k	661k	710k	729k	
37k	37k	37k	37k	37k	37k	37k	34.9k	34.9k	35.4k	
216k	233k	332k	373k	391k	487k	973k	1.84M	2.2M	2.42M	
3.05M	3.11M	3.52M	3.63M	3.66M	3.81M	4.12M	4.6M	4.94M	5.08M	

1-10 of 197 rows | 1-10 of 25 columns

Previous **1** 2 3 4 5 6 ... 20 Next

## Conditionals and flow

```
n <-10
if (n<10) {
  print("n is <10")
} else if (n>10) {
  print("n is >10")
}else {
  print("I love moth man")
}
```

```
## [1] "I love moth man"
```

```
for (n in seq(0,20)){
  n <-10
  if (n<10) {
    print("n is <10")
  } else if (n>10) {
    print("n is >10")
  }else {
    print("I love moth man")
  }
}
```

```
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
## [1] "I love moth man"
```

```
g<-0
while(g<=10){
  print(paste(g,"is less than or equal to 10"))
  g <- g+1
}
```

```
## [1] "0 is less than or equal to 10"
## [1] "1 is less than or equal to 10"
## [1] "2 is less than or equal to 10"
## [1] "3 is less than or equal to 10"
## [1] "4 is less than or equal to 10"
## [1] "5 is less than or equal to 10"
## [1] "6 is less than or equal to 10"
## [1] "7 is less than or equal to 10"
## [1] "8 is less than or equal to 10"
## [1] "9 is less than or equal to 10"
## [1] "10 is less than or equal to 10"
```

## Plotting and figures

```
#install.packages(("ggplot2"))
```

```
#library(ggplot2)
```

```
#ggplot(data=gp, mapping=aes(x=X2000, y=X2019)) +geom_point()
```

## b. scatter plots

```
#plot(spид.gen$left.bulb ~ спид.gen$right.bulb, pch=as.character(habitat))
```

## c. linear regression

```
#gen.reg<-lm(spид.gen$left.bulb~спид.gen$right.bulb)
#gen.reg
#summary(gen.reg)
```

```
#plot(spид.gen$left.bulb~спид.gen$right.bulb)
#abline(gen.reg)
```

## d. correlation coefficients and spearman rank correlation

```
#cor.gen<- with(spид.gen, cor(left.bulb, right.bulb))
#cor.gen
#cor.gen^2
```

```
#spearman.cor.gen<- with(spид.gen, cor(left.bulb, right.bulb, method="spearman"))
#spearman.cor.gen
#spearman.cor.gen^2
```

## e. Residuals

```
#residuals(gen.reg)
```

## f. Transformations

```
#plot(log10(spид.gen$left.bulb) ~ спид.gen$right.bulb)
#log.left.bulb<-log10(spид.gen$left.bulb)
```

```
#Identify() #identify in base R what entry a point on a plot is
```

## 2. Comparing discrete treatment effects

## a. Chi square

```
obs<-c(4,15,6,15,18,2)
exp<-c(.16,.17,.16,.17,.17,.17)
```

```
chisq.test(obs,p=exp)
```



```
##
## Chi-squared test for given probabilities
##
## data:  obs
## X-squared = 21.691, df = 5, p-value = 0.0005993
```

```
obs_weighted<-c(4,15,6,15,18,2)
#obs_fair<-(10,10,10,10,10,10)
exp<-c(.16,.17,.16,.17,.17,.17)
chisq.test(obs,p=exp)
```

```
##
## Chi-squared test for given probabilities
##
## data:  obs
## X-squared = 21.691, df = 5, p-value = 0.0005993
```

## b.t-test

```
#H0 true mean is =0, but you can set true mean to other values with mu=
#t.test(spид.gen$carapace.length)
```

```
#mean(spид.gen$carapace.length)
#t.test(spид.gen$carapace.length, mu=29)
```

```
#two sample t test
#habitat.t2<-t.test(spид.gen$carapace.length~spид.gen$habitat)
#habitat.t2
```

```
#habitat.tless<-t.test(spид.gen$left.bulb, alternative="less")
```

```
#habitat.tgreater<-t.test(spид.gen$left.bulb, alternative="greater")
#habitat.tgreater
```

```
kira<-read.csv(file="~/BIOL6220_Fall122/practcomp2022/data/AllData.csv",header=TRUE)
```

```
kira
```

SiteID <chr>	Latitude <dbl>	Longitude <dbl>	y_proj <dbl>	x_proj <dbl>	altitude <dbl>	Survey1Date <chr>	Survey1JulienDate <int>
22-BBS1	36.63135	-75.90505	36.63135	-75.90505	3.294277	4/16/2022	22100
22-BBS2	36.63984	-75.90106	36.63984	-75.90106	0.348488	4/16/22	22100
22-BBS3	36.64892	-75.90648	36.64892	-75.90648	0.599400	4/16/22	22100

SiteID <chr>	Latitude <dbl>	Longitude <dbl>	y_proj <dbl>	x_proj <dbl>	altitude <dbl>	Survey1Date <chr>	Survey1JulienDate <int>
22-BBS4	36.65613	-75.90842	36.65613	-75.90842	-2.929150	4/16/22	22100
22-BBS5	36.66343	-75.91312	36.66343	-75.91312	-0.258301	4/16/22	22100
22-BBS6	36.65995	-75.91542	36.65995	-75.91542	0.515656	4/16/22	22100
22-BBS7	36.65507	-75.91416	36.65507	-75.91416	-2.362091	4/16/22	22100
22-BBS8	36.64607	-75.91222	36.64607	-75.91222	8.634022	4/16/22	22100
22-BBS9	36.64232	-75.91056	36.64232	-75.91056	0.342795	4/16/22	22100
	NA	NA	NA	NA	NA		NA

1-10 of 66 rows | 1-8 of 52 columns

Previous 1 2 3 4 5 6 7 Next

c. analysis of variance

```
library(car)
```

```
## Loading required package: carData
```

```
gen.lm<-lm(kira$m_toOpenWater ~kira$Location)
gen.lm
```

```
##
## Call:
## lm(formula = kira$m_toOpenWater ~ kira$Location)
##
## Coefficients:
##                (Intercept)
##                1.6667
##      kira$LocationBells Island Rd
##                -1.6667
##      kira$LocationCoinjock Boating Access Area
##                -1.6667
##      kira$LocationFalse Cape State Park, VA
##                -1.6667
##      kira$LocationMackay - Boat house
##                -1.6667
##      kira$LocationMackay - Hegge
##                16.7083
##      kira$LocationMackay - South
##                -0.8974
##      kira$LocationNorth Landing River
##                -1.6667
##      kira$LocationWaterlily Rd
##                -1.6667
##      kira$LocationYarborough Farm
##                -1.6667
```

```
gen.anova<-aov(kira$m_toOpenWater~kira$Canopy.)
gen.anova
```

```
## Call:
## aov(formula = kira$m_toOpenWater ~ kira$Canopy.)
##
## Terms:
##      kira$Canopy. Residuals
## Sum of Squares      580.115  5297.816
## Deg. of Freedom         1      56
##
## Residual standard error: 9.726452
## Estimated effects may be unbalanced
## 8 observations deleted due to missingness
```

```
gapminder<-read.csv(file="~/BIOL6220_Fall122/practcomp2022/data/gapminder_all.csv",header=TRUE)
```

```
gapminder.lifeexp.continent.anova<-aov(gapminder$lifeExp_1982~gapminder$continent)
```

```
gapminder.tukey.twoway<-TukeyHSD(gapminder.lifeexp.continent.anova)
gapminder.tukey.twoway
```

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = gapminder$lifeExp_1982 ~ gapminder$continent)
##
## $`gapminder$continent`
##              diff          lwr          upr          p adj
## Americas-Africa 14.635975 10.005068 19.266882 0.0000000
## Asia-Africa      11.025074  6.790174 15.259974 0.0000000
## Europe-Africa    21.213535 16.851019 25.576050 0.0000000
## Oceania-Africa   22.697135  8.986026 36.408243 0.0001016
## Asia-Americas    -3.610901 -8.656112  1.434311 0.2819984
## Europe-Americas   6.577560  1.424762 11.730358 0.0050790
## Oceania-Americas 8.061160 -5.921482 22.043802 0.5039606
## Europe-Asia      10.188461  5.388419 14.988503 0.0000003
## Oceania-Asia     11.672061 -2.184467 25.528588 0.1421657
## Oceania-Europe   1.483600 -12.412462 15.379662 0.9983270
```

#### d. ANCOVA

```
#boxplot(kira$SiteID~kira$Survey1KIRA_TotalIndividualResponse)
```

```
gen.ancova<-lm(kira$Avg_ht.ft.~kira$Juncus)
summary(gen.ancova)
```

```
##
## Call:
## lm(formula = kira$Avg_ht.ft. ~ kira$Juncus)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.2302 -0.9300  0.0647  0.6440  3.7206
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.279358   0.249862  21.129  <2e-16 ***
## kira$Juncus -0.009829   0.007006  -1.403   0.166
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.18 on 56 degrees of freedom
## (8 observations deleted due to missingness)
## Multiple R-squared:  0.03396,    Adjusted R-squared:  0.01671
## F-statistic: 1.968 on 1 and 56 DF,  p-value: 0.1661
```

```
gapminder.ancova<-lm(gapminder$lifeExp_1952~gapminder$gdpPercap_1952)
summary(gapminder.ancova)
```

```
##
## Call:
## lm(formula = gapminder$lifeExp_1952 ~ gapminder$gdpPercap_1952)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31.658  -9.426  -3.865   11.008   22.141
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    4.770e+01  1.066e+00  44.762 < 2e-16 ***
## gapminder$gdpPercap_1952 3.647e-04  1.065e-04   3.425 0.000808 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.79 on 140 degrees of freedom
## Multiple R-squared:  0.0773, Adjusted R-squared:  0.07071
## F-statistic: 11.73 on 1 and 140 DF,  p-value: 0.000808
```

```
#library(multcompView)
#install.packages("glht", dependencies = T)
#posthoc.gapminder.ancova<-glht(gapminder.ancova, linfct=mcp(technique="Tukey"))
```

### 3. PCA

```
kira.matrix<-with(kira, cbind(Juncus,Typha,Phrag,Survey2KIRA_TotalIndividualResponse
))
summary(kira.matrix)
```

```
##      Juncus      Typha      Phrag
## Min.   : 0.00   Min.   : 0.00   Min.   : 0.00
## 1st Qu.:10.00   1st Qu.: 0.00   1st Qu.:10.00
## Median :23.50   Median : 9.50   Median :25.00
## Mean   :27.98   Mean   :14.22   Mean   :29.98
## 3rd Qu.:39.00   3rd Qu.:26.50   3rd Qu.:48.75
## Max.   :83.00   Max.   :50.00   Max.   :90.00
## NA's   :8       NA's   :8       NA's   :8
## Survey2KIRA_TotalIndividualResponse
## Min.    : 0.000
## 1st Qu.: 0.000
## Median : 1.000
## Mean    : 2.203
## 3rd Qu.: 2.000
## Max.    :65.000
## NA's    :7
```

```
#kira.pca<-princomp(kira.matrix, cor=TRUE)
#Loadings(kira.pca)
```

```
#kira.pca.plot<-biplot(kira.pca)
```

```
#install.packages("ggfortify", dependencies = T)  
#library(ggfortify)
```

```
#kira.pca$scores
```