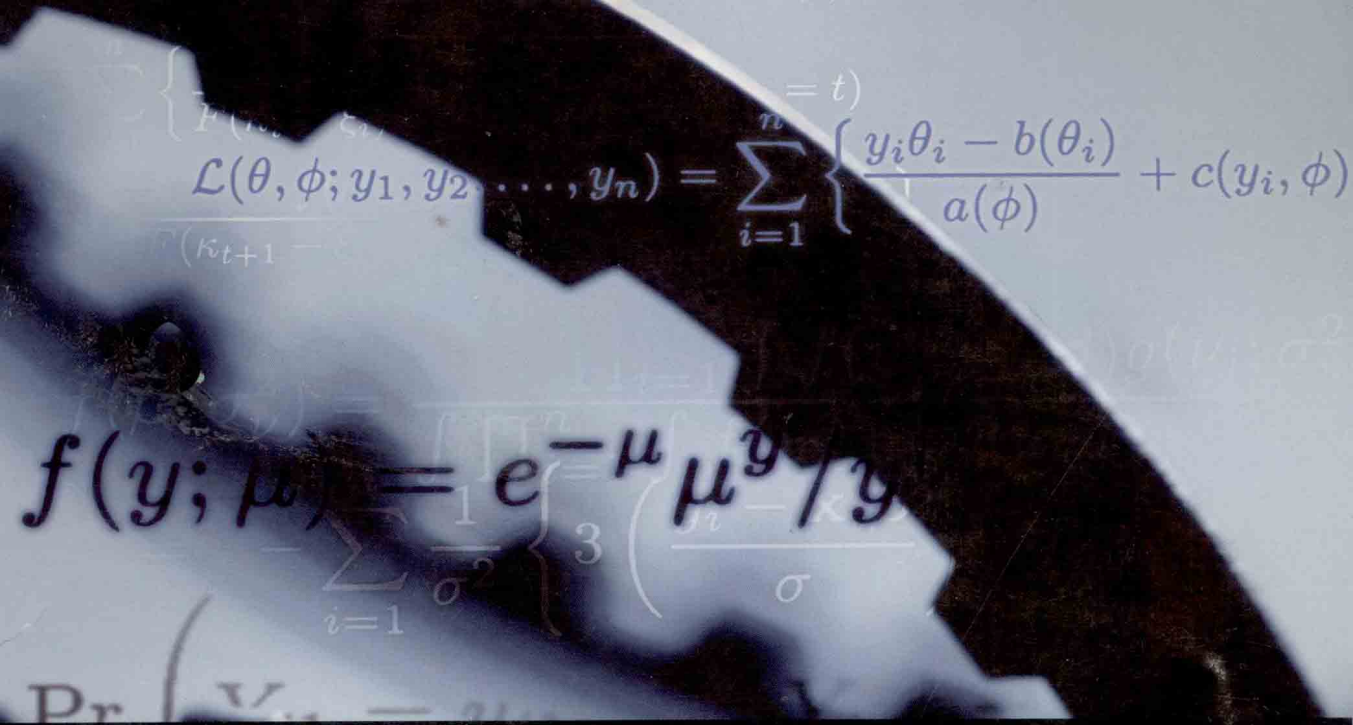
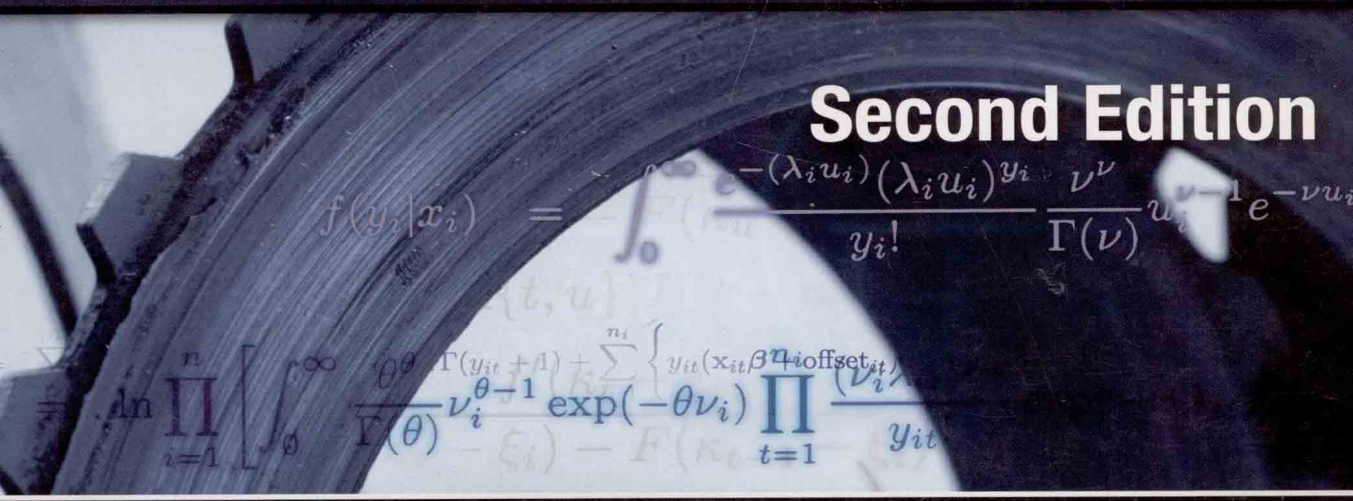


Generalized Linear Models and Extensions



Second Edition

JAMES W. HARDIN
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Stata Press

Generalized Linear Models and Extensions

Second Edition

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For our

wives

Mariaelena Castro-Hardin
Cheryl Hilbe

and

children

Taylor Hardin and Conner Hardin
Michael Hilbe, Mitchell Hilbe,
and Heather Hilbe O'Meara

who were affected by our time away preparing this book (again).

Preface

This second edition of *Generalized Linear Models and Extensions* is written for the active researcher as well as for the theoretical statistician. Our goal has been to clarify the nature and scope of generalized linear models (GLMs) and to demonstrate how all the families, links, and variations of GLMs fit together in an understandable whole.

In a step-by-step manner, we detail the foundations and provide working algorithms that readers can use to construct and better understand models that they wish to develop. In a sense, we offer readers a workbook or handbook of how to deal with data using GLM and GLM extensions.

Many people have contributed to the ideas presented in the new edition of this book. John Nelder has been the foremost influence. Other important and influential people include Peter Bruce, David Collett, David Hosmer, Stanley Lemeshow, James Lindsey, J. Scott Long, Roger Newson, Scott Zeger, Kung-Yee Liang, Raymond J. Carroll, H. Joseph Newton, Henrik Schmiediche, Norman Breslow, Berwin Turlach, Gordon Johnston, Thomas Lumley, Bill Sribney, Vince Wiggins, Mario Cleves, William Greene, and many others. We also thank William Gould, president of StataCorp, for his encouragement in this project. His statistical computing expertise and his contributions to statistical modeling have had a deep impact on this book.

We also thank StataCorp's editorial staff for their equanimity in reading and editing our manuscript, especially Roberto Gutierrez, Patricia Branton, and Lisa Gilmore for their insightful and patient contributions in this area.

Stata Press allowed us to dictate some of the style of this text. In writing this material in other forms for short courses, we have always included equation numbers for all equations rather than only for those equations mentioned in text. Although this is not the standard editorial style for textbooks, we enjoy the benefits of students' being able to more easily (and efficiently) communicate questions and comments on all parts of the material. We hope that readers will find this practice as beneficial as our short-course participants have found it.

James Hardin
Joseph Hilbe

December 2006

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