Description

The data were collected during a study of the settlement pattern of common terns on a small islet in the Delta d'Ebre (Hernandez and Ruiz, 2003), particularly in the mouths of the Ebre river. The islet was inspected at two-day intervals throughout the 2000 breeding season. The data include the location of each nest, its elevation above sea level, and elevations at a number of additional points (points without nest) on the islet.

In the file called **elevationsIslet.txt**, contains the information of the coordinates and elevation above sea, and in file, called **poly84.txt** contains the coordinates of the borders of the islet**.**

The aim is to predict the elevation above sea level along the small islet using a kriging interpolation.

Answer the following questions:

1. Explore the requirement of stationary mean of the process. In case this requirement is not meet, detrend the data to ensure that the process is stationary in mean. Discuss the results and show the plot of the results.
2. Explore the spatial dependence of the elevation variable using the variogram cloud and bins and the empirical variogram. Discuss the results and plot them.
3. Check the hypothesis of the spatial independence.
4. Check the isotropy property of the process. Comment the results, it's not necessary to overcome the anisotropy.
5. Propose four theoretical variogram and estimate the parameters via restricted maximum likelihood or weighed least square. Select the two variograms best fit the data. Explain the parameters of the chosen variogram (sill, nugget, range and kappa).

6. Predict the elevations along all the area of study using the two variogram selected in point 4. Discuss the type of kriging chosen:
    a. Compare both kriging predictions using cross-validation, and propose the best model.
    b. Show the predictions and their standard errors.

In annex, write the R code used.

Last day to delivery is the November 4t^{h} via Atenea. You can do the task individually or in groups of two people. Please, all the students who want to do the task in group, let me know by email (rabellana@ub.edu) , and write your names. In case of working in group, only one component of group has to send the task via atena