The book is divided into the following seven chapters: 1) fuzzy sets, *L*-sets, flou sets; 2) fuzzy theories; 3) fuzzy logic; 4) fuzzy systems; 5) fuzzy automata, fuzzy languages, fuzzy algorithms; 6) deciding in a fuzzy environment; 7) fuzzy clustering. In each chapter there are historical and bibliographical remarks. Hence, the reader is provided with good information on the development of the subject and on further questions raised in the literature. The choice of material by the authors concentrates on the essential notions and results, but most of the existing papers have also been taken into consideration. In all, this is a really good book.

Riccati Differential Equations—William T. Reid (New York: Academic, 1972, 216 pp.). *Reviewed by M. R. Chidambara, School of Automation, Indian Institute of Science, Bangalore, India 560 019.*

According to the author, "the purpose of this volume is to present in a unified form a compendium of results for the matrix Riccati differential equations which have wide occurrence notably in variational theory and allied areas of optimal control, invariant imbedding and dynamic programming."

The author has summarized the contents of the book and thereby has helped the reviewer. Chapter I surveys the basic properties of scalar Riccati differential equations, while Chapter II treats the matrix ($m \times n$) version. Chapters III and IV are concerned with some special cases involving symmetric and Hermitian Riccati matrix differential equations, their properties, and solutions. Chapter V deals with applications in various fields such as transmission line phenomena, theory of noise and random processes, optimal control theory, diffusion problems, and invariant imbedding.

Basically, the book is well written. An excellent feature of the book is that each chapter contains historical background, notes, and remarks on the respective topics. References pertinent to individual sections are cited, thus fulfilling the purpose with which the book was written. There is a good list of references which includes many contributions by the author.

One drawback of the book is that there is no discussion on the numerical solution of matrix differential equations, an aspect which is of great importance to workers in the areas of applications mentioned above. Given below are some references (in this regard) which complement the contents of the book. For a method of direct numerical integration of the Riccati matrix differential equations containing both time-varying and time-invariant matrices see [1]. For a discussion on the instability of the Riccati matrix differential in the forward direction and consequent numerical inaccuracies see [2]. For a complete solution of the Riccati matrix differential equations with time-invariant coefficient matrices see [3]. For an appraisal of the computational aspects and difficulties that are involved in the numerical solution of the Riccati matrix differential equations, for some special methods of solution, and for the steady-state solution see [4]–[12].

In summary, the reviewer recommends a place for this book on the bookshelf of those that have something to do with Riccati differential equations.

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Statistical Techniques in Simulation—Jack P. C. Kleijnen (New York: M. Dekker, Part I: 1974, xv + 285 pp., $17.75; Part II: 1975, xv + pp. 286–775, $29.50). *Reviewed by G. Arthur Mihram, P.O. Box No. 234, Haverford, PA 19041.*

The book, arranged in two volumes (parts), each comprising three chapters, constitutes the lengthiest text to date on simulation methodology [1]. Its bibliographies, arranged chapter-by-chapter, have been excelled in number perhaps only once.

Part I comprises three chapters: I. Fundamentals of Simulation; II. Statistical Aspects of Simulation; and III. Variance Reduction Techniques. Part (volume) II follows with three further chapters: IV. Design and Analysis of Experiments; V. Sample Size and Reliability; and VI. Monte Carlo Experimentation: A Case Study. Each chapter concludes with a short set of exercises and Part II with their solutions.

The text's strong point is its exposition (in Part II) of topics relatively lightly treated in earlier books: Screening Designs (Section IV.7); Multiple Comparison Procedures (Subchapter V.B); and Multiple Ranking Procedures (Subchapter V.C and Chapter VI).

The book's weak points are three: 1) its failure to recognize that the modeling process is now better understood [2] than the procedure outlined by Naylor *et al.* [3], a procedure which described an intrinsic trial-and-error approach to obtaining simply a *mathematical* formulation which would then, if deemed adequate, be programmed and computerized; 2) its failure to note that variance-reduction techniques (the subject of Chapter III) are generally inappropriate [4] to proper *simular* formulations; and 3) its failure to deal with time series analysis in any extensive detail.

A proper *simulation* is a model consisting of a set of algorithms, each algorithm describing the "thought process" which would mime a decider in the natural system to be modeled. Thus a simular model is a second-person (computer-directed, algorithmic) description of a system; whereas, a strictly mathematical model is a third-person description which, though it may be programmed and computerized, typically fails to reveal that its author understands *operationally* the dynamics of change in the real-world system being modeled. This distinction is particularly important for an understanding of the quite intrinsic incredibility of extant computerized models (mathematical) of societal and ecological systems [5]. The book does not treat this very important distinction.

Dr. Kleijnen has expended a considerable effort to show empirically (Chapter III) that variance-reduction techniques, appropriate to the Monte Carlo evaluation of integrals of known integrands, work in many cases. Yet, only the careful reader might note (p. 198) that there do exist simular responses for which the application of the techniques leads to an undesired variance *augmentation*.

Part I contains an Appendix (III.1) on the "jackknife" statistic, another topic seldom discussed in the literature of simulation methodology. But it is Part (volume) II which simulationists might find more useful, though one must be advised that Dr. Kleijnen does not delineate the established principles by which the conditions for the applicability of these statistical techniques are assured. The terminal chapter (a case study) reveals that Dr. Kleijnen, like too many simulationists, views simular experimentation as a Monte Carlo exercise, using the model as though there were at hand a deterministic integrand, itself a known transformation of the model's seed.

Nonetheless, the lengthy discussion of statistical topics, such as multiple comparisons and multiple ranking techniques, make Part (volume) II a welcome addition to the literature of simulation methodology.

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