A Machine Profile Summary

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Providing a characterization of a particular computing environment for R calculations

If we want to compare results computed on different machines, we need a way to provide measures and identifiers of the particular computing environment at hand. This document attempts to summarize some possibilities available in the R statistical software and language.

Some possible information desired

?? should provide unique names for each info item

Temporal information

Most computatins should have a time/date stamp that is unlikely to be confused with any other, at least in combination with a machine name and/or other tags.

?? tdstamp

Identifier for the computing environment

- machine name
- operating system and version
- compiler or interpreter version
- specific variations, if any, that should be noted

Hardware information

- cpu
- cores
- operating cycle speed??
- RAM total
- RAM available, possibly indicating swap space and usage
- RAM speed (could be variable)

Software information

?? what to put in.

R tools for machine information

sessionInfo()

```
tt <- sessionInfo()
tt <- as.vector(tt)
tt
```

```
## R version 4.1.0 (2021-05-18)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Linux Mint 20.1
##
## Matrix products: default
## BLAS:   /usr/lib/x86_64-linux-gnu/openblas-pthread/libblas.so.3
## LAPACK: /usr/lib/x86_64-linux-gnu/openblas-pthread/liblapack.so.3
##
## locale:
##  [1] LC_CTYPE=en_CA.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=en_CA.UTF-8        LC_COLLATE=en_CA.UTF-8
##  [5] LC_MONETARY=en_CA.UTF-8    LC_MESSAGES=en_CA.UTF-8
##  [7] LC_PAPER=en_CA.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_CA.UTF-8 LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## loaded via a namespace (and not attached):
##  [1] compiler_4.1.0   magrittr_2.0.1   tools_4.1.0      htmltools_0.5.1.1
##  [5] yaml_2.2.1       stringi_1.6.2    rmarkdown_2.8    knitr_1.33
##  [9] stringr_1.4.0    xfun_0.23        digest_0.6.27   rlang_0.4.11
## [13] evaluate_0.14
```

benchmarkme

- uses `proc.time()` for timings
- has single core and parallel timings
- ?? does it do GPUs
- provides far too much for most needs i.e., a succinct summary of how capable a computing system should be

```
library(benchmarkmeData)
library(benchmarkme)
ls(package:benchmarkmeData)
```

```
## Warning in ls(package:benchmarkmeData): 'package:benchmarkmeData' converted to
## character string
```

```
## [1] "get_datatable_past" "is_blas_optimize"   "make_data_set"
## [4] "move_files"         "past_results"       "past_results_v2"
## [7] "plot_past"          "select_results"     "summarise_results"
```

```
ls(package:benchmarkme)
```

```
## Warning in ls(package:benchmarkme): 'package:benchmarkme' converted to character
## string
```

```
##  [1] "benchmark_io"            "benchmark_matrix_cal"
```

```
##  [3] "benchmark_matrix_fun"        "benchmark_prog"
##  [5] "benchmark_std"               "bm_matrix_cal_cross_product"
##  [7] "bm_matrix_cal_lm"            "bm_matrix_cal_manip"
##  [9] "bm_matrix_cal_power"         "bm_matrix_cal_sort"
## [11] "bm_matrix_fun_cholesky"      "bm_matrix_fun_determinant"
## [13] "bm_matrix_fun_eigen"         "bm_matrix_fun_fft"
## [15] "bm_matrix_fun_inverse"       "bm_parallel"
## [17] "bm_prog_escoufier"           "bm_prog_fib"
## [19] "bm_prog_gcd"                 "bm_prog_hilbert"
## [21] "bm_prog_toeplitz"            "bm_read"
## [23] "bm_write"                    "create_bundle"
## [25] "get_available_benchmarks"    "get_byte_compiler"
## [27] "get_cpu"                     "get_linear_algebra"
## [29] "get_platform_info"           "get_r_version"
## [31] "get_ram"                     "get_sys_details"
## [33] "is_blas_optimize"            "plot_past"
## [35] "rank_results"                "sample_results"
## [37] "upload_results"
```

```r
lsf.str("package:benchmarkme")
```

```
## benchmark_io : function (runs = 3, size = c(5, 50), tmpdir = tempdir(), verbose = TRUE,
##     cores = 0L)
## benchmark_matrix_cal : function (runs = 3, verbose = TRUE, cores = 0L)
## benchmark_matrix_fun : function (runs = 3, verbose = TRUE, cores = 0L)
## benchmark_prog : function (runs = 3, verbose = TRUE, cores = 0L)
## benchmark_std : function (runs = 3, verbose = TRUE, cores = 0L)
## bm_matrix_cal_cross_product : function (runs = 3, verbose = TRUE)
## bm_matrix_cal_lm : function (runs = 3, verbose = TRUE)
## bm_matrix_cal_manip : function (runs = 3, verbose = TRUE)
## bm_matrix_cal_power : function (runs = 3, verbose = TRUE)
## bm_matrix_cal_sort : function (runs = 3, verbose = TRUE)
## bm_matrix_fun_cholesky : function (runs = 3, verbose = TRUE)
## bm_matrix_fun_determinant : function (runs = 3, verbose = TRUE)
## bm_matrix_fun_eigen : function (runs = 3, verbose = TRUE)
## bm_matrix_fun_fft : function (runs = 3, verbose = TRUE)
## bm_matrix_fun_inverse : function (runs = 3, verbose = TRUE)
## bm_parallel : function (bm, runs, verbose, cores, ...)
## bm_prog_escoufier : function (runs = 3, verbose = TRUE)
## bm_prog_fib : function (runs = 3, verbose = TRUE)
## bm_prog_gcd : function (runs = 3, verbose = TRUE)
## bm_prog_hilbert : function (runs = 3, verbose = TRUE)
## bm_prog_toeplitz : function (runs = 3, verbose = TRUE)
## bm_read : function (runs = 3, size = c(5, 50), tmpdir = tempdir(), verbose = TRUE)
## bm_write : function (runs = 3, size = c(5, 50), tmpdir = tempdir(), verbose = TRUE)
## create_bundle : function (results, filename = NULL, args = NULL, id_prefix = "")
## get_available_benchmarks : function ()
## get_byte_compiler : function ()
## get_cpu : function ()
## get_linear_algebra : function ()
## get_platform_info : function ()
## get_r_version : function ()
## get_ram : function ()
## get_sys_details : function (sys_info = TRUE, platform_info = TRUE, r_version = TRUE, ram = TRUE,
##     cpu = TRUE, byte_compiler = TRUE, linear_algebra = TRUE, locale = TRUE,
```

```
##       installed_packages = TRUE, machine = TRUE)
## is_blas_optimize : function (results)
## plot_past : function (test_group, blas_optimize = NULL, cores = 0, log = "y")
## rank_results : function (results, blas_optimize = is_blas_optimize(results), verbose = TRUE)
## upload_results : function (results, url = "http://www.mas.ncl.ac.uk/~ncsg3/form.php", args = NULL,
##       id_prefix = "")
```

```r
lsf.str("package:benchmarkmeData")
```

```
## get_datatable_past : function (test_group, blas_optimize = NULL, cores = 0)
## is_blas_optimize : function (results)
## make_data_set : function (from)
## move_files : function (from, to)
## plot_past : function (test_group, blas_optimize = NULL, cores = 0, log = "y")
## select_results : function (test_group, results = NULL, blas_optimize = NULL, cores = 0)
## summarise_results : function (res)
```

```r
## This next line takes some time
benchmark_std()
```

```
## # Programming benchmarks (5 tests):

##   3,500,000 Fibonacci numbers calculation (vector calc): 0.179 (sec).

##   Grand common divisors of 1,000,000 pairs (recursion): 0.472 (sec).

##   Creation of a 3,500 x 3,500 Hilbert matrix (matrix calc): 0.226 (sec).

##   Creation of a 3,000 x 3,000 Toeplitz matrix (loops): 0.985 (sec).

##   Escoufier's method on a 60 x 60 matrix (mixed): 0.63 (sec).

## # Matrix calculation benchmarks (5 tests):

##   Creation, transp., deformation of a 5,000 x 5,000 matrix: 0.492 (sec).

##   2,500 x 2,500 normal distributed random matrix^1,000: 0.17 (sec).

##   Sorting of 7,000,000 random values: 0.578 (sec).

##   2,500 x 2,500 cross-product matrix (b = a' * a): 0.278 (sec).

##   Linear regr. over a 5,000 x 500 matrix (c = a \ b'): 0.024 (sec).

## # Matrix function benchmarks (5 tests):

##   Cholesky decomposition of a 3,000 x 3,000 matrix: 0.245 (sec).

##   Determinant of a 2,500 x 2,500 random matrix: 0.185 (sec).

##   Eigenvalues of a 640 x 640 random matrix: 0.382 (sec).

##   FFT over 2,500,000 random values: 0.212 (sec).

##   Inverse of a 1,600 x 1,600 random matrix: 0.164 (sec).

##      user system elapsed            test test_group cores
## 1  0.220  0.007   0.228             fib       prog     0
## 2  0.148  0.008   0.155             fib       prog     0
## 3  0.144  0.012   0.155             fib       prog     0
## 4  0.579  0.003   0.582             gcd       prog     0
## 5  0.424  0.003   0.426             gcd       prog     0
## 6  0.408  0.000   0.407             gcd       prog     0
## 7  0.213  0.036   0.249         hilbert       prog     0
```

```
## 8  0.206  0.048  0.253       hilbert       prog     0
## 9  0.144  0.032  0.175       hilbert       prog     0
## 10 0.963  0.000  0.963      toeplitz       prog     0
## 11 0.966  0.000  0.966      toeplitz       prog     0
## 12 1.025  0.000  1.025      toeplitz       prog     0
## 13 0.613  0.051  0.664     escoufier       prog     0
## 14 0.609  0.000  0.610     escoufier       prog     0
## 15 0.615  0.000  0.616     escoufier       prog     0
## 16 0.514  0.024  0.538         manip matrix_cal     0
## 17 0.495  0.044  0.539         manip matrix_cal     0
## 18 0.358  0.039  0.398         manip matrix_cal     0
## 19 0.170  0.000  0.170         power matrix_cal     0
## 20 0.155  0.015  0.170         power matrix_cal     0
## 21 0.159  0.012  0.171         power matrix_cal     0
## 22 0.561  0.012  0.573          sort matrix_cal     0
## 23 0.563  0.012  0.575          sort matrix_cal     0
## 24 0.575  0.012  0.587          sort matrix_cal     0
## 25 2.473  0.770  0.285 cross_product matrix_cal     0
## 26 2.472  0.258  0.233 cross_product matrix_cal     0
## 27 2.598  0.940  0.317 cross_product matrix_cal     0
## 28 0.192  0.101  0.025            lm matrix_cal     0
## 29 0.191  0.057  0.020            lm matrix_cal     0
## 30 0.146  0.162  0.027            lm matrix_cal     0
## 31 1.835  0.887  0.267      cholesky matrix_fun     0
## 32 1.826  1.025  0.287      cholesky matrix_fun     0
## 33 1.570  0.362  0.182      cholesky matrix_fun     0
## 34 1.867  0.150  0.187   determinant matrix_fun     0
## 35 1.760  0.271  0.186   determinant matrix_fun     0
## 36 1.854  0.136  0.183   determinant matrix_fun     0
## 37 1.426  3.074  0.388         eigen matrix_fun     0
## 38 1.422  3.057  0.380         eigen matrix_fun     0
## 39 1.438  3.025  0.377         eigen matrix_fun     0
## 40 0.207  0.000  0.208           fft matrix_fun     0
## 41 0.216  0.003  0.219           fft matrix_fun     0
## 42 0.208  0.000  0.208           fft matrix_fun     0
## 43 1.568  0.280  0.162       inverse matrix_fun     0
## 44 1.464  0.436  0.167       inverse matrix_fun     0
## 45 1.463  0.385  0.162       inverse matrix_fun     0
```

```
get_byte_compiler()
```

```
## byte_optimize
##             2
```

```
get_linear_algebra()
```

```
## $blas
## [1] "/usr/lib/x86_64-linux-gnu/openblas-pthread/libblas.so.3"
##
## $lapack
## [1] "/usr/lib/x86_64-linux-gnu/openblas-pthread/liblapack.so.3"
```

```
get_sys_details()
```

```
## $sys_info
## $sys_info$sysname
```

```
## [1] "Linux"
##
## $sys_info$release
## [1] "5.4.0-74-generic"
##
## $sys_info$version
## [1] "#83-Ubuntu SMP Sat May 8 02:35:39 UTC 2021"
##
## $sys_info$nodename
## [1] "M21"
##
## $sys_info$machine
## [1] "x86_64"
##
## $sys_info$login
## [1] "unknown"
##
## $sys_info$user
## [1] "john"
##
## $sys_info$effective_user
## [1] "john"
##
##
## $platform_info
## $platform_info$OS.type
## [1] "unix"
##
## $platform_info$file.sep
## [1] "/"
##
## $platform_info$dynlib.ext
## [1] ".so"
##
## $platform_info$GUI
## [1] "X11"
##
## $platform_info$endian
## [1] "little"
##
## $platform_info$pkgType
## [1] "source"
##
## $platform_info$path.sep
## [1] ":"
##
## $platform_info$r_arch
## [1] ""
##
##
## $r_version
## $r_version$platform
## [1] "x86_64-pc-linux-gnu"
##
```

```
## $r_version$arch
## [1] "x86_64"
##
## $r_version$os
## [1] "linux-gnu"
##
## $r_version$system
## [1] "x86_64, linux-gnu"
##
## $r_version$status
## [1] ""
##
## $r_version$major
## [1] "4"
##
## $r_version$minor
## [1] "1.0"
##
## $r_version$year
## [1] "2021"
##
## $r_version$month
## [1] "05"
##
## $r_version$day
## [1] "18"
##
## $r_version$`svn rev`
## [1] "80317"
##
## $r_version$language
## [1] "R"
##
## $r_version$version.string
## [1] "R version 4.1.0 (2021-05-18)"
##
## $r_version$nickname
## [1] "Camp Pontanezen"
##
##
## $ram
## 33.5 GB
##
## $cpu
## $cpu$vendor_id
## [1] "GenuineIntel"
##
## $cpu$model_name
## [1] "Intel(R) Core(TM) i5-10400 CPU @ 2.90GHz"
##
## $cpu$no_of_cores
## [1] 12
##
##
```

```
## $byte_compiler
## byte_optimize
##             2
##
## $linear_algebra
## $linear_algebra$blas
## [1] "/usr/lib/x86_64-linux-gnu/openblas-pthread/libblas.so.3"
##
## $linear_algebra$lapack
## [1] "/usr/lib/x86_64-linux-gnu/openblas-pthread/liblapack.so.3"
##
##
## $locale
## [1] "LC_CTYPE=en_CA.UTF-8;LC_NUMERIC=C;LC_TIME=en_CA.UTF-8;LC_COLLATE=en_CA.UTF-8;LC_MONETARY=en_CA.U
##
## $installed_packages
##                     Package
## askpass             "askpass"
## benchmarkme         "benchmarkme"
## benchmarkmeData     "benchmarkmeData"
## caracas             "caracas"
## curl                "curl"
## doParallel          "doParallel"
## dplyr               "dplyr"
## foreach             "foreach"
## freetypeharfbuzz    "freetypeharfbuzz"
## generics            "generics"
## httr                "httr"
## iterators           "iterators"
## microbenchmark      "microbenchmark"
## minpack.lm          "minpack.lm"
## nlmrt               "nlmrt"
## nlsalt              "nlsalt"
## nlspkg              "nlspkg"
## nlsr                "nlsr"
## numDeriv            "numDeriv"
## openssl             "openssl"
## png                 "png"
## pryr                "pryr"
## purrr               "purrr"
## rappdirs            "rappdirs"
## reticulate          "reticulate"
## sys                 "sys"
## tidyselect          "tidyselect"
## base64enc           "base64enc"
## brio                "brio"
## cairoDevice         "cairoDevice"
## callr               "callr"
## cli                 "cli"
## cpp11               "cpp11"
## crayon              "crayon"
## data.table          "data.table"
## desc                "desc"
## diffobj             "diffobj"
```

```
## digest            "digest"
## ellipsis          "ellipsis"
## evaluate          "evaluate"
## fansi             "fansi"
## flextable         "flextable"
## fontBitstreamVera "fontBitstreamVera"
## fontLiberation    "fontLiberation"
## fontquiver        "fontquiver"
## freetypeharfbuzz  "freetypeharfbuzz"
## gdtools           "gdtools"
## glue              "glue"
## highr             "highr"
## htmltools         "htmltools"
## htmlwidgets       "htmlwidgets"
## jsonlite          "jsonlite"
## knitr             "knitr"
## lifecycle         "lifecycle"
## magrittr          "magrittr"
## markdown          "markdown"
## mime              "mime"
## officer           "officer"
## pillar            "pillar"
## pkgconfig         "pkgconfig"
## pkgload           "pkgload"
## praise            "praise"
## processx          "processx"
## ps                "ps"
## R6                "R6"
## Rcpp              "Rcpp"
## rematch2          "rematch2"
## rJava             "rJava"
## rjson             "rjson"
## rJython           "rJython"
## rlang             "rlang"
## rmarkdown         "rmarkdown"
## rprojroot         "rprojroot"
## rstudioapi        "rstudioapi"
## rSymPy            "rSymPy"
## stringi           "stringi"
## stringr           "stringr"
## systemfonts       "systemfonts"
## testthat          "testthat"
## tibble            "tibble"
## tinytex           "tinytex"
## utf8              "utf8"
## uuid              "uuid"
## vctrs             "vctrs"
## waldo             "waldo"
## withr             "withr"
## xfun              "xfun"
## xml2              "xml2"
## yaml              "yaml"
## zip               "zip"
## 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"
## utils             "utils"
##                   LibPath                                          Version
## askpass           "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.1"
## benchmarkme       "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.0.7"
## benchmarkmeData   "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.0.4"
## caracas           "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.1.0"
## curl              "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "4.3.1"
## doParallel        "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.0.16"
## dplyr             "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.0.6"
## foreach           "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.5.1"
## freetypeharfbuzz  "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.2.6"
## generics          "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.1.0"
## httr              "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.4.2"
## iterators         "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.0.13"
## microbenchmark    "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.4-7"
## minpack.lm        "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.2-1"
## nlmrt             "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "2016.3.2"
## nlsalt            "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.1.0"
## nlspkg            "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.1.0"
## nlsr              "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "2019.9.7"
## numDeriv          "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "2016.8-1.1"
## openssl           "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.4.4"
## png               "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.1-7"
## pryr              "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.1.4"
## purrr             "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.3.4"
## rappdirs          "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "0.3.3"
## reticulate        "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.20"
```

```
## sys                "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "3.4"
## tidyselect         "/home/john/R/x86_64-pc-linux-gnu-library/4.1" "1.1.1"
## base64enc          "/usr/lib/R/site-library"                      "0.1-3"
## brio               "/usr/lib/R/site-library"                      "1.1.2"
## cairoDevice        "/usr/lib/R/site-library"                      "2.28.2"
## callr              "/usr/lib/R/site-library"                      "3.7.0"
## cli                "/usr/lib/R/site-library"                      "2.5.0"
## cpp11              "/usr/lib/R/site-library"                      "0.2.7"
## crayon             "/usr/lib/R/site-library"                      "1.4.1"
## data.table         "/usr/lib/R/site-library"                      "1.14.0"
## desc               "/usr/lib/R/site-library"                      "1.3.0"
## diffobj            "/usr/lib/R/site-library"                      "0.3.4"
## digest             "/usr/lib/R/site-library"                      "0.6.27"
## ellipsis           "/usr/lib/R/site-library"                      "0.3.2"
## evaluate           "/usr/lib/R/site-library"                      "0.14"
## fansi              "/usr/lib/R/site-library"                      "0.5.0"
## flextable          "/usr/lib/R/site-library"                      "0.6.6"
## fontBitstreamVera  "/usr/lib/R/site-library"                      "0.1.1"
## fontLiberation     "/usr/lib/R/site-library"                      "0.1.0"
## fontquiver         "/usr/lib/R/site-library"                      "0.2.1"
## freetypeharfbuzz   "/usr/lib/R/site-library"                      "0.2.5"
## gdtools            "/usr/lib/R/site-library"                      "0.2.3"
## glue               "/usr/lib/R/site-library"                      "1.4.2"
## highr              "/usr/lib/R/site-library"                      "0.9"
## htmltools          "/usr/lib/R/site-library"                      "0.5.1.1"
## htmlwidgets        "/usr/lib/R/site-library"                      "1.5.3"
## jsonlite           "/usr/lib/R/site-library"                      "1.7.2"
## knitr              "/usr/lib/R/site-library"                      "1.33"
## lifecycle          "/usr/lib/R/site-library"                      "1.0.0"
## magrittr           "/usr/lib/R/site-library"                      "2.0.1"
## markdown           "/usr/lib/R/site-library"                      "1.1"
## mime               "/usr/lib/R/site-library"                      "0.10"
## officer            "/usr/lib/R/site-library"                      "0.3.18"
## pillar             "/usr/lib/R/site-library"                      "1.6.1"
## pkgconfig          "/usr/lib/R/site-library"                      "2.0.3"
## pkgload            "/usr/lib/R/site-library"                      "1.2.1"
## praise             "/usr/lib/R/site-library"                      "1.0.0"
## processx           "/usr/lib/R/site-library"                      "3.5.2"
## ps                 "/usr/lib/R/site-library"                      "1.6.0"
## R6                 "/usr/lib/R/site-library"                      "2.5.0"
## Rcpp               "/usr/lib/R/site-library"                      "1.0.6"
## rematch2           "/usr/lib/R/site-library"                      "2.1.2"
## rJava              "/usr/lib/R/site-library"                      "1.0-4"
## rjson              "/usr/lib/R/site-library"                      "0.2.20"
## rJython            "/usr/lib/R/site-library"                      "0.0-4"
## rlang              "/usr/lib/R/site-library"                      "0.4.11"
## rmarkdown          "/usr/lib/R/site-library"                      "2.8"
## rprojroot          "/usr/lib/R/site-library"                      "2.0.2"
## rstudioapi         "/usr/lib/R/site-library"                      "0.13"
## rSymPy             "/usr/lib/R/site-library"                      "0.2-1.2"
## stringi            "/usr/lib/R/site-library"                      "1.6.2"
## stringr            "/usr/lib/R/site-library"                      "1.4.0"
## systemfonts        "/usr/lib/R/site-library"                      "1.0.2"
## testthat           "/usr/lib/R/site-library"                      "3.0.2"
```

```
## tibble              "/usr/lib/R/site-library"              "3.1.2"
## tinytex             "/usr/lib/R/site-library"              "0.32"
## utf8                "/usr/lib/R/site-library"              "1.2.1"
## uuid                "/usr/lib/R/site-library"              "0.1-4"
## vctrs               "/usr/lib/R/site-library"              "0.3.8"
## waldo               "/usr/lib/R/site-library"              "0.2.5"
## withr               "/usr/lib/R/site-library"              "2.4.2"
## xfun                "/usr/lib/R/site-library"              "0.23"
## xml2                "/usr/lib/R/site-library"              "1.3.2"
## yaml                "/usr/lib/R/site-library"              "2.2.1"
## zip                 "/usr/lib/R/site-library"              "2.2.0"
## base                "/usr/lib/R/library"                   "4.1.0"
## boot                "/usr/lib/R/library"                   "1.3-28"
## class               "/usr/lib/R/library"                   "7.3-19"
## cluster             "/usr/lib/R/library"                   "2.1.2"
## codetools           "/usr/lib/R/library"                   "0.2-18"
## compiler            "/usr/lib/R/library"                   "4.1.0"
## datasets            "/usr/lib/R/library"                   "4.1.0"
## foreign             "/usr/lib/R/library"                   "0.8-81"
## graphics            "/usr/lib/R/library"                   "4.1.0"
## grDevices           "/usr/lib/R/library"                   "4.1.0"
## grid                "/usr/lib/R/library"                   "4.1.0"
## KernSmooth          "/usr/lib/R/library"                   "2.23-20"
## lattice             "/usr/lib/R/library"                   "0.20-44"
## MASS                "/usr/lib/R/library"                   "7.3-54"
## Matrix              "/usr/lib/R/library"                   "1.3-4"
## methods             "/usr/lib/R/library"                   "4.1.0"
## mgcv                "/usr/lib/R/library"                   "1.8-36"
## nlme                "/usr/lib/R/library"                   "3.1-152"
## nnet                "/usr/lib/R/library"                   "7.3-16"
## parallel            "/usr/lib/R/library"                   "4.1.0"
## rpart               "/usr/lib/R/library"                   "4.1-15"
## spatial             "/usr/lib/R/library"                   "7.3-14"
## splines             "/usr/lib/R/library"                   "4.1.0"
## stats               "/usr/lib/R/library"                   "4.1.0"
## stats4              "/usr/lib/R/library"                   "4.1.0"
## survival            "/usr/lib/R/library"                   "3.2-11"
## tcltk               "/usr/lib/R/library"                   "4.1.0"
## tools               "/usr/lib/R/library"                   "4.1.0"
## utils               "/usr/lib/R/library"                   "4.1.0"
##                     Priority
## askpass             NA
## benchmarkme         NA
## benchmarkmeData     NA
## caracas             NA
## curl                NA
## doParallel          NA
## dplyr               NA
## foreach             NA
## freetypeharfbuzz    NA
## generics            NA
## httr                NA
## iterators           NA
## microbenchmark      NA
```

```
## minpack.lm          NA
## nlmrt               NA
## nlsalt              NA
## nlspkg              NA
## nlsr                NA
## numDeriv            NA
## openssl             NA
## png                 NA
## pryr                NA
## purrr               NA
## rappdirs            NA
## reticulate          NA
## sys                 NA
## tidyselect          NA
## base64enc           NA
## brio                NA
## cairoDevice         NA
## callr               NA
## cli                 NA
## cpp11               NA
## crayon              NA
## data.table          NA
## desc                NA
## diffobj             NA
## digest              NA
## ellipsis            NA
## evaluate            NA
## fansi               NA
## flextable           NA
## fontBitstreamVera NA
## fontLiberation      NA
## fontquiver          NA
## freetypeharfbuzz    NA
## gdtools             NA
## glue                NA
## highr               NA
## htmltools           NA
## htmlwidgets         NA
## jsonlite            NA
## knitr               NA
## lifecycle           NA
## magrittr            NA
## markdown            NA
## mime                NA
## officer             NA
## pillar              NA
## pkgconfig           NA
## pkgload             NA
## praise              NA
## processx            NA
## ps                  NA
## R6                  NA
## Rcpp                NA
## rematch2            NA
```

```
## rJava              NA
## rjson              NA
## rJython            NA
## rlang              NA
## rmarkdown          NA
## rprojroot          NA
## rstudioapi         NA
## rSymPy             NA
## stringi            NA
## stringr            NA
## systemfonts        NA
## testthat           NA
## tibble             NA
## tinytex            NA
## utf8               NA
## uuid               NA
## vctrs              NA
## waldo              NA
## withr              NA
## xfun               NA
## xml2               NA
## yaml               NA
## zip                NA
## base               "base"
## boot               "recommended"
## class              "recommended"
## cluster            "recommended"
## codetools          "recommended"
## compiler           "base"
## datasets           "base"
## foreign            "recommended"
## graphics           "base"
## grDevices          "base"
## grid               "base"
## KernSmooth         "recommended"
## lattice            "recommended"
## MASS               "recommended"
## Matrix             "recommended"
## methods            "base"
## mgcv               "recommended"
## nlme               "recommended"
## nnet               "recommended"
## parallel           "base"
## rpart              "recommended"
## spatial            "recommended"
## splines            "base"
## stats              "base"
## stats4             "base"
## survival           "recommended"
## tcltk              "base"
## tools              "base"
## utils              "base"
##                    Depends
## askpass            NA
```

```
## benchmarkme      "R (>= 3.5.0)"
## benchmarkmeData  "R (>= 3.5.0)"
## caracas          "R (>= 3.0), methods"
## curl             "R (>= 3.0.0)"
## doParallel       "R (>= 2.14.0), foreach(>= 1.2.0), iterators(>= 1.0.0),\nparallel, utils"
## dplyr            "R (>= 3.3.0)"
## foreach          "R (>= 2.5.0)"
## freetypeharfbuzz "R (>= 3.2)"
## generics         "R (>= 3.1)"
## httr             "R (>= 3.2)"
## iterators        "R (>= 2.5.0), utils"
## microbenchmark   NA
## minpack.lm       NA
## nlmrt            "R (>= 2.15.0)"
## nlsalt           NA
## nlspkg           NA
## nlsr             "R (>= 3.0)"
## numDeriv         "R (>= 2.11.1)"
## openssl          NA
## png              "R (>= 2.9.0)"
## pryr             "R (>= 3.1.0)"
## purrr            "R (>= 3.2)"
## rappdirs         "R (>= 3.2)"
## reticulate       "R (>= 3.0)"
## sys              NA
## tidyselect       "R (>= 3.2)"
## base64enc        "R (>= 2.9.0)"
## brio             NA
## cairoDevice      "R (>= 2.12.0)"
## callr            NA
## cli              "R (>= 2.10)"
## cpp11            NA
## crayon           NA
## data.table       "R (>= 3.1.0)"
## desc             "R (>= 3.1.0)"
## diffobj          "R (>= 3.1.0)"
## digest           "R (>= 3.3.0)"
## ellipsis         "R (>= 3.2)"
## evaluate         "R (>= 3.0.2)"
## fansi            "R (>= 3.1.0)"
## flextable        NA
## fontBitstreamVera "R (>= 3.0.0)"
## fontLiberation   "R (>= 3.0)"
## fontquiver       "R (>= 3.0.0)"
## freetypeharfbuzz "R (>= 3.2)"
## gdtools          NA
## glue             "R (>= 3.2)"
## highr            "R (>= 3.2.3)"
## htmltools        "R (>= 2.14.1)"
## htmlwidgets      NA
## jsonlite         "methods"
## knitr            "R (>= 3.2.3)"
## lifecycle        "R (>= 3.3)"
## magrittr         NA
```

```
## markdown         "R (>= 2.11.1)"
## mime             NA
## officer          NA
## pillar           NA
## pkgconfig        NA
## pkgload          NA
## praise           NA
## processx         NA
## ps               "R (>= 3.1)"
## R6               "R (>= 3.0)"
## Rcpp             NA
## rematch2         NA
## rJava            "R (>= 3.6.0), methods"
## rjson            "R (>= 3.1.0)"
## rJython          "rJava (>= 0.8-1), rjson (>= 0.1.9)"
## rlang            "R (>= 3.3.0)"
## rmarkdown        "R (>= 3.0)"
## rprojroot        "R (>= 3.0.0)"
## rstudioapi       NA
## rSymPy           "rJython"
## stringi          "R (>= 3.1)"
## stringr          "R (>= 3.1)"
## systemfonts      "R (>= 3.2.0)"
## testthat         "R (>= 3.1)"
## tibble           "R (>= 3.1.0)"
## tinytex          NA
## utf8             "R (>= 2.10)"
## uuid             "R (>= 2.9.0)"
## vctrs            "R (>= 3.3)"
## waldo            NA
## withr            "R (>= 3.2.0)"
## xfun             NA
## xml2             "R (>= 3.1.0)"
## yaml             NA
## zip              NA
## base             NA
## boot             "R (>= 3.0.0), graphics, stats"
## class            "R (>= 3.0.0), stats, utils"
## cluster          "R (>= 3.4.0)"
## 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 (>= 3.4.0)"
## 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
## utils              NA
##                    Imports
## askpass            "sys (>= 2.1)"
## benchmarkme        "benchmarkmeData (>= 1.0.4), compiler, doParallel, dplyr,\nforeach, graphics, httr
## benchmarkmeData    "dplyr, graphics, tibble, utils"
## caracas            "reticulate (>= 1.14), magrittr"
## curl               NA
## doParallel         NA
## dplyr              "ellipsis, generics, glue (>= 1.3.2), lifecycle (>= 1.0.0),\nmagrittr (>= 1.5), me
## foreach            "codetools, utils, iterators"
## freetypeharfbuzz   "fontquiver"
## generics           "methods"
## httr               "curl (>= 3.0.0), jsonlite, mime, openssl (>= 0.8), R6"
## iterators          NA
## microbenchmark     "graphics, stats"
## minpack.lm         NA
## nlmrt              NA
## nlsalt             "graphics, stats"
## nlspkg             "graphics, stats"
## nlsr               "digest"
## numDeriv           NA
## openssl            "askpass"
## png                NA
## pryr               "stringr, codetools, methods, Rcpp (>= 0.11.0)"
## purrr              "magrittr (>= 1.5), rlang (>= 0.3.1)"
## rappdirs           NA
## reticulate         "Matrix, Rcpp (>= 0.12.7), graphics, jsonlite, methods, png,\nrappdirs, utils, wit
## sys                NA
## tidyselect         "ellipsis, glue (>= 1.3.0), purrr (>= 0.3.2), rlang (>= 0.4.6),\nvctrs (>= 0.3.0)"
## base64enc          NA
## brio               NA
## cairoDevice        "grDevices"
## callr              "processx (>= 3.5.0), R6, utils"
## cli                "glue, utils"
## cpp11              NA
## crayon             "grDevices, methods, utils"
## data.table         "methods"
## desc               "utils, R6, crayon, rprojroot"
## diffobj            "crayon (>= 1.3.2), tools, methods, utils, stats"
## digest             "utils"
## ellipsis           "rlang (>= 0.3.0)"
## evaluate           "methods"
## fansi              "grDevices, utils"
## flextable          "stats, utils, grDevices, graphics, officer (>= 0.3.17),\nrmarkdown, knitr, htmlto
## fontBitstreamVera  NA
```

```
## fontLiberation    NA
## fontquiver         "fontBitstreamVera (>= 0.1.0), fontLiberation (>= 0.1.0)"
## freetypeharfbuzz   "fontquiver"
## gdtools            "Rcpp (>= 0.12.12), systemfonts (>= 0.1.1)"
## glue               "methods"
## highr              "xfun (>= 0.18)"
## htmltools          "utils, digest, grDevices, base64enc, rlang"
## htmlwidgets        "grDevices, htmltools (>= 0.3), jsonlite (>= 0.9.16), yaml"
## jsonlite           NA
## knitr              "evaluate (>= 0.10), highr, methods, markdown, stringr (>=\n0.6), yaml (>= 2.1.19)
## lifecycle          "glue, rlang (>= 0.4.10)"
## magrittr           NA
## markdown           "utils, xfun, mime (>= 0.3)"
## mime               "tools"
## officer            "R6, grDevices, stats, graphics, utils, zip (>= 2.1.0), uuid\n(>= 0.1-4), xml2 (>=
## pillar             "cli, crayon (>= 1.3.4), ellipsis (>= 0.3.2), fansi, lifecycle,\nrlang (>= 0.3.0),
## pkgconfig          "utils"
## pkgload            "cli, crayon, desc, methods, rlang, rprojroot, rstudioapi,\nutils, withr"
## praise             NA
## processx           "ps (>= 1.2.0), R6, utils"
## ps                 "utils"
## R6                 NA
## Rcpp               "methods, utils"
## rematch2           "tibble"
## rJava              NA
## rjson              NA
## rJython            NA
## rlang              "utils"
## rmarkdown          "tools, utils, knitr (>= 1.22), yaml (>= 2.1.19), htmltools (>=\n0.3.5), evaluate
## rprojroot          NA
## rstudioapi         NA
## rSymPy             NA
## stringi            "tools, utils, stats"
## stringr            "glue (>= 1.2.0), magrittr, stringi (>= 1.1.7)"
## systemfonts        NA
## testthat           "brio, callr (>= 3.5.1), cli (>= 2.2.0), crayon (>= 1.3.4),\ndesc, digest, ellipsi
## tibble             "ellipsis (>= 0.3.2), fansi (>= 0.4.0), lifecycle (>= 0.2.0),\nmagrittr, methods, 
## tinytex            "xfun (>= 0.23)"
## utf8               NA
## uuid               NA
## vctrs              "ellipsis (>= 0.2.0), glue, rlang (>= 0.4.10)"
## waldo              "cli, diffobj, fansi, glue, methods, rematch2, rlang (>=\n0.4.10), tibble"
## withr              "graphics, grDevices, stats"
## xfun               "stats, tools"
## xml2               "methods"
## yaml               NA
## zip                NA
## 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
## utils            NA
##                  LinkingTo
## askpass          NA
## benchmarkme      NA
## benchmarkmeData  NA
## caracas          NA
## curl             NA
## doParallel       NA
## dplyr            NA
## foreach          NA
## freetypeharfbuzz NA
## generics         NA
## httr             NA
## iterators        NA
## microbenchmark   NA
## minpack.lm       NA
## nlmrt            NA
## nlsalt           NA
## nlspkg           NA
## nlsr             NA
## numDeriv         NA
## openssl          NA
## png              NA
## pryr             "Rcpp"
## purrr            NA
## rappdirs         NA
## reticulate       "Rcpp"
## sys              NA
## tidyselect       NA
## base64enc        NA
## brio             NA
## cairoDevice      NA
## callr            NA
```

```
## cli                 NA
## cpp11               NA
## crayon              NA
## data.table          NA
## desc                NA
## diffobj             NA
## digest              NA
## ellipsis            NA
## evaluate            NA
## fansi               NA
## flextable           NA
## fontBitstreamVera   NA
## fontLiberation      NA
## fontquiver          NA
## freetypeharfbuzz    NA
## gdtools             "Rcpp"
## glue                NA
## highr               NA
## htmltools           NA
## htmlwidgets         NA
## jsonlite            NA
## knitr               NA
## lifecycle           NA
## magrittr            NA
## markdown            NA
## mime                NA
## officer             NA
## pillar              NA
## pkgconfig           NA
## pkgload             NA
## praise              NA
## processx            NA
## ps                  NA
## R6                  NA
## Rcpp                NA
## rematch2            NA
## rJava               NA
## rjson               NA
## rJython             NA
## rlang               NA
## rmarkdown           NA
## rprojroot           NA
## rstudioapi          NA
## rSymPy              NA
## stringi             NA
## stringr             NA
## systemfonts         "cpp11 (>= 0.2.1)"
## testthat            NA
## tibble              NA
## tinytex             NA
## utf8                NA
## uuid                NA
## vctrs               NA
## waldo               NA
```

```
## withr             NA
## xfun              NA
## xml2              NA
## yaml              NA
## zip               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
## utils             NA
##                   Suggests
## askpass           "testthat"
## benchmarkme       "covr, DT, ggplot2, knitr, RcppZiggurat, rmarkdown, testthat"
## benchmarkmeData   "benchmarkme, covr, DT, testthat"
## caracas           "Matrix, testthat (>= 2.1.0), knitr, rmarkdown"
## curl              "spelling, testthat (>= 1.0.0), knitr, jsonlite, rmarkdown,\nmagrittr, httpuv (>=
## doParallel        "caret, mlbench, rpart, RUnit"
## dplyr             "bench, broom, callr, covr, DBI, dbplyr (>= 1.4.3), knitr,\nLahman, lobstr, microb
## foreach           "randomForest, doMC, doParallel, testthat, knitr, rmarkdown"
## freetypeharfbuzz  "covr, testthat"
## generics          "covr, pkgload, testthat, tibble"
## httr              "covr, httpuv, jpeg, knitr, png, readr, rmarkdown, testthat\n(>= 0.8.0), xml2"
## iterators         "RUnit, foreach"
## microbenchmark    "ggplot2, multcomp, RUnit"
## minpack.lm        "MASS"
## nlmrt             "minpack.lm, optimx, Rvmmin, Rcgmin, numDeriv"
## nlsalt            "MASS"
## nlspkg            "MASS"
## nlsr              "minpack.lm, optimx, Rvmmin, Rcgmin, numDeriv, knitr,\nrmarkdown, Ryacas, Deriv"
## numDeriv          NA
```

```
## openssl          "testthat (>= 2.1.0), digest, knitr, rmarkdown, jsonlite,\njose, sodium"
## png              NA
## pryr             "testthat (>= 0.8.0)"
## purrr            "covr, crayon, dplyr (>= 0.7.8), knitr, rmarkdown, testthat,\ntibble, tidyselect"
## rappdirs         "roxygen2, testthat (>= 3.0.0), covr, withr"
## reticulate       "callr, knitr, rmarkdown, testthat"
## sys              "unix (>= 1.4), spelling, testthat"
## tidyselect       "covr, crayon, dplyr, knitr, magrittr, rmarkdown, testthat (>=\n2.3.0), tibble (>=
## base64enc        NA
## brio             "testthat (>= 2.1.0), covr"
## cairoDevice      NA
## callr            "cli, covr, ps, rprojroot, spelling, testthat, withr (>=\n2.3.0)"
## cli              "callr, covr, grDevices, htmlwidgets, knitr, methods, mockery,\nps (>= 1.3.4.9000)
## cpp11            "bench, brio, callr, cli, covr, decor, desc, ggplot2, glue,\nknitr, lobstr, mockery
## crayon           "mockery, rstudioapi, testthat, withr"
## data.table       "bit64 (>= 4.0.0), bit (>= 4.0.4), curl, R.utils, xts,\nnanotime, zoo (>= 1.8-1), 
## desc             "covr, testthat, whoami, withr, spelling, gh"
## diffobj          "knitr, rmarkdown"
## digest           "tinytest, knitr, rmarkdown, minidown"
## ellipsis         "covr, testthat"
## evaluate         "testthat, lattice, ggplot2"
## fansi            "unitizer, knitr, rmarkdown"
## flextable        "testthat (>= 2.1.0), xtable, webshot, magick, ggplot2,\nscales, broom, mgcv, booko
## fontBitstreamVera NA
## fontLiberation   NA
## fontquiver       "testthat, htmltools"
## freetypeharfbuzz "covr, testthat"
## gdtools          "htmltools, testthat, fontquiver (>= 0.2.0), curl"
## glue             "testthat, covr, magrittr, crayon, knitr, rmarkdown, DBI,\nRSQLite, R.utils, forca
## highr            "knitr, markdown, testit"
## htmltools        "markdown, testthat, withr, Cairo, ragg, shiny"
## htmlwidgets      "knitr (>= 1.8), rmarkdown, testthat"
## jsonlite         "httr, curl, plyr, testthat, knitr, rmarkdown, R.rsp, sf"
## knitr            "formatR, testit, digest, rgl (>= 0.95.1201), codetools,\nrmarkdown, htmlwidgets (
## lifecycle        "covr, crayon, knitr, rmarkdown, testthat (>= 3.0.1), tibble"
## magrittr         "covr, knitr, rlang, rmarkdown, testthat"
## markdown         "knitr, RCurl"
## mime             NA
## officer          "testthat, devEMF, ggplot2, rmarkdown, base64enc, knitr, rsvg"
## pillar           "bit64, debugme, DiagrammeR, dplyr, formattable, ggplot2,\nknitr, lubridate, nycfl
## pkgconfig        "covr, testthat, disposables (>= 1.0.3)"
## pkgload          "bitops, covr, pkgbuild, Rcpp, testthat"
## praise           "testthat"
## processx         "callr (>= 3.2.0), cli, codetools, covr, curl, debugme,\nparallel, testthat, withr
## ps               "callr, covr, curl, pingr, processx (>= 3.1.0), R6, rlang,\ntestthat, tibble"
## R6               "knitr, microbenchmark, pryr, testthat, ggplot2, scales"
## Rcpp             "tinytest, inline, rbenchmark, pkgKitten (>= 0.1.2)"
## rematch2         "covr, testthat"
## rJava            NA
## rjson            NA
## rJython          NA
## rlang            "cli, covr, crayon, glue, magrittr, methods, pak, pillar,\nrmarkdown, testthat (>=
## rmarkdown        "shiny (>= 1.6.0), tufte, testthat (>= 3.0.0), digest,\ndygraphs, vctrs, tibble, f
## rprojroot        "covr, knitr, lifecycle, mockr, rmarkdown, testthat (>=\n3.0.0), withr"
```

```
## rstudioapi        "testthat, knitr, rmarkdown, clipr"
## rSymPy            NA
## stringi           NA
## stringr           "covr, htmltools, htmlwidgets, knitr, rmarkdown, testthat"
## systemfonts       "testthat (>= 2.1.0), covr, knitr, rmarkdown, tools"
## testthat          "covr, curl (>= 0.9.5), diffviewer (>= 0.1.0), knitr, mockery,\nrmarkdown, rstudioa
## tibble            "bench, bit64, blob, cli, covr, crayon (>= 1.3.4), DiagrammeR,\ndplyr, evaluate, fo
## tinytex           "testit, rstudioapi"
## utf8              "covr, knitr, rlang, rmarkdown, testthat (>= 3.0.0)"
## uuid              NA
## vctrs             "bit64, covr, crayon, dplyr (>= 0.8.5), generics, knitr,\npillar (>= 1.4.4), pkgdo
## waldo             "testthat (>= 3.0.0), covr, R6"
## withr             "covr, DBI, knitr, lattice, methods, rmarkdown, RSQLite,\ntestthat (>= 2.1.0)"
## xfun              "testit, parallel, codetools, rstudioapi, tinytex (>= 0.30),\nmime, markdown, knit
## xml2              "covr, curl, httr, knitr, magrittr, mockery, rmarkdown,\ntestthat (>= 2.1.0)"
## yaml              "RUnit"
## zip               "covr, processx, R6, testthat, withr"
## base              "methods"
## boot              "MASS, survival"
## class             NA
## cluster           "MASS, Matrix"
## codetools         NA
## compiler          NA
## datasets          NA
## foreign           NA
## graphics          NA
## grDevices         "KernSmooth"
## grid              "lattice"
## KernSmooth        "MASS, carData"
## lattice           "KernSmooth, MASS, latticeExtra"
## MASS              "lattice, nlme, nnet, survival"
## Matrix            "expm, MASS"
## methods           "codetools"
## mgcv              "parallel, survival, MASS"
## nlme              "Hmisc, MASS"
## 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"
## utils             "methods, xml2, commonmark"
##                   Enhances
## askpass           NA
## benchmarkme       NA
## benchmarkmeData   NA
## caracas           NA
## curl              NA
## doParallel        "compiler"
## dplyr             NA
```

```
## foreach            NA
## freetypeharfbuzz   NA
## generics           NA
## httr               NA
## iterators          NA
## microbenchmark     NA
## minpack.lm         NA
## nlmrt              NA
## nlsalt             NA
## nlspkg             NA
## nlsr               NA
## numDeriv           NA
## openssl            NA
## png                NA
## pryr               NA
## purrr              NA
## rappdirs           NA
## reticulate         NA
## sys                NA
## tidyselect         NA
## base64enc          "png"
## brio               NA
## cairoDevice        NA
## callr              NA
## cli                NA
## cpp11              NA
## crayon             NA
## data.table         NA
## desc               NA
## diffobj            NA
## digest             NA
## ellipsis           NA
## evaluate           NA
## fansi              NA
## flextable          NA
## fontBitstreamVera  NA
## fontLiberation     NA
## fontquiver         NA
## freetypeharfbuzz   NA
## gdtools            NA
## glue               NA
## highr              NA
## htmltools          "knitr"
## htmlwidgets        "shiny (>= 1.1)"
## jsonlite           NA
## knitr              NA
## lifecycle          NA
## magrittr           NA
## markdown           NA
## mime               NA
## officer            NA
## pillar             NA
## pkgconfig          NA
## pkgload            NA
```

```
## praise           NA
## processx         NA
## ps               NA
## R6               NA
## Rcpp             NA
## rematch2         NA
## rJava            NA
## rjson            NA
## rJython          NA
## rlang            "winch"
## rmarkdown        NA
## rprojroot        NA
## rstudioapi       NA
## rSymPy           NA
## stringi          NA
## stringr          NA
## systemfonts      NA
## testthat         NA
## tibble           NA
## tinytex          NA
## utf8             NA
## uuid             NA
## vctrs            NA
## waldo            NA
## withr            NA
## xfun             NA
## xml2             NA
## yaml             NA
## zip              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
## utils             NA
##                   License                             License_is_FOSS
## askpass           "MIT + file LICENSE"                NA
## benchmarkme       "GPL-2 | GPL-3"                     NA
## benchmarkmeData   "GPL-2 | GPL-3"                     NA
## caracas           "GPL"                               NA
## curl              "MIT + file LICENSE"                NA
## doParallel        "GPL-2"                             NA
## dplyr             "MIT + file LICENSE"                NA
## foreach           "Apache License (== 2.0)"           NA
## freetypeharfbuzz  "GPL-3 | file LICENSE"              NA
## generics          "MIT + file LICENSE"                NA
## httr              "MIT + file LICENSE"                NA
## iterators         "Apache License (== 2.0)"           NA
## microbenchmark    "BSD_2_clause + file LICENSE"       NA
## minpack.lm        "GPL-3"                             NA
## nlmrt             "GPL-2"                             NA
## nlsalt            "GPL-2"                             NA
## nlspkg            "GPL-2, GPL-3"                      NA
## nlsr              "GPL-2"                             NA
## numDeriv          "GPL-2"                             NA
## openssl           "MIT + file LICENSE"                NA
## png               "GPL-2 | GPL-3"                     NA
## pryr              "GPL-2"                             NA
## purrr             "GPL-3 | file LICENSE"              NA
## rappdirs          "MIT + file LICENSE"                NA
## reticulate        "Apache License 2.0"                NA
## sys               "MIT + file LICENSE"                NA
## tidyselect        "MIT + file LICENSE"                NA
## base64enc         "GPL-2 | GPL-3"                     NA
## brio              "MIT + file LICENSE"                NA
## cairoDevice       "GPL"                               NA
## callr             "MIT + file LICENSE"                NA
## cli               "MIT + file LICENSE"                NA
## cpp11             "MIT + file LICENSE"                NA
## crayon            "MIT + file LICENSE"                NA
## data.table        "MPL-2.0 | file LICENSE"            NA
## desc              "MIT + file LICENSE"                NA
## diffobj           "GPL (>= 2)"                        NA
## digest            "GPL (>= 2)"                        NA
## ellipsis          "MIT + file LICENSE"                NA
## evaluate          "MIT + file LICENSE"                NA
## fansi             "GPL (>= 2)"                        NA
## flextable         "GPL-3"                             NA
## fontBitstreamVera "file LICENCE"                      "yes"
## fontLiberation    "file LICENSE"                      "yes"
## fontquiver        "GPL-3 | file LICENSE"              NA
## freetypeharfbuzz  "GPL-3 | file LICENSE"              NA
## gdtools           "GPL-3 | file LICENSE"              NA
## glue              "MIT + file LICENSE"                NA
## highr             "GPL"                               NA
```

```
## htmltools         "GPL (>= 2)"                              NA
## htmlwidgets       "MIT + file LICENSE"                      NA
## jsonlite          "MIT + file LICENSE"                      NA
## knitr             "GPL"                                     NA
## lifecycle         "MIT + file LICENSE"                      NA
## magrittr          "MIT + file LICENSE"                      NA
## markdown          "GPL-2"                                   NA
## mime              "GPL"                                     NA
## officer           "GPL-3"                                   NA
## pillar            "MIT + file LICENSE"                      NA
## pkgconfig         "MIT + file LICENSE"                      NA
## pkgload           "GPL-3"                                   NA
## praise            "MIT + file LICENSE"                      NA
## processx          "MIT + file LICENSE"                      NA
## ps                "MIT + file LICENSE"                      NA
## R6                "MIT + file LICENSE"                      NA
## Rcpp              "GPL (>= 2)"                              NA
## rematch2          "MIT + file LICENSE"                      NA
## rJava             "LGPL-2.1"                                NA
## rjson             "GPL-2"                                   NA
## rJython           "GPL (>= 2)"                              NA
## rlang             "MIT + file LICENSE"                      NA
## rmarkdown         "GPL-3"                                   NA
## rprojroot         "MIT + file LICENSE"                      NA
## rstudioapi        "MIT + file LICENSE"                      NA
## rSymPy            "GPL"                                     NA
## stringi           "file LICENSE"                            "yes"
## stringr           "GPL-2 | file LICENSE"                    NA
## systemfonts       "MIT + file LICENSE"                      NA
## testthat          "MIT + file LICENSE"                      NA
## tibble            "MIT + file LICENSE"                      NA
## tinytex           "MIT + file LICENSE"                      NA
## utf8              "Apache License (== 2.0) | file LICENSE" NA
## uuid              "MIT + file LICENSE"                      NA
## vctrs             "MIT + file LICENSE"                      NA
## waldo             "MIT + file LICENSE"                      NA
## withr             "MIT + file LICENSE"                      NA
## xfun              "MIT + file LICENSE"                      NA
## xml2              "GPL (>= 2)"                              NA
## yaml              "BSD_3_clause + file LICENSE"             NA
## zip               "MIT + file LICENSE"                      NA
## base              "Part of R 4.1.0"                         NA
## boot              "Unlimited"                               NA
## class             "GPL-2 | GPL-3"                           NA
## cluster           "GPL (>= 2)"                              NA
## codetools         "GPL"                                     NA
## compiler          "Part of R 4.1.0"                         NA
## datasets          "Part of R 4.1.0"                         NA
## foreign           "GPL (>= 2)"                              NA
## graphics          "Part of R 4.1.0"                         NA
## grDevices         "Part of R 4.1.0"                         NA
## grid              "Part of R 4.1.0"                         NA
## KernSmooth        "Unlimited"                               NA
## lattice           "GPL (>= 2)"                              NA
```

```
## MASS              "GPL-2 | GPL-3"                              NA
## Matrix            "GPL (>= 2) | file LICENCE"                  NA
## methods           "Part of R 4.1.0"                            NA
## mgcv              "GPL (>= 2)"                                 NA
## nlme              "GPL (>= 2) | file LICENCE"                  NA
## nnet              "GPL-2 | GPL-3"                              NA
## parallel          "Part of R 4.1.0"                            NA
## rpart             "GPL-2 | GPL-3"                              NA
## spatial           "GPL-2 | GPL-3"                              NA
## splines           "Part of R 4.1.0"                            NA
## stats             "Part of R 4.1.0"                            NA
## stats4            "Part of R 4.1.0"                            NA
## survival          "LGPL (>= 2)"                                NA
## tcltk             "Part of R 4.1.0"                            NA
## tools             "Part of R 4.1.0"                            NA
## utils             "Part of R 4.1.0"                            NA
##                   License_restricts_use OS_type MD5sum NeedsCompilation Built
## askpass           NA                    NA      NA     "yes"            "4.1.0"
## benchmarkme       NA                    NA      NA     "no"             "4.1.0"
## benchmarkmeData   NA                    NA      NA     "no"             "4.1.0"
## caracas           NA                    NA      NA     "no"             "4.1.0"
## curl              NA                    NA      NA     "yes"            "4.1.0"
## doParallel        NA                    NA      NA     "no"             "4.1.0"
## dplyr             NA                    NA      NA     "yes"            "4.1.0"
## foreach           NA                    NA      NA     "no"             "4.1.0"
## freetypeharfbuzz  NA                    NA      NA     "yes"            "4.1.0"
## generics          NA                    NA      NA     "no"             "4.1.0"
## httr              NA                    NA      NA     "no"             "4.1.0"
## iterators         NA                    NA      NA     "no"             "4.1.0"
## microbenchmark    NA                    NA      NA     "yes"            "4.1.0"
## minpack.lm        NA                    NA      NA     "yes"            "4.1.0"
## nlmrt             NA                    NA      NA     "no"             "4.1.0"
## nlsalt            NA                    NA      NA     NA               "4.1.0"
## nlspkg            NA                    NA      NA     NA               "4.1.0"
## nlsr              NA                    NA      NA     "no"             "4.1.0"
## numDeriv          NA                    NA      NA     "no"             "4.1.0"
## openssl           NA                    NA      NA     "yes"            "4.1.0"
## png               NA                    NA      NA     "yes"            "4.1.0"
## pryr              NA                    NA      NA     "yes"            "4.1.0"
## purrr             NA                    NA      NA     "yes"            "4.1.0"
## rappdirs          NA                    NA      NA     "yes"            "4.1.0"
## reticulate        NA                    NA      NA     "yes"            "4.1.0"
## sys               NA                    NA      NA     "yes"            "4.1.0"
## tidyselect        NA                    NA      NA     "yes"            "4.1.0"
## base64enc         NA                    NA      NA     "yes"            "4.0.0"
## brio              NA                    NA      NA     "yes"            "4.0.5"
## cairoDevice       NA                    NA      NA     "yes"            "4.0.2"
## callr             NA                    NA      NA     "no"             "4.0.5"
## cli               NA                    NA      NA     "no"             "4.0.5"
## cpp11             NA                    NA      NA     "no"             "4.0.4"
## crayon            NA                    NA      NA     "no"             "4.0.3"
## data.table        NA                    NA      NA     "yes"            "4.0.4"
## desc              NA                    NA      NA     "no"             "4.0.4"
## diffobj           NA                    NA      NA     "yes"            "4.0.4"
```

```
## digest              NA                     NA   NA   "yes"   "4.0.3"
## ellipsis            NA                     NA   NA   "yes"   "4.0.5"
## evaluate            NA                     NA   NA   "no"    "4.0.0"
## fansi               NA                     NA   NA   "yes"   "4.1.0"
## flextable           NA                     NA   NA   "no"    "4.0.5"
## fontBitstreamVera   NA                     NA   NA   "no"    "4.0.0"
## fontLiberation      NA                     NA   NA   "no"    "4.0.0"
## fontquiver          NA                     NA   NA   "no"    "4.0.0"
## freetypeharfbuzz    NA                     NA   NA   "yes"   "4.0.0"
## gdtools             NA                     NA   NA   "yes"   "4.0.3"
## glue                NA                     NA   NA   "yes"   "4.0.2"
## highr               NA                     NA   NA   "no"    "4.0.5"
## htmltools           NA                     NA   NA   "yes"   "4.0.3"
## htmlwidgets         NA                     NA   NA   "no"    "4.0.3"
## jsonlite            NA                     NA   NA   "yes"   "4.0.3"
## knitr               NA                     NA   NA   "no"    "4.0.5"
## lifecycle           NA                     NA   NA   "no"    "4.0.4"
## magrittr            NA                     NA   NA   "yes"   "4.0.3"
## markdown            NA                     NA   NA   "yes"   "4.0.0"
## mime                NA                     NA   NA   "yes"   "4.0.3"
## officer             NA                     NA   NA   "no"    "4.0.5"
## pillar              NA                     NA   NA   "no"    "4.0.5"
## pkgconfig           NA                     NA   NA   "no"    "4.0.0"
## pkgload             NA                     NA   NA   "yes"   "4.0.5"
## praise              NA                     NA   NA   "no"    "4.0.0"
## processx            NA                     NA   NA   "yes"   "4.0.5"
## ps                  NA                     NA   NA   "yes"   "4.0.4"
## R6                  NA                     NA   NA   "no"    "4.0.3"
## Rcpp                NA                     NA   NA   "yes"   "4.0.5"
## rematch2            NA                     NA   NA   "no"    "4.0.0"
## rJava               NA                     NA   NA   "yes"   "4.0.5"
## rjson               NA                     NA   NA   "yes"   "4.0.0"
## rJython             NA                     NA   NA   NA      "4.0.0"
## rlang               NA                     NA   NA   "yes"   "4.0.5"
## rmarkdown           NA                     NA   NA   "no"    "4.0.5"
## rprojroot           NA                     NA   NA   "no"    "4.0.3"
## rstudioapi          NA                     NA   NA   "no"    "4.0.3"
## rSymPy              NA                     NA   NA   "no"    "4.0.0"
## stringi             NA                     NA   NA   "yes"   "4.0.5"
## stringr             NA                     NA   NA   "no"    "4.0.0"
## systemfonts         NA                     NA   NA   "yes"   "4.0.5"
## testthat            NA                     NA   NA   "yes"   "4.0.4"
## tibble              NA                     NA   NA   "yes"   "4.0.5"
## tinytex             NA                     NA   NA   "no"    "4.1.0"
## utf8                NA                     NA   NA   "yes"   "4.0.4"
## uuid                NA                     NA   NA   "yes"   "4.0.0"
## vctrs               NA                     NA   NA   "yes"   "4.0.5"
## waldo               NA                     NA   NA   "no"    "4.0.4"
## withr               NA                     NA   NA   "no"    "4.0.5"
## xfun                NA                     NA   NA   "yes"   "4.0.5"
## xml2                NA                     NA   NA   "yes"   "4.0.0"
## yaml                NA                     NA   NA   "yes"   "4.0.0"
## zip                 NA                     NA   NA   "yes"   "4.1.0"
## base                NA                     NA   NA   NA      "4.1.0"
```

```
## boot           NA              NA    NA    "no"    "4.0.5"
## class          NA              NA    NA    "yes"   "4.0.5"
## cluster        NA              NA    NA    "yes"   "4.0.5"
## codetools      NA              NA    NA    "no"    "4.0.3"
## compiler       NA              NA    NA    NA      "4.1.0"
## datasets       NA              NA    NA    NA      "4.1.0"
## foreign        NA              NA    NA    "yes"   "4.0.3"
## graphics       NA              NA    NA    "yes"   "4.1.0"
## grDevices      NA              NA    NA    "yes"   "4.1.0"
## grid           NA              NA    NA    "yes"   "4.1.0"
## KernSmooth     NA              NA    NA    "yes"   "4.0.5"
## lattice        NA              NA    NA    "yes"   "4.1.0"
## MASS           NA              NA    NA    "yes"   "4.0.5"
## Matrix         NA              NA    NA    "yes"   "4.1.0"
## methods        NA              NA    NA    "yes"   "4.1.0"
## mgcv           NA              NA    NA    "yes"   "4.1.0"
## nlme           NA              NA    NA    "yes"   "4.0.3"
## nnet           NA              NA    NA    "yes"   "4.0.5"
## parallel       NA              NA    NA    "yes"   "4.1.0"
## rpart          NA              NA    NA    "yes"   "4.0.0"
## spatial        NA              NA    NA    "yes"   "4.0.5"
## splines        NA              NA    NA    "yes"   "4.1.0"
## stats          NA              NA    NA    "yes"   "4.1.0"
## stats4         NA              NA    NA    NA      "4.1.0"
## survival       NA              NA    NA    "yes"   "4.0.5"
## tcltk          NA              NA    NA    "yes"   "4.1.0"
## tools          NA              NA    NA    "yes"   "4.1.0"
## utils          NA              NA    NA    "yes"   "4.1.0"
## 
## $machine
## $machine$double.eps
## [1] 2.220446e-16
## 
## $machine$double.neg.eps
## [1] 1.110223e-16
## 
## $machine$double.xmin
## [1] 2.225074e-308
## 
## $machine$double.xmax
## [1] 1.797693e+308
## 
## $machine$double.base
## [1] 2
## 
## $machine$double.digits
## [1] 53
## 
## $machine$double.rounding
## [1] 5
## 
## $machine$double.guard
## [1] 0
## 
```

```
## $machine$double.ulp.digits
## [1] -52
##
## $machine$double.neg.ulp.digits
## [1] -53
##
## $machine$double.exponent
## [1] 11
##
## $machine$double.min.exp
## [1] -1022
##
## $machine$double.max.exp
## [1] 1024
##
## $machine$integer.max
## [1] 2147483647
##
## $machine$sizeof.long
## [1] 8
##
## $machine$sizeof.longlong
## [1] 8
##
## $machine$sizeof.longdouble
## [1] 16
##
## $machine$sizeof.pointer
## [1] 8
##
## $machine$longdouble.eps
## [1] 1.084202e-19
##
## $machine$longdouble.neg.eps
## [1] 5.421011e-20
##
## $machine$longdouble.digits
## [1] 64
##
## $machine$longdouble.rounding
## [1] 5
##
## $machine$longdouble.guard
## [1] 0
##
## $machine$longdouble.ulp.digits
## [1] -63
##
## $machine$longdouble.neg.ulp.digits
## [1] -64
##
## $machine$longdouble.exponent
## [1] 15
##
```

```
## $machine$longdouble.min.exp
## [1] -16382
##
## $machine$longdouble.max.exp
## [1] 16384
##
##
## $package_version
## [1] "1.0.7"
##
## $id
## [1] "2021-06-09-68149061"
##
## $date
## [1] "2021-06-09"
```

calceps.R

This is a port of Mike Malcolm's ENVRON to R. ??ref. It computes the machine precision, radix and number of radix digits.

?? get file into chunk

`calceps.R`

- calceps.R example

Sys.info()

````r
Sys.info()
````

```
##                                 sysname
##                                 "Linux"
##                                 release
##                       "5.4.0-74-generic"
##                                 version
## "#83-Ubuntu SMP Sat May 8 02:35:39 UTC 2021"
##                                nodename
##                                   "M21"
##                                 machine
##                                "x86_64"
##                                   login
##                               "unknown"
##                                    user
##                                  "john"
##                          effective_user
##                                  "john"
```

Issues relateing to RNG

Issues relating to compilation of R

- LAPACK

- BLAS
- others?

Tools for accessing and clearing environments and dataframes

?? should this be here – probably to list things in the workspace

```
sys.frame()
sys.frames()
sys.status()
sys.on.exit()
sys.parents()
sys.calls()
```

??JN exp(sin(cos())) benchmark