2. "The Pontryagin maximum principle and some of its applications," by James A. Meditch (pp. 55–74). The maximum principle and its application to the design of systems is described and illustrated.

3. "Control of distributed parameter systems," by P. K. C. Wang (pp. 75–172). The extension of the theory for lumped parameter systems (ordinary differential equations) to distributed parameter systems (partial differential equations or integral equations) and the difficulties are discussed.

4. "Optimal control for systems described by difference equations," by Hubert Halkin (pp. 173–196). This contribution provides in the simpler context of difference equations an introduction to the geometrical and topological method in the theory of optimal control and includes a proof of the maximum principle for difference equations.

5. "An optimal control problem with state vector measurement errors," by Peter R. Schultz (pp. 197–243). The problem discussed is a linear stochastic one with a quadratic performance criterion, and its study is based on the method of dynamic programming.

6. "On line computer control techniques and their application to re-entry aerospace vehicle control," by Francis H. Kishi (pp. 245–557). Methods available "to perform adaption in a control process" are based on observation of input-output data, the estimation of parameter values and state-variables, and thence the computation of optimal control. Methods available for the linear problem with quadratic performance criteria are summarized and then extended to the same problem with control constraints. Results of computer simulation are given. An application to a phase of the re-entry problem is presented in outline.

This first volume indicates that the series will prove to be of considerable value to all concerned with the theory and design of control systems and with the education of system engineers. The chapters are written independently and this results in much repetition, particularly in the statement and review of the control problem. This has both advantages and disadvantages, but it is to be hoped that the contributors to Volume II will, with the appearance of Volume I, avoid needless repetition and the introduction of new terminology, and that they will relate their contributions to those previously appearing in the series.

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34[P, Z].—M. Nadler, *Topics in Engineering Logic*, Pergamon Press, New York, 1962, ix + 231 pp., 21 cm. Price $9.50.

Too often simplified notations and methods of procedure are not sufficiently emphasized in the literature. Indeed, as Nadler states ". . . the history of mathematics shows that progress is not indifferent to notation." This remark is particularly apropos when applying mathematical results to modern technological problems. There are many instances in the history of modern technology in which mathematical results that could be applied with great benefit are not so applied, simply because of the lack of proper notations and procedures.

The need for such notation arises from three reasons. First, the engineer or technologist who is to apply the mathematical results will, in general, not be familiar with the mathematical theory or its mathematical background. In order to bring the mathematical results to his immediate attention, without his extensively reviewing mathematical background and theory, the engineer requires a specialized notation designed especially to display the required results. Second, the engineer's primary attention will be on his technological problem rather than on the mathematical methods. Therefore, a systematic mathematical notation that can enable the mathematical results to be applied by rote, with as little analytical thought as possible, will more likely be utilized by the engineer, unless analytical ingenuity must be concentrated on the engineering pattern at hand. Third and finally, applying a mathematical theory to a specific technological situation is frequently far from trivial. This transition, from theoretical mathematical results to specific applications, can be substantially aided by means of an application-oriented notation, by means of which the relationships between the mathematical entities and their properties can be more readily identified with the hardware components and "real world" phenomena being investigated.

Nadler's book can therefore be praised as a step in the right direction, since its main purpose is to present one such application-oriented notation. The notation involves "logical matrices," and the application is the logical design of digital electronic circuits. The logical matrix is attributed to Marquand, Veitch, and Svoboda, and consists in the more extensive use of the "Veitch Chart" than is normally considered in most texts. The main advantage of the method rests upon the convenience that results from writing the truth values of a Boolean function of n variables as a two-dimensional array, where the columns correspond to all combinations of truth values of r of the variables, and the rows correspond to all combinations of the remaining $n - r$ variables. In particular, the combinations of truth values are so chosen that they form the binary numbers from 0 to 2^r from left to right, and from 0 to 2^{n-r} from top to bottom. Various observations about patterns made by such arrays are applied to the problems of minimizing Boolean functions, of forming self-correcting codes, of synthesizing circuit designs, etc. Other subjects associated with logical design of digital circuits are considered, including redundancy.

Nadler's presentation is best read by one already familiar with the problems of logical circuit design, and presents one approach to computational methods for various problems. Manual computational feasibility is stressed. The book could be a useful addition to the library of the engineer who is interested in various notations devised to aid such logical design.

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35[S, X].—J. S. R. Chisholm & Rosa M. Morris, *Mathematical Methods in Physics*, W. B. Saunders Company, Philadelphia, Pennsylvania, 1965, xviii + 719 pp., 23 cm. Price $10.00.

In spite of its title, and the correct number of authors, one should not expect to find a competitor here for Courant-Hilbert, Morse-Feshbach, Jeffreys-Jeffreys,