

Empirical processes with applications to  
statistics - G. R. Shorack and J. A. Wellner.

Csörgö, Sandor

in: Metrika | Metrika | Book Reviews | Article

61 - 61

## Terms and Conditions

The Göttingen State and University Library provides access to digitized documents strictly for noncommercial educational, research and private purposes and makes no warranty with regard to their use for other purposes.

Some of our collections are protected by copyright. Publication and/or broadcast in any form (including electronic) requires prior written permission from the Goettingen State- and University Library.

Each copy of any part of this document must contain there Terms and Conditions. With the usage of the library's online system to access or download a digitized document you accept there Terms and Conditions.

Reproductions of material on the web site may not be made for or donated to other repositories, nor may be further reproduced without written permission from the Goettingen State- and University Library

For reproduction requests and permissions, please contact us. If citing materials, please give proper attribution of the source.

### Contact:

Niedersächsische Staats- und Universitätsbibliothek

Digitalisierungszentrum

37070 Goettingen

Germany

Email: [gdz@www.sub.uni-goettingen.de](mailto:gdz@www.sub.uni-goettingen.de)

### Purchase a CD-ROM

The Goettingen State and University Library offers CD-ROMs containing whole volumes / monographs in PDF for Adobe Acrobat. The PDF-version contains the table of contents as bookmarks, which allows easy navigation in the document. For availability and pricing, please contact:

Niedersaechisische Staats- und Universitaetsbibliothek Goettingen - Digitalisierungszentrum

37070 Goettingen, Germany, Email: [gdz@www.sub.uni-goettingen.de](mailto:gdz@www.sub.uni-goettingen.de)

Shorack GR, Wellner JA: *Empirical processes with applications to statistics*. Wiley Series in Probability and Mathematical Statistics, Wiley, New York 1986, XXXVIII + 938 pp, \$ 59.95.

This encyclopaedic masterpiece fills a gap that was perhaps the widest in the literature of Probability and Statistics. It is the first comprehensive work which covers the whole breadth and depth of the theory of empirical processes based on independent real random variables with wide-ranging applications to the statistical theories of non-parametric estimation and hypothesis testing. Therefore it is of great importance both for statisticians who want to see and understand what is the probabilistic theory underlying many of the procedures they use and for probabilists interested in the statistical motivation for many of the theories they work on. These two aspects are very nicely blended in the book, which is designed to be a basic reference for research workers and a basic textbook for graduate students. This double aim has been fully achieved and hence it is easy to foretell that the book will be doing good service in both of its qualities for decades to come.

The first five chapters present the basic unified weak convergence theory of general weighted empirical processes based on a triangular array, the associated rank processes and corresponding reduced quantile processes, empirical processes of residuals in a linear model, stochastic integral processes, and supremum and  $L^2$  functionals of these processes with various applications to testing and estimation. The approach to weak convergence is the constructional one based on the Skorohod-Dudley-Wichura theorem. The next two chapters and Appendix B are on the martingale-counting process weak convergence techniques as applied to the product-limit estimator based on randomly censored data. Chapters 8 and 9 are on Poisson representations and the exact distribution theory of functionals of the empirical distribution function  $G_n$  of Uniform (0, 1) variables. Then two chapters deal with linear or almost linear bounds for  $G_n$  and its inverse  $G_n^{-1}$  and with the weak convergence of the uniform empirical and quantile processes  $U_n(t) = \sqrt{n}(G_n(t) - t)$  and  $V_n(t) = \sqrt{n}(G_n^{-1}(t) - t)$ ,  $0 \leq t \leq 1$ , in weighted supremum metrics. Chapters 12–15 are devoted to the almost sure behaviour of  $U_n$ ,  $V_n$  and  $U_n + V_n$ , and the next three chapters to the standardized  $U_n$  and  $V_n$ , to  $U_n$  indexed by functions and to the general quantile process. Then three chapters present applications to  $L$ -statistics, rank statistics and spacings, while the next two to problems under symmetry and to reliability, econometric and  $U$ -statistic empirical processes and the bootstrap. A short chapter follows on large deviation and Bahadur efficiency and the next one is about empirical processes of non-identically distributed random variables. The final Chapter 26 is a short glance into the convergence theory of empirical processes on general state spaces, expounded in much more detail in three recent monographs by P. Gaenssler, R. M. Dudley and D. Pollard. Appendix A is a very skillfully compiled collection of inequalities and other miscellanea.

This short list is, of course, just to poorly indicate the scope: only the table of contents takes 18 pages in the book. The number of misprints and inaccuracies I