

Preface to the First Edition

In November of 1995, I was at the University of Massachusetts in Amherst for a few days to attend a symposium held, in part, to celebrate Professor Berthold Schweizer's retirement from classroom teaching. During one afternoon break, a small group of us were having coffee following several talks in which copulas were mentioned. Someone asked what one should read to learn the basics about copulas. We mentioned several references, mostly research papers and conference proceedings. I then suggested that perhaps the time was ripe for "someone" to write an introductory-level monograph on the subject. A colleague, I forget who, responded somewhat mischievously, "Good idea, Roger—why don't *you* write it?"

Although flattered by the suggestion, I let it lie until the following September, when I was in Prague to attend an international conference on distributions with fixed marginals and moment problems. In Prague, I asked Giorgio Dall'Aglia, Ingram Olkin, and Abe Sklar if they thought that there might indeed be interest in the statistical community for such a book. Encouraged by their responses and knowing that I would soon be eligible for a sabbatical, I began to give serious thought to writing an introduction to copulas.

This book is intended for students and practitioners in statistics and probability—at almost any level. The only prerequisite is a good upper-level undergraduate course in probability and mathematical statistics, although some background in nonparametric statistics would be beneficial. Knowledge of measure-theoretic probability is not required.

The book begins with the basic properties of copulas and then proceeds to present methods for constructing copulas and to discuss the role played by copulas in modeling and in the study of dependence. The focus is on bivariate copulas, although most chapters conclude with a discussion of the multivariate case. As an introduction to copulas, it is not an encyclopedic reference, and thus it is necessarily incomplete—many topics that could have been included are omitted. The reader seeking additional material on families of continuous bivariate distributions and their applications should see (Hutchinson and Lai 1990); and the reader interested in learning more about multivariate copulas and dependence should consult (Joe 1997).

There are about 150 exercises in the book. Although it is certainly not necessary to do all (or indeed any) of them, the reader is encouraged to read through the statements of the exercises before proceeding to the next section or chapter. Although some exercises do not add

anything to the exposition (e.g., “Prove Theorem 1.1.1”), many present examples, counterexamples, and supplementary topics that are often referenced in subsequent sections.

I would like to thank Lewis & Clark College for granting me a sabbatical leave in order to write this book; and my colleagues in the Department of Mathematics, Statistics, and Computer Science at Mount Holyoke College for graciously inviting me to spend the sabbatical year with them. Thanks, too, to Ingram Olkin for suggesting and encouraging that I consider publication with Springer’s *Lecture Notes in Statistics*; and to John Kimmel, the executive editor for statistics at Springer, for his valuable assistance in the publication of this book.

Finally, I would like to express my gratitude and appreciation to all those with whom I have had the pleasure of working on problems related to copulas and their applications: Claudi Alsina, Jerry Frank, Greg Fredricks, Juan Quesada Molina, José Antonio Rodríguez Lallena, Carlo Sempi, Abe Sklar, and Manuel Úbeda Flores. But most of all I want to thank my good friend and mentor Berthold Schweizer, who not only introduced me to the subject but also has consistently and unselfishly aided me in the years since and who inspired me to write this book. I also want to thank Bert for his careful and critical reading of earlier drafts of the manuscript and his invaluable advice on matters mathematical and stylistic. However, it goes without saying that any and all remaining errors in the book are mine alone.

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