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FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Department of Mathematics

Robust methods in statistical genetics

CMA-FCT-UNL and CEMAT-IST-UTL

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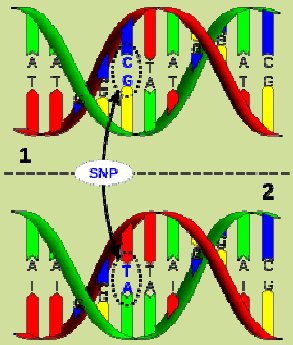
PhD in Statistics and Stochastic Processes (IST-UTL 2011)

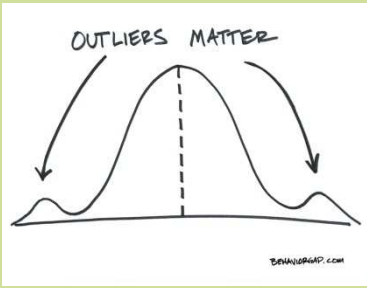
Objectives

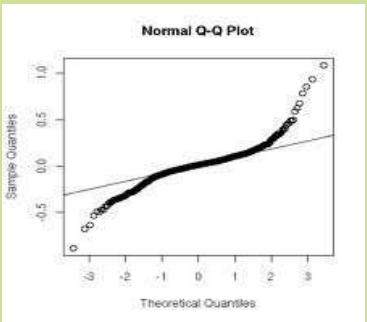
Genetic association studies (GAS) are a field of research with an immense potential for statisticians to develop new methodologies given the sometimes complexity and dimension of the data sets. It is a tip-of-the-day subject in many areas of application, scoping from crop/forest and animal improvement to case-control studies in humans. In this project we will focus on developing new robust statistical methodologies that may be a valuable asset to quantitative trait locus (QTL) detection and genetic association studies of quantitative traits.



Methodology

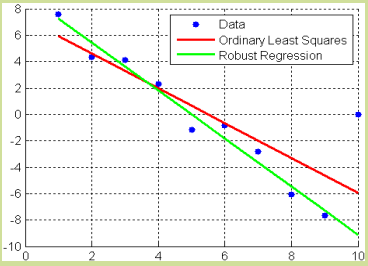
The project will be developed in five stages. In each of the four first tasks a specific problem encountered in GAS will be tackled via robust statistical methodologies and simulation studies will be performed to assess the good performance of the methods. The last task will be devoted to the construction of an R package that will integrate the methodologies developed throughout the project.





Expected Results

We expect to provide to the researcher indication of an adequate robust linear regression model, robust association tests, robust outlier tests, robust coefficient of determination and robust principal component analysis to be used in the context of GAS and QTL analysis. We also expect these tools to be made available in an R package.



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