For civil engineers, at least, this is an extremely useful book. It contains a systematic presentation of reliability theory, it is generously laced with structural examples, and it ends with a chapter on optimization. All in all, this is a difficult presentation to find fault with.

The authors suggest in their preface that the reader may wish to try *Structural Reliability and Its Applications* (P. Thoft-Christensen and M. J. Baker, Springer-Verlag, 1982) "to get some basic understanding of structural reliability theory." This relates to the rather minor complaint that the book has too many examples, say 50 percent of the text. (How could a book have too many examples?) But on the whole the authors deliver a useful and timely text which will serve well both students and practitioners of reliability theory for structures.

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Non-Uniform Random Variate Generation. By LUC DEVROYE. Springer–Verlag, New York, 1986. xvi + 843 pp. $68.00. ISBN 0-387-96305-7.

The nature of the scientific enterprise is such that no work can stand forever as definitive. Still, there is good reason to believe that Devroye's encyclopedic effort, *Non-Uniform Random Variate Generation,* will stand for a good many years as the basic reference in this important area.

The fundamental issue addressed by the book is that of generating those random variables which are of interest in probabilistic models. The main assumption which is made is that one has at hand a fast and reliable supply of pseudorandom variates with the uniform distribution on [0, 1]. The subject of pseudorandom number generation is thus left untouched, and three benefits accrue to that decision.

First, the text is brought directly into the domain of mathematics, without having to deal with the thorny issue of deciding how one can ever certify a pseudorandom number generator as being a good one. We all know perfectly well what it means to study the distribution of $f(U)$, assuming U is uniform, but who can really say when a pseudorandom sequence is an acceptable surrogate for a sequence of independent uniforms?

The second benefit which comes from Devroye's decision to assume a source of independent uniforms is that the text can focus on problems of a probabilistic and computational nature without ever having to develop the number-theoretic tools associated with pseudorandom numbers. Those number-theoretic tools are important and interesting, but they are extravagantly different from the methods familiar to most statisticians and probabilists. Those humble consumers of pseudorandom variates do well to leave the production of pseudorandom numbers to specialists who may not know (or care about) probability and statistics.

The third benefit which Devroye gains by decoupling the process of building nonuniform random variates from the process of psuedorandom number generation is that his 843-page text is given the best possible shot at providing comprehensive coverage of his chosen ground.

There are fifteen chapters in *Non-Uniform Random Variate Generation.* Each of these chapters has from three to seven sections, and every section has exercises. While one can select from these chapters a subset which can serve well as a text in courses in departments of statistics, operations research or computer science, my own sense of the volume is that it serves best as a book for the browsing professional.

An example of what such browsing can turn up is the following result of Letac: If U_i are independent and uniformly distributed on [0, 1], and $X = U_N$ where N is a stopping time, then $E(N) \geq \|f\|_\infty$, where f is the density of X. This particular result is not at the heart of any truly practical generation method, but what a pleasant fact to learn!

By focusing on this example, I should not suggest that Devroye has struck a bad balance between the essential and the intriguing. In fact, much of the otherwise hard-to-find material which Devroye chooses to include does indeed do an honest job of earning its place in the text. For example, the literature possibly offers no more detailed collection of inequalities for densities than that provided by this text. Still, in view of the many nonuniform generation techniques (like the rejection method) which depend on such inequalities, the inclusion of this detailed information is perfectly natural and appropriate.

While creating this encyclopedia, Devroye has naturally contributed to the research in this area, and numerous pieces of his own work are to be found in the volume. One observation due to Devroye which I find particularly interesting is his general answer for the question of generating a random variable with a Polya type characteristic function. For example, how would you generate X with the Linnik distribution, i.e., having characteristic function $Ee^{itX} = (1+|t|^\alpha)^{-1}$, $0<\alpha<1$? Devroye first observes that, if $\phi(t)$ is any Polya type characteristic function, then by taking F such that $F(s) = 1-\phi(s)+s\phi'(s)$, $s>0$ and $F(0)=0$, one can show that F is a distribution function. Next, if Y is a random variable with the Fejer–de la Vallee Poussin density $2\sin^2(x/2)/x^2\pi$ and Z is independent of Y and with distribution F, then $X = Y/Z$ can be proved to have the characteristic function ϕ.

The generation of Y can be achieved by a typical application of the rejection method, and the recipe for Z can be boiled down to the following:

REPEAT
    Generate i.i.d. uniform random variates U, V.
    $W := U^{-1} - 1$
UNTIL $2\alpha U \leqq V$
Return $Z := W^{1/\alpha}$

One general point which generating Linnik variates makes clear to me is that generating algorithms are a powerful tool for understanding distributions, even on a theoretical basis.

Devroye's text does a remarkable job of teaching a great deal of interesting material. All of the fundamentals are covered and, in many cases, we have the opportunity to see those fundamentals subsequently applied with some subtlety. The bottom line concerning this volume is that it is one which all libraries and many individuals will want. It is a source book which will not be soon replaced.

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Verification and Validation of Real-Time Software. Edited by W. J. QUIRK. Springer-Verlag, Berlin, 1985. xii + 245 pp. $29.50. ISBN 3-540-15102-8.

This book is an introduction to the theory and practice of verification and validation of real-time systems. It does not contain ready prescriptions on how to