

Preface

The dissemination of the MIXED procedure in SAS and related software have provided a whole class of linear mixed-effects models, some of which with a long history, for routine use. Experience shows that both the ideas behind the techniques and their software implementation are not at all straightforward, and users from various applied backgrounds often encounter difficulties in using the methodology effectively. Courses and consultancy in this domain have been in great demand over the last decade, illustrating the clear need for resource material to aid the user.

As an outgrowth of such courses, Verbeke and Molenberghs (1997) was intended as a contribution to bridging this gap. Since its appearance, it has been the basis for several short and regular courses in academia and industry. In the meantime, many research papers on these and related topics have appeared in the statistical literature. Therefore, it is considered timely to present a second, entirely recast version. Material kept from Verbeke and Molenberghs (1997) has been reworked, and a large range of new topics has been added. The structure of the book reflects not only our own research activity but also our experience in teaching various applied longitudinal modeling courses, such as the Longitudinal Data Analysis course in the Master of Science in Biostatistics Programme of the Limburgs Universitair Centrum, the Repeated Measures course in the International Study Programme in Statistics of the Katholieke Universiteit Leuven, and the Topics in Biostatistics course at the Universiteit Antwerpen.

As with the first version, we hope this book will be of value to a wide audience, including applied statisticians and biomedical researchers, particularly in the pharmaceutical industry, medical and public health research organizations, contract research organizations, and academic departments. This implies that the majority of the chapters is explanatory rather than research oriented and that it emphasizes practice rather than mathematical rigor. In this respect, guidance and advice on practical issues are the main focus of the text. On the other hand, some more advanced topics are included as well, which we believe to be of use to the more demanding modeler.

In the first version, we had placed strong emphasis on the SAS procedure MIXED, without discouraging the non-SAS users. Considerable effort was put in treating data analysis issues in a generic fashion, instead of making them fully software dependent. Therefore, a research question was first translated into a statistical model by means of algebraic notation. In a number of cases, such a model was then implemented using SAS code. This was positively received by many readers and we therefore for most part kept this format. In this version, much of the SAS-related issues are centralized in a single chapter, and we still keep selected examples throughout the text. Additionally, an Appendix is devoted to other software tools (MLwiN, SPlus).

Because SAS Version 7 has not been generally marketed, SAS Version 6.12 was used throughout this book. The Appendix briefly lists the most important changes in Version 7. Selected macros for tools discussed in the text, not otherwise available in commercial software packages, as well as publicly available data sets, can be found at Springer-Verlag's URL: www.springer-ny.com.

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