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book reviews

DESIGN PROCESS, Vol. IV, by D. Baker, et al., Bell Telephone Laboratories, Prentice Hall Inc., 1972, 595 pp.

REVIEWED BY BERNARDO RETCHKIMAN[1]

SCIENTISTS, engineers, or students concerned with the physical realization of not only electrical or electronic circuits, but also physical systems, will find in this fourth and final volume of the series on *Physical Design of Electronic Systems*, a wealth of practical experience and a useful summary of the "state of the art" in many aspects of electronic engineering design and production. Special emphasis is given to improving the efficiency of system design process by means of digital computers.

The contents of this book are very digestible to the engineer who is already familiar with classical control system theory, computer programming, electronics, and solid state physics. Especially commendable is the contributor's strategic selection of illustrative examples, to demonstrate solution techniques or to compare various types of results.

Part I, consisting of 4 chapters, is entitled "Logical and Functional Aids to Design." The emphasis in the first chapter is on the choices for decisions and design. In chapter 2 Professor Cottingham introduces a brief but excellent survey of classical methods of optimization theory. He continues in chapter 3 with an adequate survey of the theory of errors, which commences with definitions of statistical tools for inference. This first part ends with a chapter dealing with project scheduling, by means of PERT and Critical Path methods.

Part II, consisting of 2 chapters, is entitled "Computer Aids to Design." Chapter 5 includes some "digital computer fundamentals" illustrating several problems with examples of computer programming in Fortran language. Chapter 6 is on computer application in the design process, and considers various programs used in assisting the reader designing electronic equipment with a "machine-aid."

Part III, with 3 chapters, is called "System Reliability" and focuses its attention on "Allocation Processes." Topics covered include system reliability or availability goals, apportioned into requirements for the various subsystems, lower level equipment subdivisions, down to electronic parts, and discussing the design information needed to determine failure rates.

The last part of the book, consisting of 3 chapters is named "Approach to Physical Design," and concentrates on the physical design problem. System requirements are established in chapter 10. The physical design of the modules which make up the partitioned structure, together with their interconnection, are shown in chapter 11. Chapter 12 concludes with a case study, giving a good application example.

Reliability engineers and circuit and systems designers are recommended to supplement their theoretical and practical understanding, by the comprehension of real problems that can be achieved with the help of this volume. They will find here also, a manual of expertise that will assist them, in an understandable approach to their everyday problems.

The reviewer believes that this book is an important contribution to the literature on the design of electronic systems. The authors are to be commended for doing an excellent job of organizing and writing these four volumes of research material.

[1]Professor, Electrical Engineering Department-Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, México, D. F.

TOWARD A GENERAL SCIENCE OF VIABLE SYSTEMS, by A. S. Iberall, McGraw-Hill, 1972, 414 pp.

> VIABLE—(*a*) at that stage of development that permits it to live outside the uterus, (*b*) able to take root and grow.
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> Webster

REVIEWED BY JOHN W. BREWER[1]

OUR age is one in which some intellectuals are groping for a grand synthesis. Boulding [1][2] makes his attempt along standard disciplinary lines while Forrester [2] and Odum [4] boldly strike out in new directions. These persons receive much encouragement, financial and otherwise, from a world that no longer believes it understands the long range implications of accelerating population growth and resource utilization and which no longer has faith in standard academic prognoses.

Iberall has recently made the most heroic attempt of all to develop a formalism for analyzing the dynamics of large systems. He begins with a discussion of systems of elementary particles and ends with a discussion of systems of solar systems. Along the way, man, communities, and nations are discussed in the proper place.

[1]Department of Mechanical Engineering, University of California, Davis, Calif.

[2]Numbers in brackets designate References at end of review.