

Preface

Stein's method has developed considerably since its first appearance in 1972, and presently shows every sign that its range in theory and applications will continue to expand. Nevertheless, there must be some point along this continuing path when the method reaches a certain level of maturity that a thorough, self contained treatment, highlighted with a sampling of its many successes, is warranted. The authors of this book believe that now is this time.

In the years since Stein's method for the normal was introduced, the recognition of its power has only slowly begun to percolate throughout the probability community, helped along, no doubt, by the main references in the field over the last many years, first, the monograph of Stein (1986), the compilation of Diaconis and Holmes (2004), and the series of Barbour and Chen (2005a, 2005b). Nevertheless, to use one barometer, to date there exist only a small number of books or monographs, targeted generally and accessible at the graduate or undergraduate level, that make any mention of Stein's method for the normal at all, in particular, the texts of Stroock (2000) and Ross and Peköz (2007). With a thorough building up of the fundamentals necessary to cover the many forms that Stein's method for the normal can take to date, and the inclusion of a large number of recent developments in both theory and applications, we hope this book on normal approximation will continue to accelerate the appreciation, understanding, and use of Stein's method. Indeed, as interest in the method has steadily grown, this book was partly written to add to the list we can give in response to the many queries we have received over the years, regarding sources where one can go to learn more about the method, and, moreover, to get a sense of whether it can be applied to new situations.

We have many to thank for this book's existence. The first author would like to thank Charles Stein for his ideas which the former learned from him as a student and which has been a rich source of inspiration to him over the years. He would also like to thank his co-authors, Andrew Barbour, Kwok-Pui Choi, Xiao Fang, Yu-Kiang Leong, Qi-Man Shao and Aihua Xia, from whom he has benefited substantially through many stimulating discussions.

The second author first heard about Stein's method, for the Poisson case, in a lecture by Persi Diaconis, and he thanks his first teachers in that area, Richard Arratia and Louis Gordon, for conveying a real sense of the use of the Stein equation, and

Michael Waterman for providing a fountain of wonderful applications. He learned the most about the normal approximation version of the method, and about its applications, from his work with Yosi Rinott, to whom he is most grateful. He has also benefited greatly through all his other collaborations where Stein's method played a role, most notably those with Gesine Reinert, as well as with Aihua Xia, Mathew Penrose, and Haimeng Zhang.

The third author would like to thank Louis Chen for introducing him to Stein's method, and for the inspiration and insight he has provided.

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For updates and further information on this book, please visit: <http://mizar.usc.edu/~larry/nabsm.html>.

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