Regression Methods for Astrophysics
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Foreword

Astrostatistics is spreading through the field of astrophysics at an increasing pace. Astronomers realize that they can benefit from sophisticated tools to analyse their data, but they are not trained to this new way of thinking. The astrostatistic/ astroinformatic international community is now organized and recognized officially as what can be seen as a new discipline, not unlike bioinformatics for biology.

Conferences on data analysis are regularly proposed throughout the world, and they generally are accompanied by tutorial sessions. However, very few dedicated training schools do exist, especially not in Europe.

The present book is the result of the first such kind of school organized in France and, to our knowledge, in Europe. We intended to teach statistics with an emphasis on practice but without forgetting some necessary mathematical background. Statistics is a very demanding discipline for astronomers who should absolutely not hope to obtain a mysterious blackbox to analyse their data in a rigorous way.

Statistics is also a huge domain, and it is not possible to cover, even briefly, most of its aspects. This is why for this very first school, we have chosen to concentrate on the regression, which is the art to predict or explain a variable that is called dependent, to be predicted or explained, from variables that are called independent, predictive or explicatives. This theme is central in astrophysics where the data analysis, the understanding of the different parameters and observables, and the fitting to models, are ubiquitous.

This book is also probably the first book devoted to a detailed and focused topic on astrostatistics.

Besides these innovative aspects and the primary goal of a school in astrostatistics – that is to train astronomers to the use of modern statistical techniques – it also aims at bridging the gap between the two communities having different culture and jargon. During the week they spend together, they learn their respective languages and objectives, and work together during practical sessions. More generally, we strongly encourage astronomers to contact statisticians rather than to reinvent the wheel or to do mistakes.

All participants and lecturers have spent a marvelous week. Obviously the word will propagate that astronomers can tackle statistical tools together with statisticians who are also willing to cope with the challenges of modern astronomical data. We will reconduct the experience, every two years if possible, with a different topic each time.

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