Advanced Regression

TASK 1. Read the file `dispe.doc` and perform the required analyses to address the scientific question proposed in the study. Data are available in the file `dispe.txt`. NOTE: Create a function to extract the p-value of each single analysis and use apply to get a list of those variables that are associated with dispepsia. Then perform a multivariate method using those selected variables.

TASK 2. The file `pulmonCat.txt` contains data about lung cancer mortality for males and females in Catalonia of the period 1975-1997. Each column contains the next variables: gender, year of mortality, number of deaths and at-risk population. Perform next tasks:

1. Create a plot to visualize the temporal trend

2. Estimate a Poisson model (or another model that could control for overdispersion - if exists) and estimate the annual percentage change (APC) of the mortality rates.

3. Visualy detect how many changes in rate trend (e.g. joinpoints) would fit the data

4. Perform a test to determine whether this model having joinpoints is better than the one considering a single trend

5. Use an automatic method to analize these data and determine how many joinpoints are neccesaries to model the temporal trend

6. In case of having several trend changes, estimate the APC of each segment

TASK 3. Researchers have studied two different procedures to recover patients after a heart attack in to hospitals (n=8 each). The response variable is the Bartel index, a variable between 0 and 100 that encodes a functional ability (the larger the better). We have measured this index over 5 consecutive weeks. Data are available at `recuperainfarto.txt`

1. Fit a GEE to see whether there are differences between hospital. Use different correlation matrices

2. Address the same question by using a linear mixed model.

3. Solve the problem using a non-parametric method.

4. Create a plot of each individual using `tc.plot` from package `MXM`