

Example 3.6

Disease mapping: from foundations to multidimensional modeling

Martinez-Beneito M.A. and Botella-Rocamora P.

This document reproduces the analysis made at Example 3.6 of the book: “Disease mapping: from foundations to multidimensional modeling” by Martinez-Beneito M.A. and Botella-Rocamora P., published by CRC press in 2019. You can watch the analysis made with full detail at this pdf document, or even execute it if you want with the material available at <https://github.com/MigueBeneito/DMBook>. Anyway, this pdf file should be enough for following most of the details of the analysis made for this example.

The statistical analysis below has been run in R, by additionally using the library `Rmarkdown`, so be sure that you have this software installed if you want to reproduce by yourself the content of this document. In that case we advise you to download first the annex material at <https://github.com/MigueBeneito/DMBook>, open with `Rstudio` the corresponding `.Rproj` file that you will find at the folder corresponding to this example and compile the corresponding `.Rmd` document. This will allow you to reproduce the whole statistical analysis below.

Libraries and data loading

```
# Libraries loading
#-----
if (!require(rgdal)) {
  install.packages("rgdal")
  library(rgdal)
}
if (!require(spdep)) {
  install.packages("spdep")
  library(spdep)
}

# Data loading
#-----
# Valencian municipalities borders
VR.cart = readOGR(dsn = "../Data/Carto", layer = "muni")

## OGR data source with driver: ESRI Shapefile
## Source: "C:\MiguePaloma\Libro\Accompanying material\Data\Carto", layer: "muni"
## with 540 features
## It has 13 fields
## Integer64 fields read as strings: MUNI_ MUNI_ID

# ordering of the VR.cart object as a function of the municipal codes
VR.cart = VR.cart[order(VR.cart$CODMUNI), ]
```

Calculation of the adjacency matrix of the municipalities in the Valencian Region

```
# Determination of the neighbouring municipalities
VR.nb = poly2nb(VR.cart)
summary(VR.nb)
```

```

## Neighbour list object:
## Number of regions: 540
## Number of nonzero links: 3094
## Percentage nonzero weights: 1.061043
## Average number of links: 5.72963
## Link number distribution:
##
##   1   2   3   4   5   6   7   8   9  10  11  12  14  17  21  31  32
##   9  26  50  83 121  97  52  48  23  13   5   5   3   1   2   1   1
## 9 least connected regions:
## 528 512 539 47 130 345 177 211 75 with 1 link
## 1 most connected region:
## 209 with 32 links

# Location of Ademuz and Aras de Alpuente in the cartography
which(VR.cart@data$NOMBRE == "Ademuz")

## [1] 277

which(VR.cart@data$NOMBRE == "Aras de Alpuente")

## [1] 317

# Modification of the set of neighbours of these municipalities by
# defining them also as neighbours.
VR.nb[[277]] = sort(c(VR.nb[[277]], as.integer(317)))
VR.nb[[317]] = sort(c(VR.nb[[317]], as.integer(277)))

# Exporting the neighbours list to a WinBUGS friendly format
VR.wb = nb2WB(VR.nb)

# Exporting the neighbours list to an INLA friendly format
nb2INLA(VR.nb, file = "../Data/VR.graph")

```