CODECHECK certificate 2025-024

https://zenodo.org/record/17059066

Item	Value
Title of checked publication	ClockBoard: A zoning system for urban analysis
Author(s)	Robin Lovelace , Martijn Tennekes , Dustin Carlino
Reference	https://doi.org/10.5311/JOSIS.2022.24.172
Codechecker(s)	Subhan Ali
Date of check	2025-09-04 12:00:00
Summary	Successfully reproduced all main figures from the ClockBoard paper using the zonebuilder R package. All core functions (zb_zone, zb_doughnut, zb_segment, zb_quadrat) work as described. Package installs correctly from CRAN and GitHub. Interactive mapping requires coordinate transformation but works properly. Parameter flexibility confirmed through additional tests.
Repository	https://github.com/codecheckers/zonebuilder

Table 1: CODECHECK summary

Summary

This codecheck successfully reproduces the key figures and functionality described in the ClockBoard paper. The zonebuilder R package installs correctly from both CRAN and GitHub, and all core functions work as documented. The reproduction demonstrates the flexibility of the ClockBoard zoning system through various parameter configurations and confirms the package's utility for urban analysis applications.

Output	Comment	Size (b)
codecheck/outputs/figure2_clockboard_basic.png	Reproduction of Figure 2: Basic ClockBoard zoning system for London	141874
codecheck/outputs/figure3a_doughnuts.png	Reproduction of Figure 3a: Doughnut zones (concentric rings)	74454
codecheck/outputs/figure3b_segments.png	Reproduction of Figure 3b: Segment zones (clock divisions)	62981
codecheck/outputs/figure4_rectangular_grid.png	Reproduction of Figure 4: Rectangular grid comparison	47615
codecheck/outputs/test_3_rings.png	Parameter test: 3 rings instead of default configuration	88255
codecheck/outputs/test_8_segments.png	Parameter test: 8 segments instead of default 12	116346
codecheck/outputs/test_interactive_leaflet.png	Screenshot of interactive leaflet map showing zoning system with geographic context	2011264

Table 2: Summary of output files generated

CODECHECKER notes

The GitHub repository for the zonebuilder package is available at https://github.com/zonebuilders/zonebuilder. This check is based on the commit `cd87a182e6f604608520f1f3d17dd551f281c966`.

The code was written in R and uses several key dependencies including sf for spatial operations, dplyr for data manipulation, and leaflet for interactive mapping. The package provides a comprehensive set of functions for creating clock-based zoning systems.

Installation and Setup

I installed the zonebuilder package from CRAN using:

```
install.packages("zonebuilder")
```

I also tested the development version from GitHub:

```
remotes::install_github("zonebuilders/zonebuilder")
```

Both installations completed successfully without dependency conflicts.

Reproduction Process

I systematically reproduced each figure from the paper:

Figure 2 (Basic ClockBoard): Successfully created using `zb_zone()` function with London city center coordinates. The function correctly generates the default 12 segments and 4 concentric rings as described in the paper.

Figure 3a (Doughnut zones): Reproduced using `zb_doughnut()` function, which creates concentric rings without radial divisions. The zones properly represent distance-based accessibility analysis.

Figure 3b (Segment zones): Created with `zb_segment()` function, producing radial divisions without concentric rings. This demonstrates directional analysis capabilities.

Figure 4 (Rectangular grid comparison): Generated using `zb_quadrat()` function to show traditional grid-based zoning versus the clock-based approach.

Parameter Flexibility Testing

I conducted additional tests to verify the system's flexibility:

- 3 rings configuration: Modified the default 4 rings to 3 using the `n_circles` parameter
- 8 segments configuration: Changed from 12 to 8 segments using the `n_segments` parameter
- Interactive mapping: Created leaflet-based interactive maps showing the zoning system with geographic context

Manifest files

figure2_clockboard_basic.png

Comment: Reproduction of Figure 2: Basic ClockBoard zoning system for London

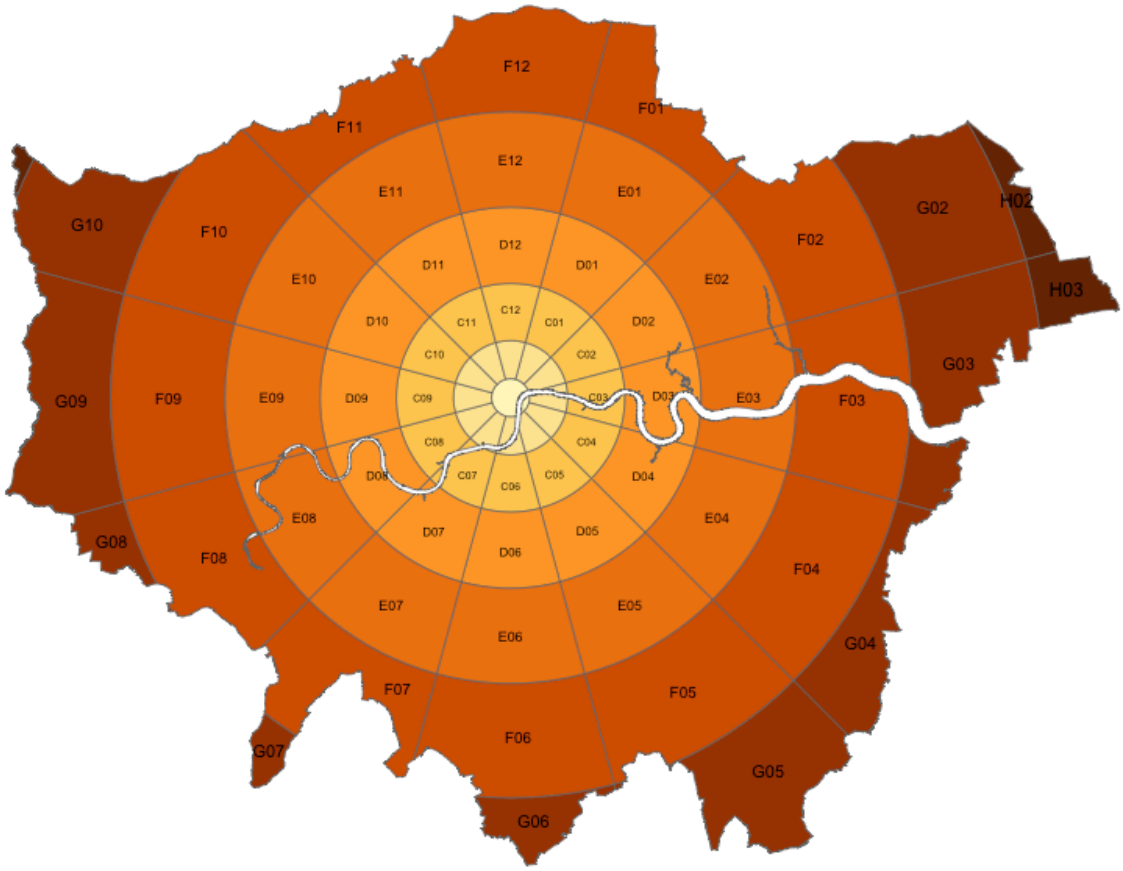


figure3a_doughnuts.png

Comment: Reproduction of Figure 3a: Doughnut zones (concentric rings)

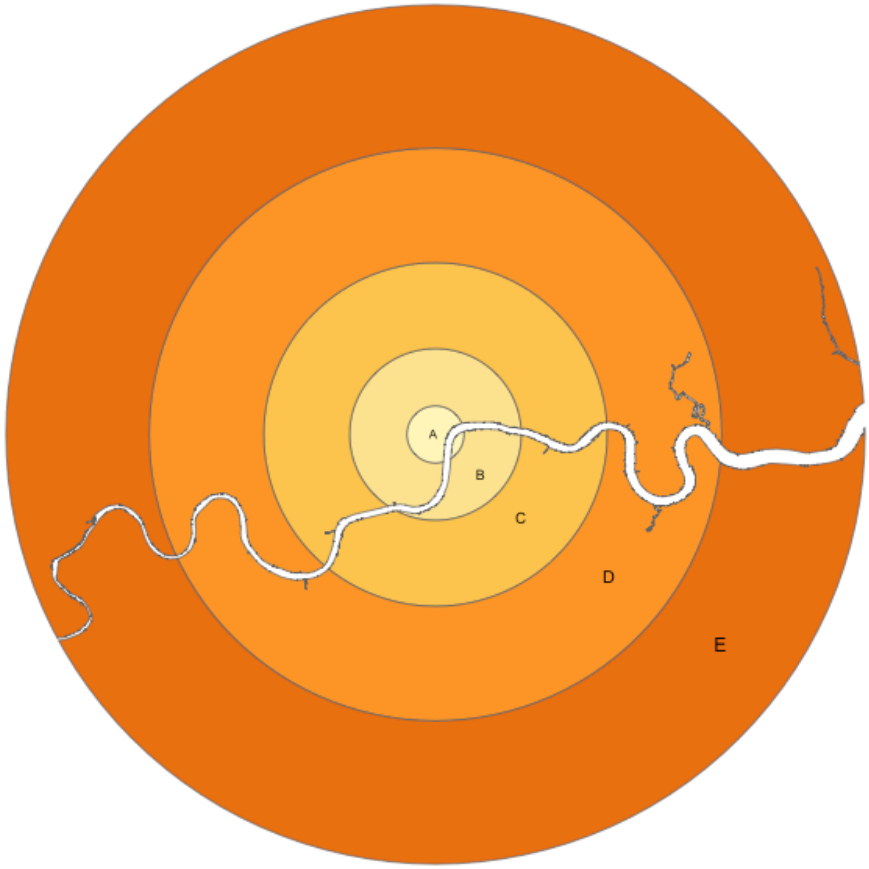


figure3b_segments.png

Comment: Reproduction of Figure 3b: Segment zones (clock divisions)

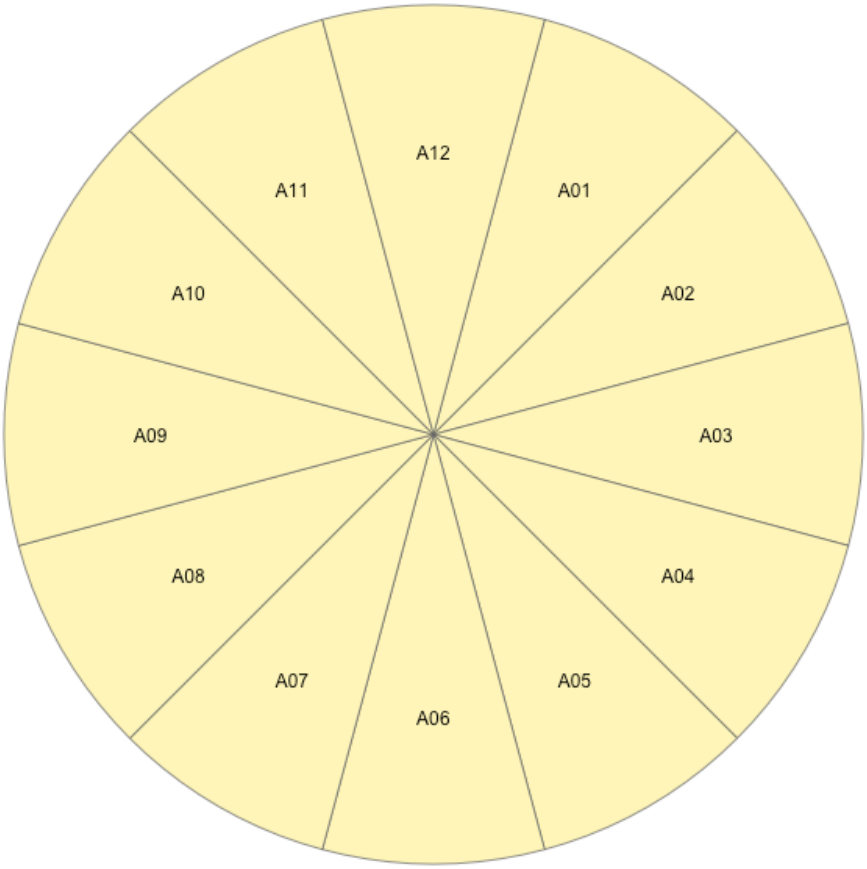
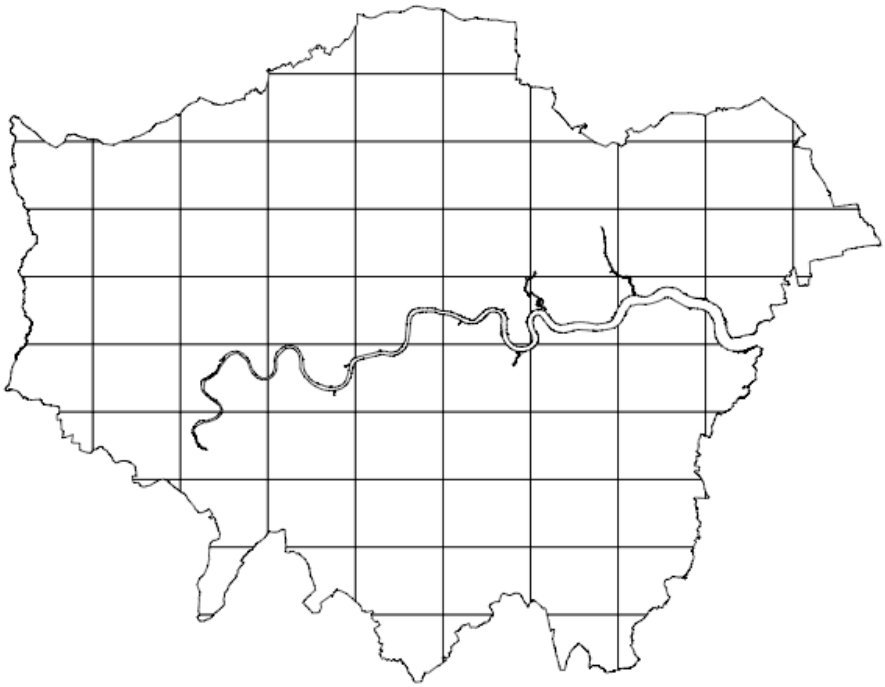


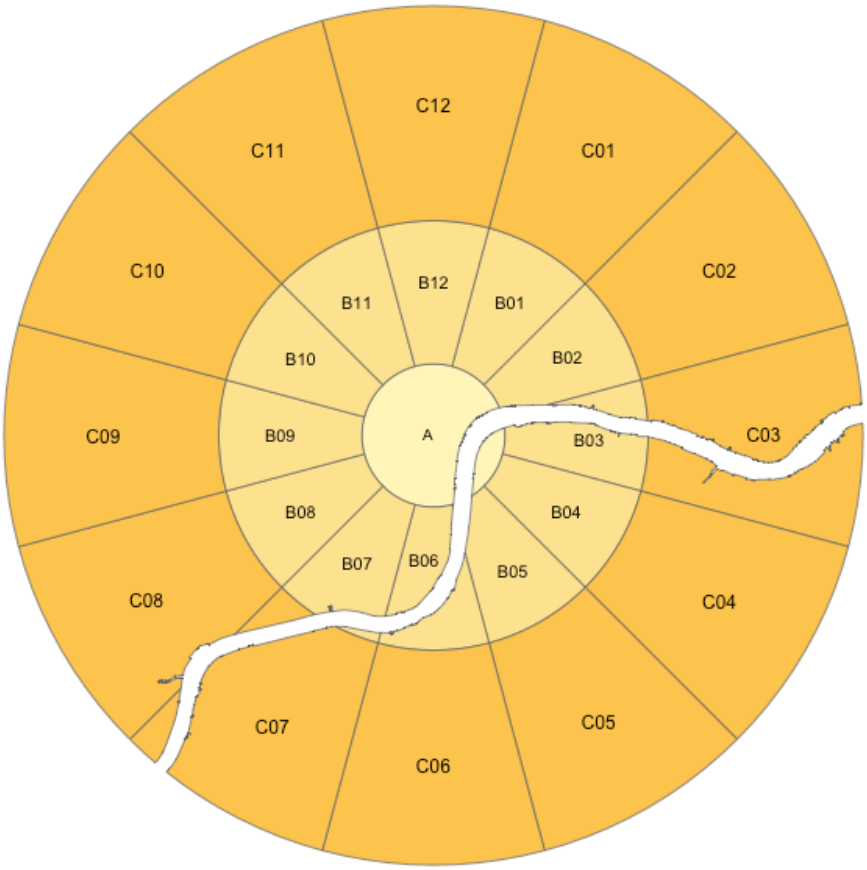
figure4_rectangular_grid.png

Comment: Reproduction of Figure 4: Rectangular grid comparison



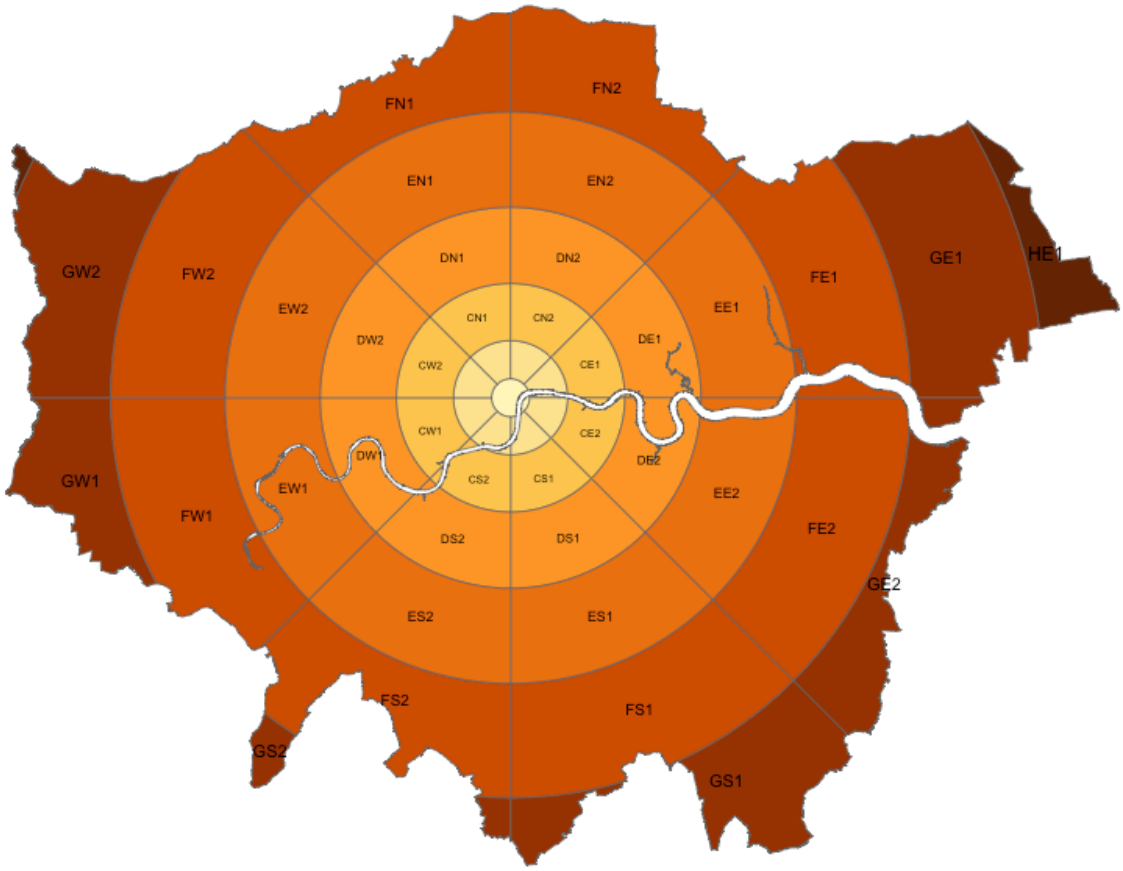
test_3_rings.png

Comment: Parameter test: 3 rings instead of default configuration



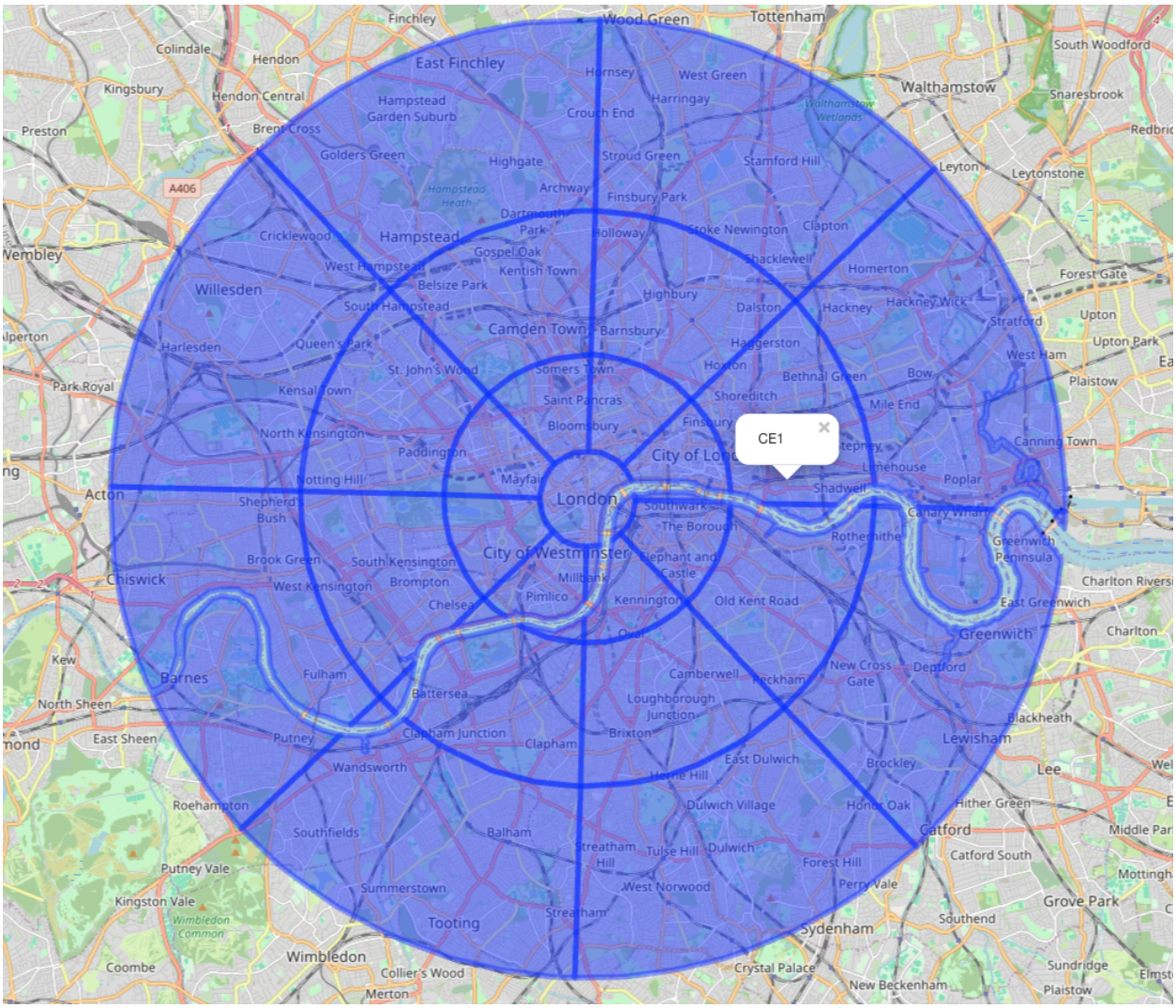
test_8_segments.png

Comment: Parameter test: 8 segments instead of default 12



test_interactive_leaflet.png

Comment: Screenshot of interactive leaflet map showing zoning system with geographic context



Acknowledgements

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Citing this document

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About CODECHECK

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About this document

This document was created using R Markdown using the `codecheck` R package. `make codecheck.pdf` will regenerate the report file.

```
sessionInfo()
```

```
## R version 4.3.2 (2023-10-31)
## Platform: aarch64-apple-darwin20 (64-bit)
## Running under: macOS 15.6.1
##
## Matrix products: default
## BLAS:   /Library/Frameworks/R.framework/Versions/4.3-arm64/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/4.3-arm64/Resources/lib/libRlapack.dylib;  LAPACK v
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## time zone: Europe/Berlin
## tzcode source: internal
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets
## [6] methods   base
##
## other attached packages:
##  [1] readr_2.1.5      tibble_3.2.1     xtable_1.8-4
##  [4] yaml_2.3.10      rprojroot_2.0.4  knitr_1.50
##  [7] codecheck_0.20.0 parsedate_1.3.2  R.cache_0.17.0
## [10] gh_1.5.0
```

```
##
## loaded via a namespace (and not attached):
##  [1] xfun_0.52         rdflib_0.2.9      tzdb_0.5.0
##  [4] vctrs_0.6.5       tools_4.3.2       generics_0.1.3
##  [7] parallel_4.3.2    curl_6.4.0        fansi_1.0.6
## [10] pkgconfig_2.0.3   pdftools_3.5.0    R.oo_1.27.1
## [13] redland_1.0.17-18 lifecycle_1.0.4   git2r_0.36.2
## [16] compiler_4.3.2    atom4R_0.3-3      stringr_1.5.1
## [19] keyring_1.4.1     htmltools_0.5.8.1 pillar_1.9.0
## [22] crayon_1.5.2      whisker_0.4.1     tidyr_1.3.0
## [25] R.utils_2.13.0    cachem_1.1.0      zen4R_0.10.2
## [28] tidyselect_1.2.0  zip_2.3.3         digest_0.6.33
## [31] stringi_1.8.3     dplyr_1.1.4       purrr_1.0.2
## [34] fastmap_1.2.0     cli_3.6.2         magrittr_2.0.3
## [37] XML_3.99-0.18     crul_1.5.0        utf8_1.2.4
## [40] withr_2.5.2       osfr_0.2.9        bit64_4.6.0-1
## [43] roxygen2_7.3.2    rmarkdown_2.29    httr_1.4.7
## [46] bit_4.6.0         qpdf_1.4.1        askpass_1.2.1
## [49] R.methodsS3_1.8.2 hms_1.1.3         memoise_2.0.1
## [52] evaluate_0.23     rlang_1.1.2       Rcpp_1.1.0
## [55] glue_1.6.2        httpcode_0.3.0    xml2_1.3.8
## [58] fauxpas_0.5.2     rorcid_0.7.0      vroom_1.6.5
## [61] jsonlite_1.8.8    plyr_1.8.9        R6_2.5.1
## [64] fs_1.6.3
```