

# CODECHECK certificate 2020-017

<https://doi.org/10.5281/zenodo.4003848>



Item	Value
Title	Progress in the R ecosystem for representing and handling spatial data
Authors	Roger S. Bivand
Reference	TODO
Codechecker	Daniel Nüst
Date of check	2020-08-27
Summary	TODO
Repository	<a href="https://github.com/codecheckers/JGSY-D-19-00087">https://github.com/codecheckers/JGSY-D-19-00087</a>

**Table 1: CODECHECK summary**

Output	Comment	Size (b)
<a href="#">figure1.pdf</a>	Figure 1	5847
<a href="#">figure2.pdf</a>	Figure 2	5936
<a href="#">figure3.pdf</a>	Figure 3	33533
<a href="#">figure4a.pdf</a>	Figure 4a	40480
<a href="#">figure4b.pdf</a>	Figure 4b	40436
<a href="#">figure5.pdf</a>	Figure 5	75045
<a href="#">figure6.pdf</a>	Figure 6	82156
<a href="#">figure7.pdf</a>	Figure 7	77736
<a href="#">webmap1.png</a>	Figure 8	407147
<a href="#">output.Rout</a>	Verbatim console output captured by sink, including messages	30549

**Table 2: Summary of output files generated**

## Summary

This code was very straightforward to codecheck. It contained a couple of data files and a well-organised R script, with a reasonable documentation of the computing environment/versions. The

[... ADD MORE INTERESTING FINDINGS HERE..]

## CODECHECKER notes

I started this check by forking the author's GitHub repository at <https://github.com/rsbivand/JGSY-D-19-00087> to the [codecheckers organisation](#). The author already provided a partial `codecheck.yml`, which I extended with the check-related metadata.

The project's README contains a clear listing of output files, contained data files, and the script file. The main script is written in R, in the file `bivand_jgs_si1_rev2.R`. The name apparently reflects the revision of the the article currently sent to peer review, which is also made available to me. The R script includes a number of code chunks, extracted from an Rnw vignette the author used to write the paper. The code is generally well formatted and understandable and was updated to save output figures into separate files (with transparent naming), and to use a seed for the word cloud. These changes are most welcome as the greatly ease the codechecking process. All code output is also captured in a text file `output.Rout`, which allows a detailed comparison of the results by the author and my own.

I opened the script in my local RStudio instance and installed the missing packages detected by RStudio. Then I ran

```
source("bivand_jgs_si1_rev2.R", echo=TRUE)
```

This took just a few minutes to complete on my laptop.

Inspecting the output log file, I saw there are a few minor numerical differences in two code chunks, as shown in the excerpts below from the output of `git diff`, comparing my changes with the original from the author:

```
[...]  
  
@@ -148,9 +148,9 @@ Units: [m]  
  > st_distance(pt_sfc1)  
  Units: [m]  
           [,1]      [,2]      [,3]  
-[1,]      0.0 157106.0 314116.3  
-[2,] 157106.0      0.0 157010.4  
-[3,] 314116.3 157010.4      0.0  
+[1,]      0.0 156759.1 313424.7  
+[2,] 156759.1      0.0 156665.6  
+[3,] 313424.7 156665.6      0.0  
  
[...]  
  
  > #####  
  > ### code chunk number 58: bivand_jgs_si1_rev2.Rnw:751-753  
@@ -628,7 +628,7 @@ Only \pkg{sp} & 1285 & 0 & 459 & 513 \  
  > st_distance(b_pump_sf_ll, b_pump_sf1_ll)  
  Units: [m]  
           [,1]  
-[1,] 124.7286  
+[1,] 125.0578
```

These are negligible numerical differences, which are repeatable on my system. I am less sure about the following difference though:

```
[...]
```

```

> ### code chunk number 78: bivand_jgs_si1_rev2.Rnw:974-978
> ##### [TRUNCATED]
-[1] 125.057683 1.751474
+[1] 125.0577 0.0000
[...]
```

The diff also shows the differences in package versions and operating system.

```

[...]
```

```

> ### code chunk number 55: bivand_jgs_si1_rev2.Rnw:724-725
> ##### [TRUNCATED]
      GDAL GDAL_with_GEOS      PROJ      sp
-      "3.1.2"      "TRUE"      "7.1.1"      "1.4-4"
+      "3.0.4"      "TRUE"      "6.3.1"      "1.4-2"

> #####
> ### code chunk number 56: bivand_jgs_si1_rev2.Rnw:732-733
> ##### [TRUNCATED]
      GEOS      sp
-"3.8.1" "1.4-4"
+"3.8.0" "1.4-2"

> #####
> ### code chunk number 57: bivand_jgs_si1_rev2.Rnw:740-741
> ##### [TRUNCATED]
      GEOS      GDAL      proj.4 GDAL_with_GEOS      USE_PROJ_H
-      "3.8.1"      "3.1.2"      "7.1.1"      "true"      "true"
+      "3.8.0"      "3.0.4"      "6.3.1"      "true"      "true"
[...]
```

```

> sessionInfo()
R version 4.0.2 (2020-06-22)
Platform: x86_64-pc-linux-gnu (64-bit)
-Running under: Fedora 32 (Workstation Edition)
+Running under: Ubuntu 20.04 LTS
```

These differences can be further inspected by comparing the original and reproduction output files:

```
diff codecheck/outputs/output.Rout output.Rout
```

The output PDFs seems to only differ in the creation date (diff algorithm of used git tool, GitKraken), e.g.:

```

[...]
```

```

<<
-/CreationDate (D:20200827122727)
-/ModDate (D:20200827122727)
+/CreationDate (D:20200829091449)
+/ModDate (D:20200829091449)
/Title (R Graphics Output)
[...]
```

and “appear to be the same” according to the tool `diffpdf`.

A [problem](#) with package `mapview`, which I had in CRAN version (2.9.0 at the time of check), but the author had at 2.9.1, could be resolved with package version 2.9.2 installed with `remotes::install_github("r-spatial/mapview")`.

A **visual inspection** of the plots yielded absolutely no differences between the reproduced figures (see below) and the originals, including matching numbers in legends, with the negligible exception of slight deviations because of aspect ratios.

The reproduction of the computations was straightforward, partly attributed to the timing: the review happens so closely to the author’s creation of the analysis that the “current” status of CRAN packages simply works. For the future, the author may consider providing additional layers of pinning versions, such as `renv` or a Dockerfile using MRAN, approaches which are of course also available for future users of the code.

## figure1.pdf



figure2.pdf

**Comment:** Figure 2

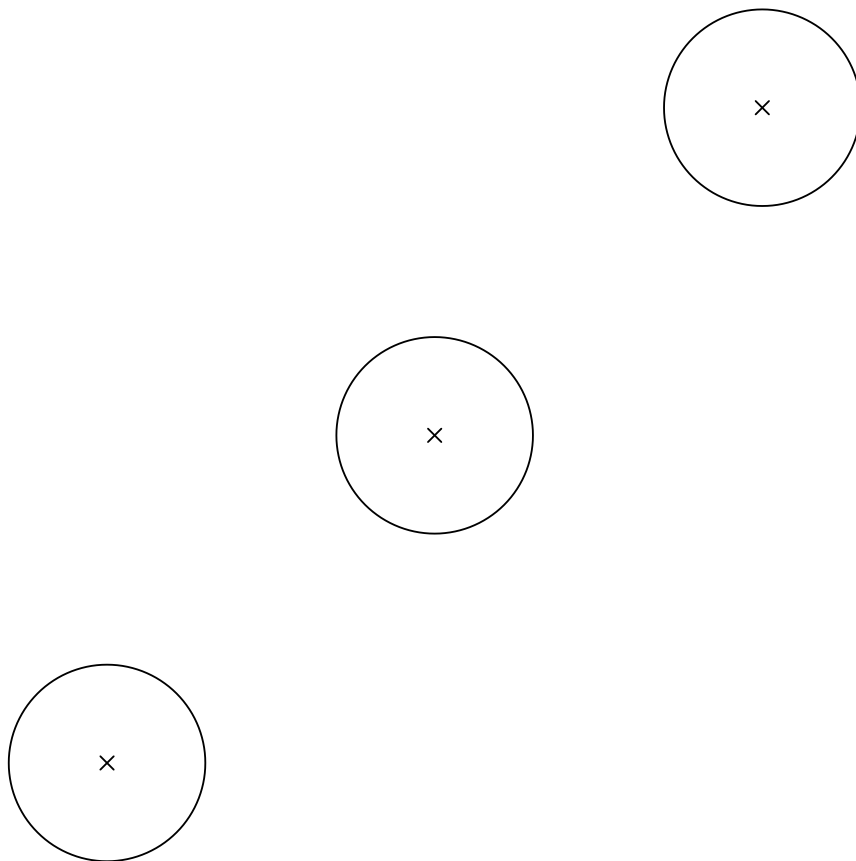


figure3.pdf

Comment: Figure 3

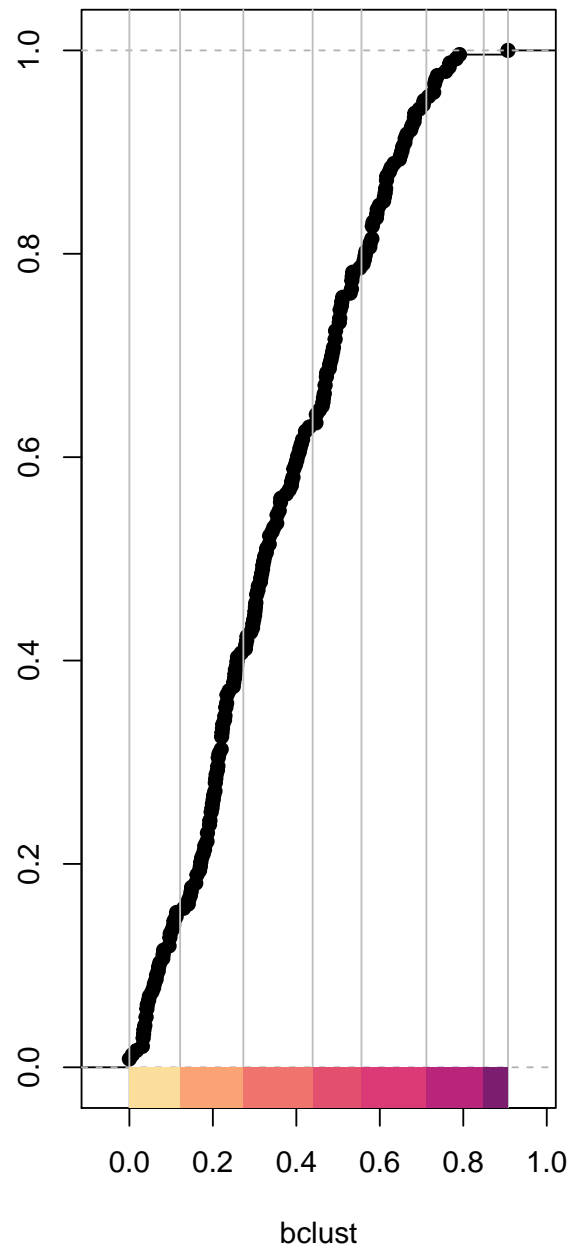
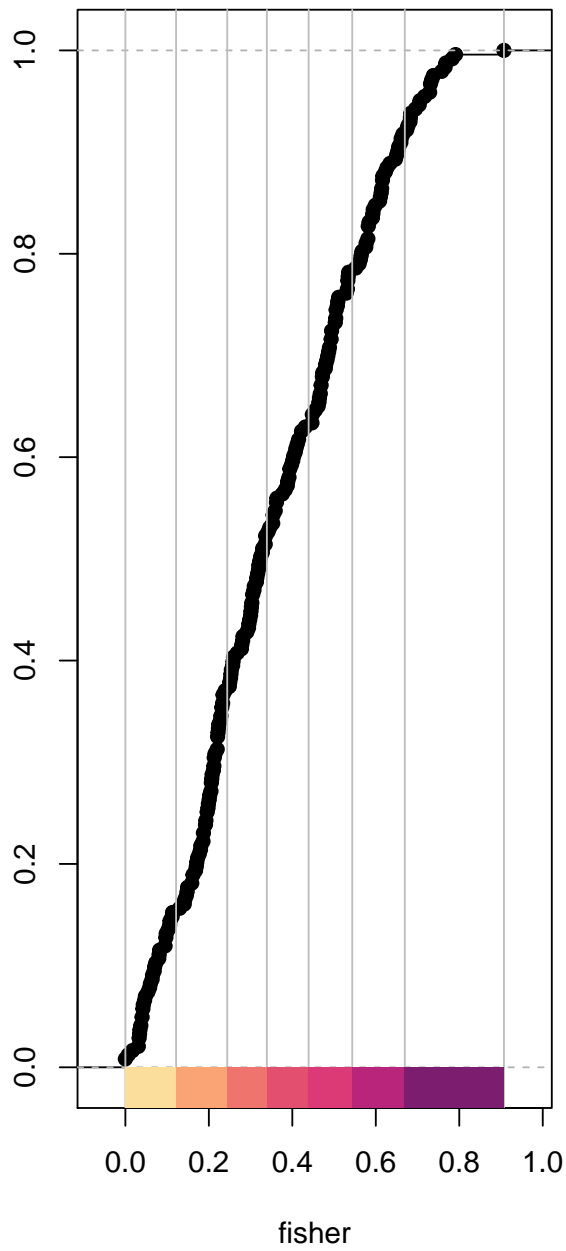




figure4a.pdf

Comment: Figure 4a

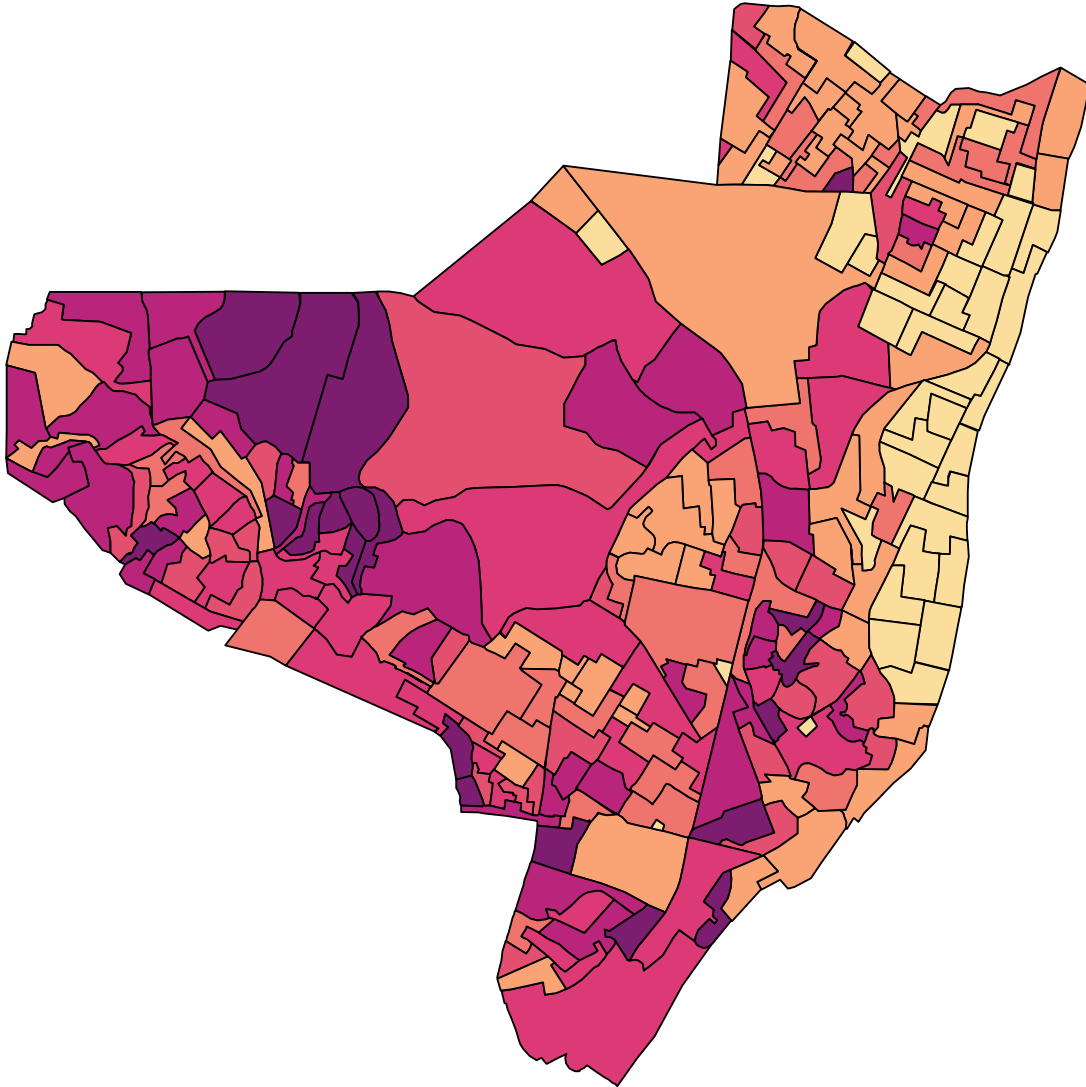


figure4b.pdf

Comment: Figure 4b

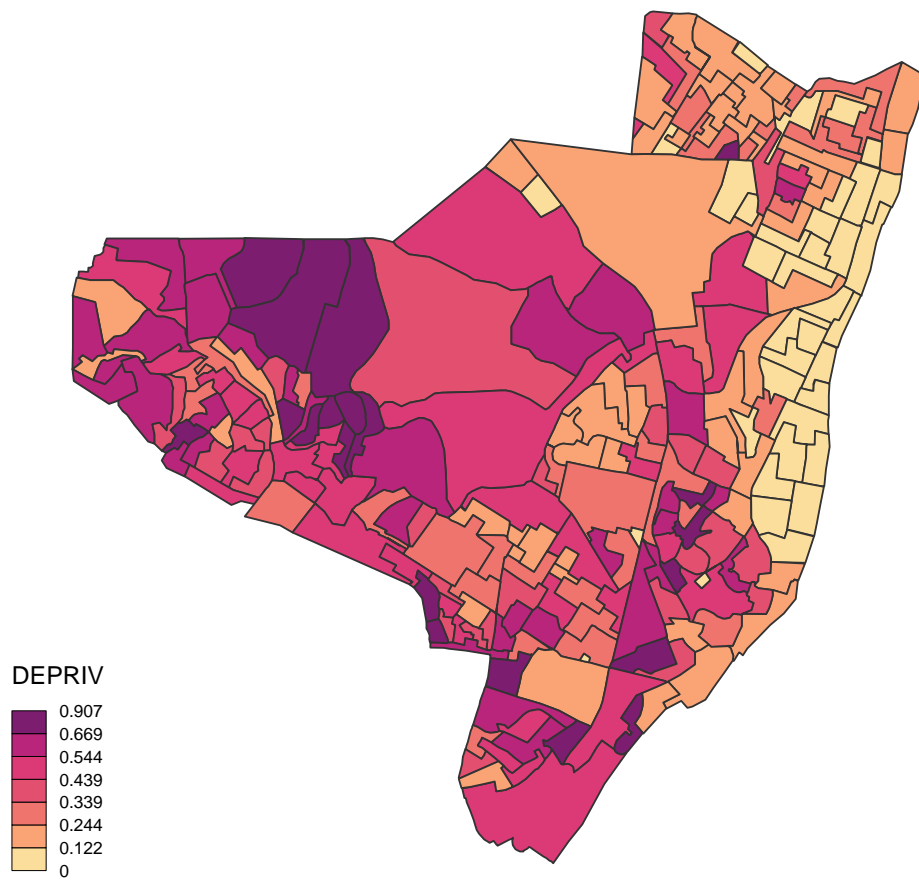


figure5.pdf

Comment: Figure 5

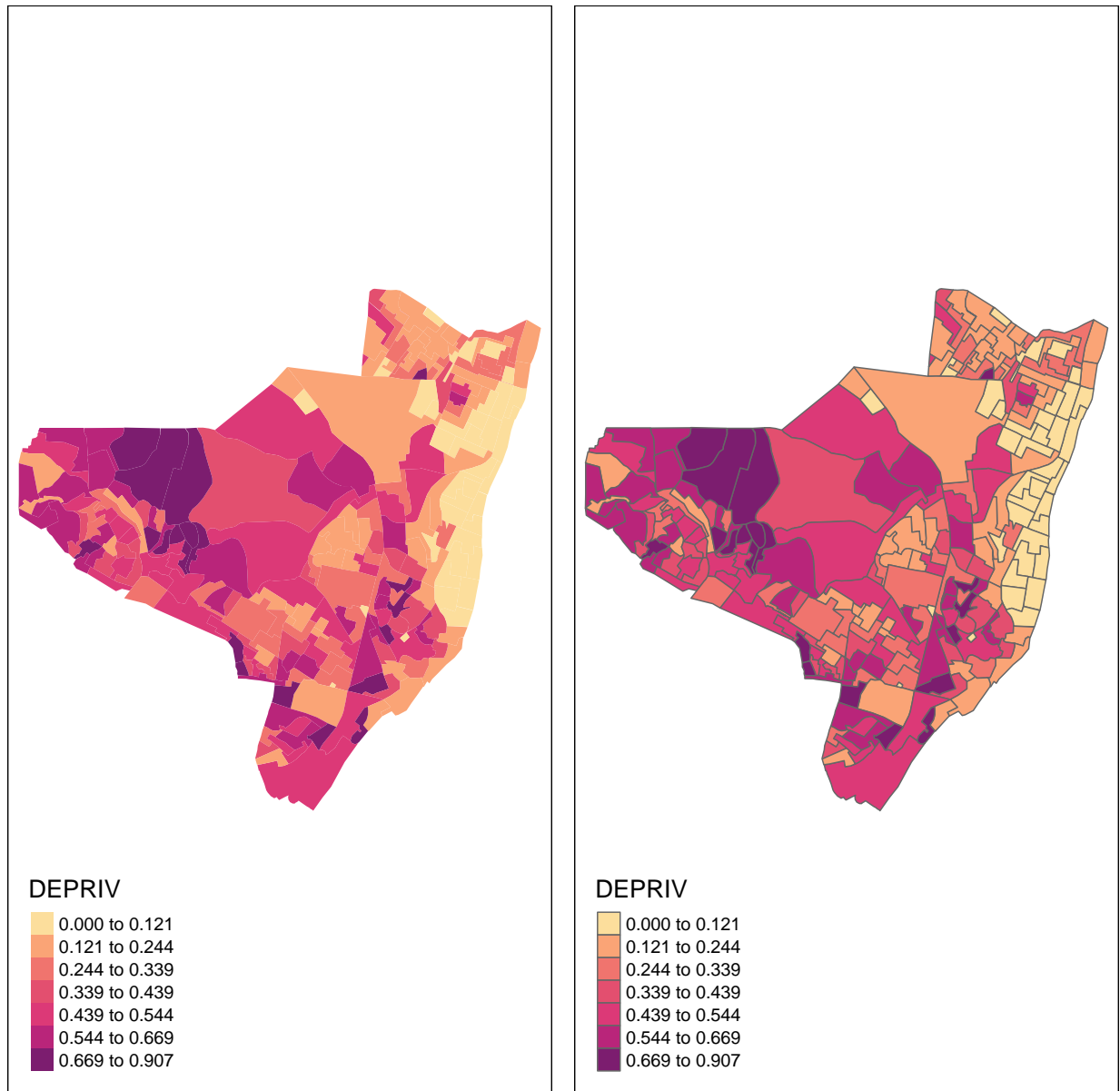


figure6.pdf

Comment: Figure 6

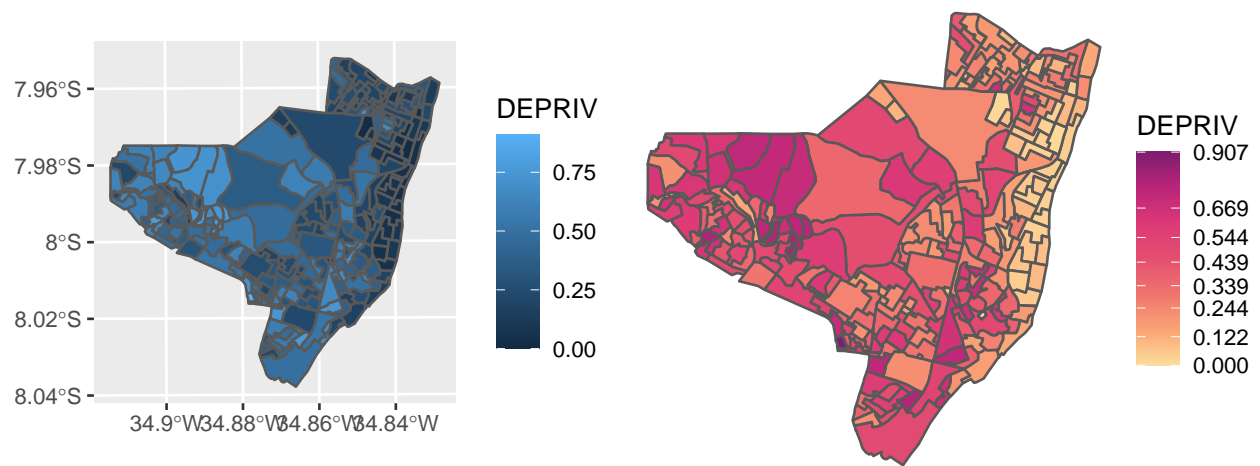
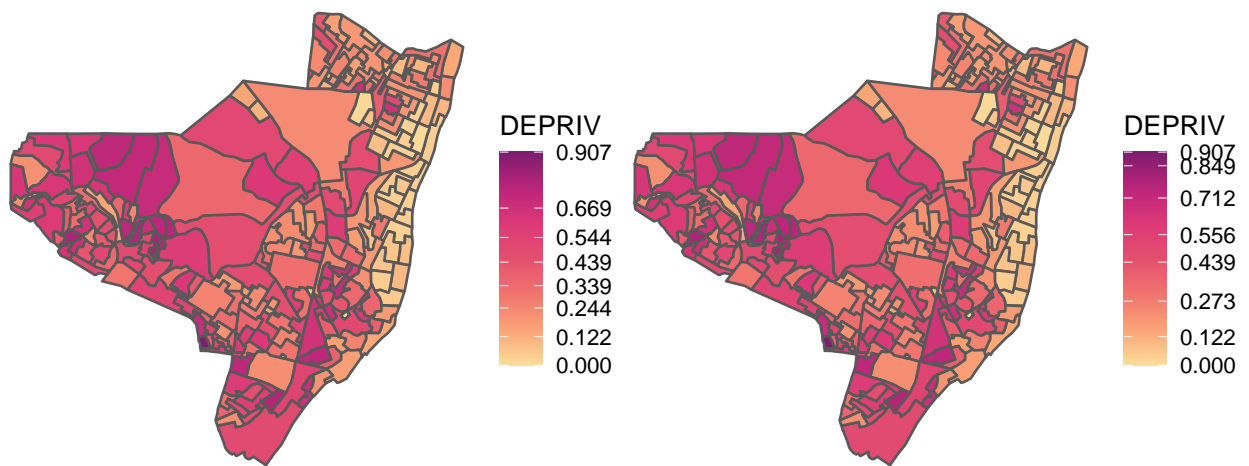


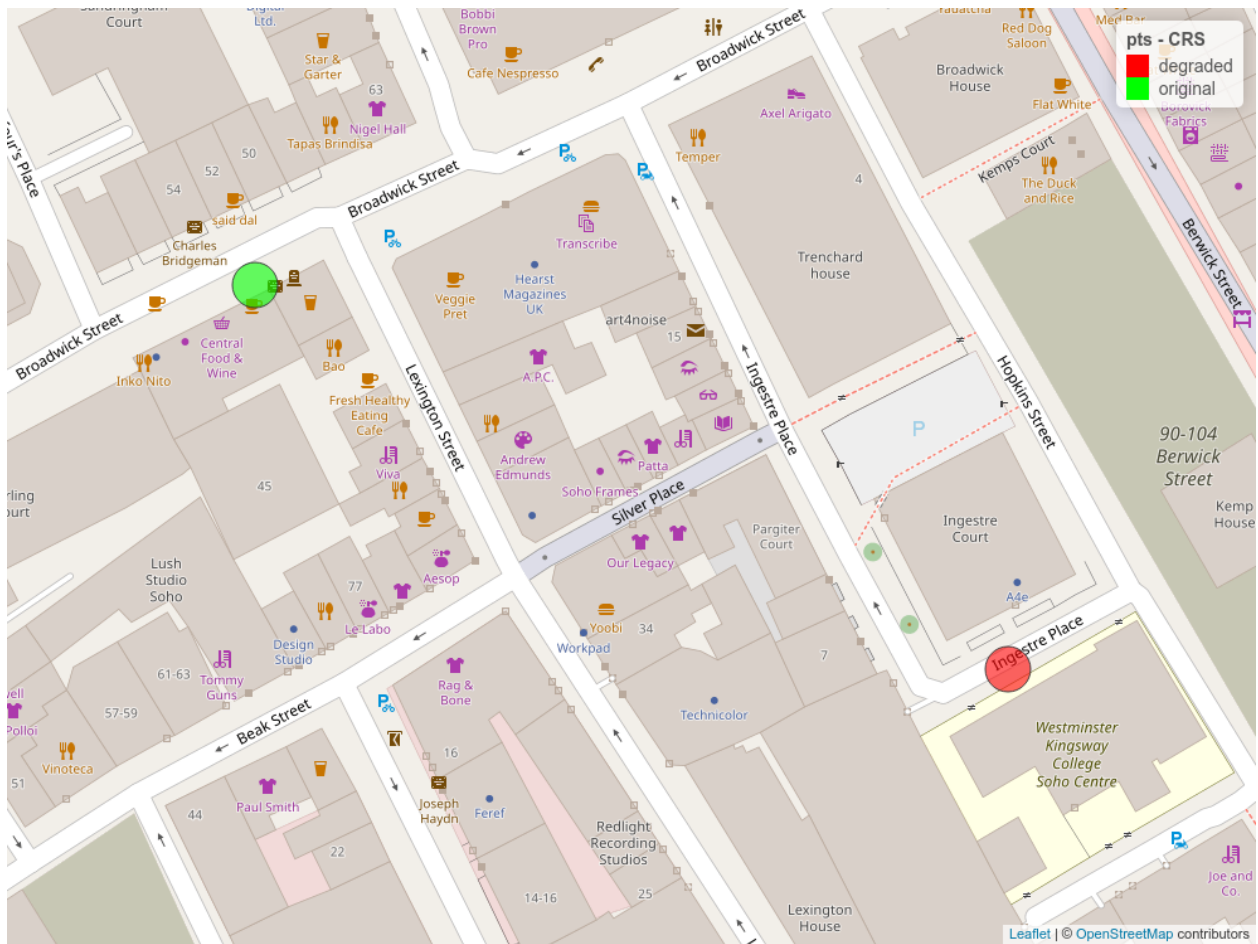
figure7.pdf

Comment: Figure 7



webmap1.png

Comment: Figure 8



## File: output.Rout

```
> sink(zz, type = "message")

> #####
> ### code chunk number 12: bivand_jgs_si1_rev2.Rnw:164-167
> ##### ... [TRUNCATED]

> dir.create(td)

> Sys.setenv("PROJ_USER_WRITABLE_DIRECTORY"=td)

> #####
> ### code chunk number 13: bivand_jgs_si1_rev2.Rnw:212-220 (eval = FALSE)
> ##### ... [TRUNCATED]

> suppressPackageStartupMessages(library(miniCRAN))

> suppressPackageStartupMessages(library(igraph))

> suppressPackageStartupMessages(library(magrittr))

> pg <- makeDepGraph(pdb[, "Package"], availPkgs = pdb, suggests=TRUE, enhances=TRUE, includeBasePkgs = FALSE)

> pr <- pg %>%
+   page.rank(directed = FALSE) %>%
+   use_series("vector") %>%
+   sort(decreasing = TRUE) %>%
+   as.matrix %>%
+   set_colnames("pa ..." ... [TRUNCATED]

> cutoff <- quantile(pr[, "page.rank"], probs = 0.2)

> popular <- pr[pr[, "page.rank"] >= cutoff, ]

> toKeep <- names(popular)

> vids <- V(pg)[toKeep]

> gs <- induced.subgraph(pg, vids = toKeep)

> cl <- walktrap.community(gs, steps = 3)

> topClusters <- table(cl$membership) %>%
+   sort(decreasing = TRUE) %>%
+   head(25)

> cluster <- function(i, clusters, pagerank, n=10){
+   group <- clusters$names[clusters$membership == i]
+   pagerank[group, ] %>% sort(decreasing = .... [TRUNCATED]

> z <- lapply(names(topClusters)[1:15], cluster, clusters=cl, pagerank=pr, n=50)

> ## saveRDS(z, file="all_z_200820.rds")
>
>
> #####
> ### code chunk number 15: bivand_jgs_si1_rev2.R ... [TRUNCATED]

> par(mar=c(4,4,2,1)+0.1)

> suppressPackageStartupMessages(library(wordcloud))

> ## z <- readRDS("all_z_200820.rds")
> sp_cl <- which(sapply(z, function(x) "sp" %in% names(x)))

> sf_cl <- which(sapply(z, function(x) "sf" %in% names(x)))

> sp_range <- range(z[[sp_cl]])

> sf_range <- range(z[[sf_cl]])

> sp_pr <- unname(z[[sp_cl]][["sp"]])

> sf_pr <- unname(z[[sf_cl]][["sf"]])

> set.seed(1)

> oopar <- par(mar=c(0,0,0,0)+0.1, mfrow=c(1,2))
```

```

> for (i in c(sp_cl, sf_cl)) wordcloud(names(z[[i]]), freq=unname(z[[i]]), scale=c(3, 0.5))

> par(oopar)

> dev.off()
null device
  1

> #####
> ### code chunk number 16: bivand_jgs_si1_rev2.Rnw:292-295
> ##### ... [TRUNCATED]

> df$c <- list(d=1, e="1", f=TRUE)

> str(df)
'data.frame':  3 obs. of  3 variables:
 $ a: chr  "a" "b" "c"
 $ b: int  1 2 3
 $ c:List of 3
 ..$ d: num 1
 ..$ e: chr "1"
 ..$ f: logi TRUE

> #####
> ### code chunk number 17: bivand_jgs_si1_rev2.Rnw:302-303
> ##### ... [TRUNCATED]
Linking to GEOS 3.8.0, GDAL 3.0.4, PROJ 6.3.1

> #####
> ### code chunk number 18: bivand_jgs_si1_rev2.Rnw:310-314
> ##### ... [TRUNCATED]

> pt2 <- pt1 + 1

> pt3 <- pt2 + 1

> str(pt3)
'XY' num [1:2] 3 5

> #####
> ### code chunk number 19: bivand_jgs_si1_rev2.Rnw:321-322
> ##### ... [TRUNCATED]
[1] "POINT (3 5)"

> #####
> ### code chunk number 20: bivand_jgs_si1_rev2.Rnw:330-331
> ##### ... [TRUNCATED]
[1] 01 01 00 00 00 00 00 00 00 00 08 40 00 00 00 00 00 14 40

> #####
> ### code chunk number 21: bivand_jgs_si1_rev2.Rnw:338-340
> ##### ... [TRUNCATED]

> str(pt_sfc)
sfc_POINT of length 3; first list element:  'XY' num [1:2] 1 3

> #####
> ### code chunk number 22: bivand_jgs_si1_rev2.Rnw:347-348
> ##### ... [TRUNCATED]
Units: [m]
      [,1]      [,2]      [,3]
[1,] 0.000000 1.414214 2.828427
[2,] 1.414214 0.000000 1.414214
[3,] 2.828427 1.414214 0.000000

> #####
> ### code chunk number 23: bivand_jgs_si1_rev2.Rnw:355-357
> ##### ... [TRUNCATED]

> st_distance(pt_sfc1)
Units: [m]
      [,1]      [,2]      [,3]
[1,]  0.0 156759.1 313424.7
[2,] 156759.1  0.0 156665.6
[3,] 313424.7 156665.6  0.0

> #####
> ### code chunk number 24: bivand_jgs_si1_rev2.Rnw:364-369
> ##### ... [TRUNCATED]

```



```

> mat[1,2] <- mat[2,1] <- s2::s2_distance(st_as_text(pt1), st_as_text(pt2))

> mat[1,3] <- mat[3,1] <- s2::s2_distance(st_as_text(pt1), st_as_text(pt3))

> mat[2,3] <- mat[3,2] <- s2::s2_distance(st_as_text(pt2), st_as_text(pt3))

> mat
      [,1]      [,2]      [,3]
[1,]    0.0 157106.0 314116.3
[2,] 157106.0     0.0 157010.4
[3,] 314116.3 157010.4     0.0

> #####
> ### code chunk number 25: bivand_jgs_si1_rev2.Rnw:377-379
> ##### [TRUNCATED]

> str(df)
Classes 'sf' and 'data.frame':  3 obs. of  4 variables:
 $ a      : chr  "a" "b" "c"
 $ b      : int   1 2 3
 $ c      :List of 3
 ..$ d: num 1
 ..$ e: chr "1"
 ..$ f: logi TRUE
 $ geometry:sfc_POINT of length 3; first list element:  'XY' num  1 3
- attr(*, "sf_column")= chr "geometry"
- attr(*, "agr")= Factor w/ 3 levels "constant","aggregate",...: NA NA NA
..- attr(*, "names")= chr [1:3] "a" "b" "c"

> #####
> ### code chunk number 26: bivand_jgs_si1_rev2.Rnw:388-390
> ##### [TRUNCATED]

> st_write(df, dsn=tf, quiet=TRUE)

> #####
> ### code chunk number 28: bivand_jgs_si1_rev2.Rnw:400-402
> ##### [TRUNCATED]

> df1
Simple feature collection with 3 features and 2 fields
geometry type:  POINT
dimension:      XY
bbox:           xmin: 1 ymin: 3 xmax: 3 ymax: 5
projected CRS:  WGS 84 / Pseudo-Mercator
  a b      geom
1 a 1 POINT (1 3)
2 b 2 POINT (2 4)
3 c 3 POINT (3 5)

> #####
> ### code chunk number 29: bivand_jgs_si1_rev2.Rnw:409-410
> ##### [TRUNCATED]
Simple feature collection with 1 feature and 2 fields
geometry type:  POINT
dimension:      XY
bbox:           xmin: 3 ymin: 5 xmax: 3 ymax: 5
projected CRS:  WGS 84 / Pseudo-Mercator
# A tibble: 1 x 3
  a      b      geom
* <chr> <int> <POINT [m]>
1 c      3      (3 5)

> #####
> ### code chunk number 30: bivand_jgs_si1_rev2.Rnw:417-419
> ##### [TRUNCATED]

> st_area(buf_df1)
Units: [m^2]
[1] 0.2826142 0.2826142 0.2826142

> #####
> ### code chunk number 32: bivand_jgs_si1_rev2.Rnw:432-436
> ##### [TRUNCATED]

> plot(st_geometry(buf_df1))

> plot(st_geometry(df1), add=TRUE, pch=4)

> dev.off()

```

```

null device
  1

> #####
> ### code chunk number 33: bivand_jgs_si1_rev2.Rnw:452-456
> ##### .... [TRUNCATED]
Loading required package: abind

> fn <- system.file("tif/L7_ETMs.tif", package = "stars")

> L7 <- read_stars(fn)

> L7
stars object with 3 dimensions and 1 attribute
attribute(s):
  L7_ETMs.tif
Min.   : 1.00
1st Qu.: 54.00
Median : 69.00
Mean   : 68.91
3rd Qu.: 86.00
Max.   :255.00
dimension(s):
  from to offset delta      refsys point values
x      1 349 288776 28.5 UTM Zone 25, Southern Hem... FALSE NULL [x]
y      1 352 9120761 -28.5 UTM Zone 25, Southern Hem... FALSE NULL [y]
band   1 6      NA      NA      NA      NA      NULL

> #####
> ### code chunk number 34: bivand_jgs_si1_rev2.Rnw:463-465
> ##### .... [TRUNCATED]

> (s2.ndvi <- st_apply(L7, c("x", "y"), ndvi))
stars object with 2 dimensions and 1 attribute
attribute(s):
  ndvi
Min.   :-0.75342
1st Qu.: -0.20301
Median : -0.06870
Mean   : -0.06432
3rd Qu.: 0.18667
Max.   : 0.58667
dimension(s):
  from to offset delta      refsys point values
x      1 349 288776 28.5 UTM Zone 25, Southern Hem... FALSE NULL [x]
y      1 352 9120761 -28.5 UTM Zone 25, Southern Hem... FALSE NULL [y]

> #####
> ### code chunk number 35: bivand_jgs_si1_rev2.Rnw:472-474
> ##### .... [TRUNCATED]

> L7p
stars_proxy object with 1 attribute in file:
$L7_ETMs.tif
[1] "[...]/L7_ETMs.tif"

dimension(s):
  from to offset delta      refsys point values
x      1 349 288776 28.5 UTM Zone 25, Southern Hem... FALSE NULL [x]
y      1 352 9120761 -28.5 UTM Zone 25, Southern Hem... FALSE NULL [y]
band   1 6      NA      NA      NA      NA      NULL

> #####
> ### code chunk number 36: bivand_jgs_si1_rev2.Rnw:481-482
> ##### .... [TRUNCATED]
stars_proxy object with 1 attribute in file:
$L7_ETMs.tif
[1] "[...]/L7_ETMs.tif"

dimension(s):
  from to offset delta      refsys point values
x      1 349 288776 28.5 UTM Zone 25, Southern Hem... FALSE NULL [x]
y      1 352 9120761 -28.5 UTM Zone 25, Southern Hem... FALSE NULL [y]
band   1 6      NA      NA      NA      NA      NULL
call list:
[[1]]
st_apply(X = X, MARGIN = c("x", "y"), FUN = ndvi)

> #####

```

```

> ### code chunk number 37: bivand_jgs_si1_rev2.Rnw:489-490
> ##### [TRUNCATED]
stars object with 2 dimensions and 6 attributes
attribute(s):
      X1      X2      X3      X4      X5      X6
Min.   : 47.00  Min.   : 32.00  Min.   : 21.00  Min.   :  9.00  Min.   :  1.00  Min.   :  1.00
1st Qu.: 67.00  1st Qu.: 55.00  1st Qu.: 49.00  1st Qu.: 52.00  1st Qu.: 63.00  1st Qu.: 32.00
Median : 78.00  Median : 66.00  Median : 63.00  Median : 63.00  Median : 89.00  Median : 60.00
Mean   : 79.15  Mean   : 67.57  Mean   : 64.36  Mean   : 59.24  Mean   : 83.18  Mean   : 59.98
3rd Qu.: 89.00  3rd Qu.: 79.00  3rd Qu.: 77.00  3rd Qu.: 75.00  3rd Qu.:112.00  3rd Qu.: 88.00
Max.   :255.00  Max.   :255.00  Max.   :255.00  Max.   :255.00  Max.   :255.00  Max.   :255.00
dimension(s):
  from to offset delta      refs point values
x   1 349 288776 28.5 UTM Zone 25, Southern Hem... FALSE  NULL [x]
y   1 352 9120761 -28.5 UTM Zone 25, Southern Hem... FALSE  NULL [y]

> #####
> ### code chunk number 38: bivand_jgs_si1_rev2.Rnw:497-500
> ##### [TRUNCATED]

> xm <- st_apply(L7, c("x", "y"), mean)

> all.equal(xm[[1]], x6$mean)
[1] TRUE

> #####
> ### code chunk number 39: bivand_jgs_si1_rev2.Rnw:513-514
> ##### [TRUNCATED]

> #####
> ### code chunk number 40: bivand_jgs_si1_rev2.Rnw:521-525
> ##### [TRUNCATED]

> cI_fisher <- classIntervals(olinda$"DEPRIV", n=7, style="fisher")

> set.seed(1)

> cI_bclust <- classIntervals(olinda$"DEPRIV", n=7, style="bclust")
Committee Member: 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1) 8(1) 9(1) 10(1)
Computing Hierarchical Clustering

> #####
> ### code chunk number 41: bivand_jgs_si1_rev2.Rnw:533-534
> ##### [TRUNCATED]

> #####
> ### code chunk number 43: bivand_jgs_si1_rev2.Rnw:547-553
> ##### [TRUNCATED]

> oopar <- par(mar=c(4,3,0,1)+0.1, mfrow=c(1,2))

> plot(cI_fisher, pal, xlab="fisher", main="", ylab="")

> plot(cI_bclust, pal, xlab="bclust", main="", ylab="")

> par(oopar)

> dev.off()
null device
1

> #####
> ### code chunk number 44: bivand_jgs_si1_rev2.Rnw:562-576 (eval = FALSE)
> ##### [TRUNCATED]

> plot(olinda[, "DEPRIV"], nbreaks=7, breaks="fisher", pal=pal, key.pos=NULL, main="")

> #gridGraphics::grid.echo()
> #library(grid)
> #gl <- grid.grab()
> dev.off()
null device
1

> #x11()
> pdf("figure4b.pdf")

> library(cartography)

> choroLayer(olinda, var="DEPRIV", method="fisher-jenks", nclass=7, col=pal, legend.values.rnd=3)

```

```

> #gridGraphics::grid.echo()
> #library(grid)
> #g2 <- grid.grab()
> dev.off()
null device
  1

> ## save(g1, g2, file="g1g2.rda")
>
>
> #####
> ### code chunk number 45: bivand_jgs_si1_rev2.Rnw:581 .... [TRUNCATED]

> o1 <- tm_shape(olinda) + tm_fill("DEPRIV", style="fisher", n=7, palette=pal)

> o2 <- o1 + tm_borders(lwd=0.8)

> #####
> ### code chunk number 48: bivand_jgs_si1_rev2.Rnw:615-618
> ##### ... [TRUNCATED]

> tmap_arrange(o1, o2, ncol=2)

> dev.off()
null device
  1

> #####
> ### code chunk number 49: bivand_jgs_si1_rev2.Rnw:627-631
> ##### ... [TRUNCATED]

> g1 <- ggplot(olinda) + geom_sf(aes(fill=DEPRIV))

> g2 <- g1 + theme_void() + scale_fill_gradientn(colours=pal,
+   breaks=round(cI_fisher$brks, 3))

> #####
> ### code chunk number 50: bivand_jgs_si1_rev2.Rnw:638-641
> ##### ... [TRUNCATED]

> gridExtra::grid.arrange(g1, g2, ncol=2, respect=TRUE)

> dev.off()
null device
  1

> #####
> ### code chunk number 51: bivand_jgs_si1_rev2.Rnw:650-652
> ##### ... [TRUNCATED]

> #####
> ### code chunk number 52: bivand_jgs_si1_rev2.Rnw:658-661
> ##### ... [TRUNCATED]

> gridExtra::grid.arrange(g2, g3, ncol=2, respect=TRUE)

> dev.off()
null device
  1

> #####
> ### code chunk number 53: bivand_jgs_si1_rev2.Rnw:673-683 (eval = FALSE)
> ##### ... [TRUNCATED]

> deps_sp <- tools::package_dependencies(packages = "sp", pdb, which = c("Depends", "Imports"), recursive = TRUE, reverse = TRUE)

> deps_sf <- tools::package_dependencies(packages = "sf", pdb, which = c("Depends", "Imports"), recursive = TRUE, reverse = TRUE)

> deps_sp3 <- tools::package_dependencies(packages = "sp", pdb, which = c("Depends", "Imports", "Suggests"), recursive = TRUE, reverse = TRUE)

> deps_sf3 <- tools::package_dependencies(packages = "sf", pdb, which = c("Depends", "Imports", "Suggests"), recursive = TRUE, reverse = TRUE)

> deps_sp1 <- tools::package_dependencies(packages = "sp", pdb, which = c("Depends", "Imports"), recursive = FALSE, reverse = TRUE)

> deps_sf1 <- tools::package_dependencies(packages = "sf", pdb, which = c("Depends", "Imports"), recursive = FALSE, reverse = TRUE)

> deps_sp2 <- tools::package_dependencies(packages = "sp", pdb, which = c("Depends", "Imports", "Suggests"), recursive = FALSE, reverse = TRUE)

> deps_sf2 <- tools::package_dependencies(packages = "sf", pdb, which = c("Depends", "Imports", "Suggests"), recursive = FALSE, reverse = TRUE)

```

```

> ## save(deps_sp, deps_sf, deps_sp1, deps_sf1, deps_sp2, deps_sf2, deps_sp3, deps_sf3, file="deps_sp_sf_200820.rda")
>
>
> ##### ... [TRUNCATED]

> mat[1,1] <- length(deps_sp[[1]])
> mat[2,1] <- length(deps_sf[[1]])
> sp_sf <- match(deps_sp[[1]], deps_sf[[1]])
> sf_sp <- match(deps_sf[[1]], deps_sp[[1]])
> mat[4,1] <- length(deps_sf[[1]][is.na(sf_sp)])
> mat[5,1] <- length(deps_sf[[1]][!is.na(sf_sp)])
> mat[3,1] <- length(deps_sp[[1]][is.na(sp_sf)])
> mat[1,4] <- length(deps_sp2[[1]])
> mat[2,4] <- length(deps_sf2[[1]])
> sp_sf2 <- match(deps_sp2[[1]], deps_sf2[[1]])
> sf_sp2 <- match(deps_sf2[[1]], deps_sp2[[1]])
> mat[4,4] <- length(deps_sf2[[1]][is.na(sf_sp2)])
> mat[5,4] <- length(deps_sf2[[1]][!is.na(sf_sp2)])
> mat[3,4] <- length(deps_sp2[[1]][is.na(sp_sf2)])
> mat[1,2] <- length(deps_sp3[[1]])
> mat[2,2] <- length(deps_sf3[[1]])
> sp_sf3 <- match(deps_sp3[[1]], deps_sf3[[1]])
> sf_sp3 <- match(deps_sf3[[1]], deps_sp3[[1]])
> mat[4,2] <- length(deps_sf3[[1]][is.na(sf_sp3)])
> mat[5,2] <- length(deps_sf3[[1]][!is.na(sf_sp3)])
> mat[3,2] <- length(deps_sp3[[1]][is.na(sp_sf3)])
> mat[1,3] <- length(deps_sp1[[1]])
> mat[2,3] <- length(deps_sf1[[1]])
> sp_sf1 <- match(deps_sp1[[1]], deps_sf1[[1]])
> sf_sp1 <- match(deps_sf1[[1]], deps_sp1[[1]])
> mat[4,3] <- length(deps_sf1[[1]][is.na(sf_sp1)])
> mat[5,3] <- length(deps_sf1[[1]][!is.na(sf_sp1)])
> mat[3,3] <- length(deps_sp1[[1]][is.na(sp_sf1)])

> rownames(mat) <- c("Sum \\pkg{sp}", "Sum \\pkg{sf}", "Only \\pkg{sp}", "Only \\pkg{sf}", "Both")
> colnames(mat) <- c("Recursive", "Recursive w/Suggests", "Not recursive", "Not recursive w/Suggests")

> #####
> ### code chunk number 55: bivand_jgs_si1_rev2.Rnw:724-725
> ##### ... [TRUNCATED]
      GDAL GDAL_with_GEOS      PROJ      sp
      "3.0.4"      "TRUE"      "6.3.1"      "1.4-2"

> #####
> ### code chunk number 56: bivand_jgs_si1_rev2.Rnw:732-733
> ##### ... [TRUNCATED]
      GEOS      sp
      "3.8.0" "1.4-2"

> #####
> ### code chunk number 57: bivand_jgs_si1_rev2.Rnw:740-741
> ##### ... [TRUNCATED]

```

GEOS	GDAL	proj.4	GDAL_with_GEOS	USE_PROJ_H
"3.8.0"	"3.0.4"	"6.3.1"	"true"	"true"

```

> #####
> ### code chunk number 58: bivand_jgs_si1_rev2.Rnw:751-753
> ##### [TRUNCATED]

> print(xtable(mat, align=c("l","r","r","r","r"), digits=c(NA, 0, 0, 0, 0), display=c("s", "d", "d", "d", "d")), floating=FALSE, comment=FALSE, sa
\begin{tabular}{lrrrr}
\hline
& Recursive & Recursive w/Suggests & Not recursive & Not recursive w/Suggests \\
\hline
Sum \pkg{sp} & 1517 & 16619 & 522 & 629 \\
Sum \pkg{sf} & 297 & 16619 & 184 & 277 \\
\hline
Only \pkg{sp} & 1285 & 0 & 459 & 513 \\
Only \pkg{sf} & 65 & 0 & 121 & 161 \\
Both & 232 & 16619 & 63 & 116 \\
\hline
\end{tabular}

> #####
> ### code chunk number 59: bivand_jgs_si1_rev2.Rnw:771-773
> ##### [TRUNCATED]

> b_pump_sf <- st_read(bp_file, quiet=TRUE)

> #####
> ### code chunk number 60: bivand_jgs_si1_rev2.Rnw:780-788
> ##### [TRUNCATED]

> legacy <- st_crs(proj5)

> proj6 <- legacy$proj4string

> proj5_parts <- unlist(strsplit(proj5, " "))

> proj6_parts <- unlist(strsplit(proj6, " "))

> proj5_parts[!is.element(proj5_parts, proj6_parts)]
[1] "+datum=OSGB36"

> proj6_parts[!is.element(proj6_parts, proj5_parts)]
[1] "+ellps=airy"

> #####
> ### code chunk number 61: bivand_jgs_si1_rev2.Rnw:795-797
> ##### [TRUNCATED]

> st_crs(b_pump_sf1) <- st_crs(st_crs(b_pump_sf1)$proj4string)

> #####
> ### code chunk number 62: bivand_jgs_si1_rev2.Rnw:804-806
> ##### [TRUNCATED]
[1] TRUE

> #####
> ### code chunk number 63: bivand_jgs_si1_rev2.Rnw:813-816
> ##### [TRUNCATED]

> b_pump_sf1_ll <- st_transform(b_pump_sf1, 4326)

> st_distance(b_pump_sf1_ll, b_pump_sf1_ll)
Units: [m]
[1]
[1,] 125.0578

> #####
> ### code chunk number 64: bivand_jgs_si1_rev2.Rnw:821-828
> ##### [TRUNCATED]

> if (sf::CPL_gdal_version() >= "3.1.0") mapviewOptions(fgb = FALSE)

> pts <- rbind(b_pump_sf1_ll, b_pump_sf1_ll)

> pts$CRS <- c("original", "degraded")

> webmap1 <- mapview(pts, zcol="CRS", map.type="OpenStreetMap", col.regions=c("green", "red"), cex=18)

> ##webmap1

```

```

> mapshot(webmap1, file="webmap1.png")

> ## magick::image_write(magick::image_read("webmap1.png"), path="webmap1.eps", format="eps")
>
>
> ##### ... [TRUNCATED]
Coordinate Reference System:
User input: EPSG:4326
wkt:
GEOGCRS["WGS 84",
  DATUM["World Geodetic System 1984",
    ELLIPSOID["WGS 84",6378137,298.257223563,
      LENGTHUNIT["metre",1]],
    PRIMEM["Greenwich",0,
      ANGLEUNIT["degree",0.0174532925199433]],
    CS[ellipsoidal,2],
      AXIS["geodetic latitude (Lat)",north,
        ORDER[1],
        ANGLEUNIT["degree",0.0174532925199433]],
      AXIS["geodetic longitude (Lon)",east,
        ORDER[2],
        ANGLEUNIT["degree",0.0174532925199433]],
    USAGE[
      SCOPE["unknown"],
      AREA["World"],
      BBOX[-90,-180,90,180]],
    ID["EPSG",4326]]

> #####
> ### code chunk number 66: bivand_jgs_si1_rev2.Rnw:855-857
> ##### ... [TRUNCATED]

> cat(wkt(CRS(SRS_string="EPSG:4326")), "\n")
GEOGCRS["WGS 84",
  DATUM["World Geodetic System 1984",
    ELLIPSOID["WGS 84",6378137,298.257223563,
      LENGTHUNIT["metre",1]],
    ID["EPSG",6326]],
    PRIMEM["Greenwich",0,
      ANGLEUNIT["degree",0.0174532925199433],
      ID["EPSG",8901]],
    CS[ellipsoidal,2],
      AXIS["longitude",east,
        ORDER[1],
        ANGLEUNIT["degree",0.0174532925199433,
          ID["EPSG",9122]]],
      AXIS["latitude",north,
        ORDER[2],
        ANGLEUNIT["degree",0.0174532925199433,
          ID["EPSG",9122]]],
    USAGE[
      SCOPE["unknown"],
      AREA["World"],
      BBOX[-90,-180,90,180]]

> #####
> ### code chunk number 67: bivand_jgs_si1_rev2.Rnw:864-867
> ##### ... [TRUNCATED]

> o <- strsplit(sf_from_sp$wkt, "\n")[[1]]

> cat(paste(o[grep("CS|AXIS|ORDER", o)], collapse="\n"))
CS[ellipsoidal,2],
  AXIS["longitude",east,
    ORDER[1],
    AXIS["latitude",north,
      ORDER[2],

> #####
> ### code chunk number 68: bivand_jgs_si1_rev2.Rnw:872-875
> ##### ... [TRUNCATED]

> o <- strsplit(wkt(sp_from_sf), "\n")[[1]]

> cat(paste(o[grep("CS|AXIS|ORDER", o)], collapse="\n"))
CS[ellipsoidal,2],
  AXIS["geodetic latitude (Lat)",north,
    ORDER[1],
    AXIS["geodetic longitude (Lon)",east,
      ORDER[2],

> #####

```

```

> ### code chunk number 69: bivand_jgs_si1_rev2.Rnw:884-886
> ##### [TRUNCATED]

> b_pump_sp1 <- as(b_pump_sf1, "Spatial")

> #####
> ### code chunk number 71: bivand_jgs_si1_rev2.Rnw:898-899
> ##### [TRUNCATED]
rgdal: version: 1.5-16, (SVN revision 1050)
Geospatial Data Abstraction Library extensions to R successfully loaded
Loaded GDAL runtime: GDAL 3.0.4, released 2020/01/28
Path to GDAL shared files: /usr/share/gdal
GDAL binary built with GEOS: TRUE
Loaded PROJ runtime: Rel. 6.3.1, February 10th, 2020, [PJ_VERSION: 631]
Path to PROJ shared files: /usr/share/proj
Linking to sp version:1.4-2
To mute warnings of possible GDAL/OSR exportToProj4() degradation,
use options("rgdal_show_exportToProj4_warnings"="none") before loading rgdal.

> #####
> ### code chunk number 72: bivand_jgs_si1_rev2.Rnw:906-913
> ##### [TRUNCATED]

> o <- list_coordOps(WKT, "EPSG:4326")

> c(nrow(o), nrow(o[o$instantiable,]), sum(o$number_grids))
[1] 8 7 1

> aoi0 <- project(t(unclass(bbox(b_pump_sp))), WKT, inv=TRUE)

> aoi <- c(t(aoi0 + c(-0.1, +0.1)))

> o_aoi <- list_coordOps(WKT, "EPSG:4326", area_of_interest=aoi)

> c(nrow(o_aoi), nrow(o_aoi[o_aoi$instantiable,]), sum(o_aoi$number_grids))
[1] 5 4 1

> #####
> ### code chunk number 73: bivand_jgs_si1_rev2.Rnw:922-924
> ##### [TRUNCATED]

> cat(strwrap(get_last_coordOp()), sep="\n")
+proj=pipeline +step +inv +proj=tmerc +lat_0=49 +lon_0=-2 +k=0.999601 +x_0=400000 +y_0=-100000 +ellps=airy
+step +proj=push +v_3 +step +proj=cart +ellps=airy +step +proj=helmert +x=446.448 +y=-125.157 +z=542.06
+rx=0.15 +ry=0.247 +rz=0.842 +s=-20.489 +convention=position_vector +step +inv +proj=cart +ellps=WGS84 +step
+proj=pop +v_3 +step +proj=unitconvert +xy_in=rad +xy_out=deg

> #####
> ### code chunk number 74: bivand_jgs_si1_rev2.Rnw:931-935
> ##### [TRUNCATED]

> cat(nrow(o), o$ballpark, "\n")
1 TRUE

> b_pump_sp1_ll <- spTransform(b_pump_sp1, CRS(SRS_string="EPSG:4326"))

> cat(strwrap(get_last_coordOp()), sep="\n")
+proj=pipeline +step +inv +proj=tmerc +lat_0=49 +lon_0=-2 +k=0.999601 +x_0=400000 +y_0=-100000 +ellps=airy
+step +proj=unitconvert +xy_in=rad +xy_out=deg

> #####
> ### code chunk number 75: bivand_jgs_si1_rev2.Rnw:944-946
> ##### [TRUNCATED]
[1] "Using: "

> list.files(td)
character(0)

> #####
> ### code chunk number 76: bivand_jgs_si1_rev2.Rnw:953-957
> ##### [TRUNCATED]

> c(nrow(o), nrow(o[o$instantiable,]), sum(o$number_grids))
[1] 5 4 1

> b_pump_sp_llg <- spTransform(b_pump_sp, CRS(SRS_string="EPSG:4326"))

> cat(strwrap(get_last_coordOp()), sep="\n")
+proj=pipeline +step +inv +proj=tmerc +lat_0=49 +lon_0=-2 +k=0.999601 +x_0=400000 +y_0=-100000 +ellps=airy
+step +proj=push +v_3 +step +proj=cart +ellps=airy +step +proj=helmert +x=446.448 +y=-125.157 +z=542.06

```



```

+rx=0.15 +ry=0.247 +rz=0.842 +s=-20.489 +convention=position_vector +step +inv +proj=cart +ellps=WGS84 +step
+proj=pop +v_3 +step +proj=unitconvert +xy_in=rad +xy_out=deg

> #####
> ### code chunk number 77: bivand_jgs_sii_rev2.Rnw:964-967
> ##### ... [TRUNCATED]
character(0)

> file.size(file.path(td, list.files(td)[1]))
[1] NA

> disable_proj_CDN()

> #####
> ### code chunk number 78: bivand_jgs_sii_rev2.Rnw:974-978
> ##### ... [TRUNCATED]
[1] 125.0577 0.0000

> all.equal(unname(coordinates(b_pump_sp_ll)),
+          unname(st_coordinates(st_geometry(b_pump_sf_ll))))
[1] TRUE

> sessionInfo()
R version 4.0.2 (2020-06-22)
Platform: x86_64-pc-linux-gnu (64-bit)
Running under: Ubuntu 20.04 LTS

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_US.UTF-8      LC_NUMERIC=C              LC_TIME=de_DE.UTF-8      LC_COLLATE=en_US.UTF-8
[5] LC_MONETARY=de_DE.UTF-8  LC_MESSAGES=en_US.UTF-8  LC_PAPER=de_DE.UTF-8     LC_NAME=C
[9] LC_ADDRESS=C             LC_TELEPHONE=C           LC_MEASUREMENT=de_DE.UTF-8 LC_IDENTIFICATION=C

attached base packages:
[1] stats      graphics  grDevices  utils      datasets  methods    base

other attached packages:
[1] rgdal_1.5-16      sp_1.4-2          mapview_2.9.2      xtable_1.8-4      ggplot2_3.3.2      tmap_3.1
[5] cartography_2.4.1 classInt_0.4-3     stars_0.4-3         abind_1.4-5        sf_0.9-5            wordcloud_2.6
[13] RColorBrewer_1.1-2 magrittr_1.5       igraph_1.2.5       miniCRAN_0.2.13

loaded via a namespace (and not attached):
[1] http_1.4.2          jsonlite_1.7.0      viridisLite_0.3.0    assertthat_0.2.1     stats4_4.0.2
[6] yaml_2.2.1          gdtools_0.2.2       pillar_1.4.6         lattice_0.20-41      glue_1.4.2
[11] uuid_0.1-4          digest_0.6.25        leaflet.providers_1.9.0 colorspace_1.4-1     htmltools_0.5.0
[16] clisymbols_1.2.0    XML_3.99-0.5         pkgconfig_2.0.3       raster_3.3-13        s2_1.0.2
[21] purrr_0.3.4         webshot_0.5.2        scales_1.1.1         processx_3.4.3       svglite_1.2.3.2
[26] brew_1.0-6          satellite_1.0.2      tibble_3.0.3         rcartocolor_2.0.0    generics_0.0.2
[31] farver_2.0.3        ellipsis_0.3.1       withr_2.2.0          leafsync_0.1.0       cli_2.0.2
[36] crayon_1.3.4        ps_1.3.4            fansi_0.4.1          lwgeom_0.2-5         class_7.3-17
[41] tools_4.0.2         lifecycle_0.2.0      munsell_0.5.0        callr_3.4.3          compiler_4.0.2
[46] e1071_1.7-3         systemfonts_0.2.3    rlang_0.4.7          leafpop_0.0.5        units_0.6-7
[51] grid_4.0.2          tmaptools_3.1        dichromat_2.0-0       rstudioapi_0.11      htmlwidgets_1.5.1
[56] crosstalk_1.1.0.1   prompt_1.0.0         leafem_0.1.3         base64enc_0.1-3      labeling_0.3
[61] wk_0.3.2            gtable_0.3.0         codetools_0.2-16     dadjoke_0.1.2        DBI_1.1.0
[66] curl_4.3            R6_2.4.1             gridExtra_2.3        dplyr_1.0.2          rgeos_0.5-3
[71] utf8_1.1.4          KernSmooth_2.23-17   parallel_4.0.2       Rcpp_1.0.5           vctr_0.3.3
[76] png_0.1-7           leaflet_2.0.3        tidysselect_1.1.0

> sink(type = "message")

> sink()

```

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## Citing this document

Daniel Nüst (2020). CODECHECK Certificate 2020-017. Zenodo. <https://doi.org/10.5281/zenodo.4003848>

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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 4.0.2 (2020-06-22)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Ubuntu 20.04 LTS
##
## 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_US.UTF-8      LC_NUMERIC=C
##  [3] LC_TIME=de_DE.UTF-8      LC_COLLATE=en_US.UTF-8
##  [5] LC_MONETARY=de_DE.UTF-8  LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=de_DE.UTF-8     LC_NAME=C
##  [9] LC_ADDRESS=C             LC_TELEPHONE=C
## [11] LC_MEASUREMENT=de_DE.UTF-8 LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets
## [6] methods    base
##
## other attached packages:
##  [1] readr_1.3.1      tibble_3.0.3
##  [3] xtable_1.8-4     yaml_2.2.1
##  [5] rprojroot_1.3-2  knitr_1.29
##  [7] codecheck_0.0.0.9006 parsedate_1.2.0
```

```
## [9] R.cache_0.14.0      gh_1.1.0
##
## loaded via a namespace (and not attached):
## [1] Rcpp_1.0.5      magrittr_1.5      hms_0.5.3
## [4] R6_2.4.1        rlang_0.4.7       fansi_0.4.1
## [7] stringr_1.4.0   httr_1.4.2        tools_4.0.2
## [10] xfun_0.16       R.oo_1.24.0       cli_2.0.2
## [13] ellipsis_0.3.1  htmltools_0.5.0   assertthat_0.2.1
## [16] digest_0.6.25   lifecycle_0.2.0   crayon_1.3.4
## [19] vctrs_0.3.3     R.utils_2.10.1    glue_1.4.2
## [22] evaluate_0.14   rmarkdown_2.3     stringi_1.4.6
## [25] pillar_1.4.6    compiler_4.0.2    backports_1.1.9
## [28] R.methodsS3_1.8.1 jsonlite_1.7.0    pkgconfig_2.0.3
```