is able to determine various feedback coefficients in the classical manner from the oscillator to multipositioned detectors.

Gyftopoulas, Henry, Kaplan, and their more sophisticated new school, say "No." Their argument is ". . . that the same high modes that contribute to the dependence of the flux oscillations on position contribute also to the reactivity that corresponds to the oscillating absorber." And ". . . if reactivity is computed in a consistent manner, then the ratio of flux-to-reactivity is independent of position."

Another large fraction of the book is devoted to optimal control solutions. Optimal control has gained very little headway in conventional power reactor systems, probably because simpler methods do the job adequately and economically. In the case of nuclear rocket control, however, a number of factors contribute to the usefulness of a more complex control system. In particular, it will be realized that nuclear rocket control is accomplished primarily by the use of propellant flow as the principal control parameter. As the amount of propellant available in today's type of nuclear rocket is strictly limited, it is essential that the control function be performed with precision. Several useful aspects and systems are presented in the conference proceedings by Kliger, Mohler, Weaver, and others.

The noise-analysis papers in the volume are few in number and represent only the spot thinking of some of the leading theoreticians. More comprehensive information will be available from the Proceedings of the University of Florida Noise Symposium Series. The papers on pulsed-neutron operation are more numerous and of a great variety, making cohesive comment difficult. The one by Becker and Quisenberry ("Spacial Dependance of Pulse Neutron Reactivity Measurements") does, however, attempt to bridge the gap between the above-mentioned classical fixed local reactivity measurement theory and the newer modal interpretations.

For a most interesting historical state-of-the-art reference as of 1965, *Neutron Dynamics and Control* is a must for all serious scientists in the field. Messrs. Hetrick and Weaver are to be commended not only for the fine conference and the excellent editorial coordination, but also for the obvious quality leadership they have brought to the University of Arizona in this field.

M. A. Schultz

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October 27, 1966

About the Reviewer: M. A. Schultz is one of the early workers in neutron kinetics and control. At the conference in Tucson where the above proceedings were generated, he was described by Jack Chernick to the local newspaper, as an old dinosaur who still used analog computers. Mr. Schultz has since reformed and he is now selling digital equipment as President of Milletron, Incorporated of Pittsburgh, Pennsylvania.

Introductory Nuclear Theory (Second Edition). By L. R. B. Elton. W. B. Saunders Company, Philadelphia, Pennsylvania (June 1966). 332 pp. $6.75.

Since the first edition of the book under review was published in 1959, the main interest in nuclear physics has shifted from the investigation of nuclear forces to that of nuclear structure. Reflecting this trend, Professor Elton has carefully recast this new edition. Many chapters have been brought up to date, and new sections have been added which account for a net increase of 43 pages. Among the main additions are a treatment of the scattering of polarized beams, a more thorough treatment of parity violation and the coupling constants in β decay, and a section on the newly developing field of direct reactions.

The present textbook is written for seniors or first-year graduate students in physics or nuclear engineering. The book is almost self-contained and should be helpful also to students who wish to study the subject independently outside the classroom. No previous knowledge of the properties of nuclei is assumed and a knowledge of elementary nonrelativistic quantum mechanics is sufficient for its reading. By his masterly treatment of principles and judicous selection of topics, Professor Elton presents the essentials of theoretical nuclear physics in a compact and elegant form.

The content is suitably organized and most subjects are covered well. The first two chapters are concerned with qualitative facts and general properties of nuclei. Two-nucleon systems at low energies and nuclear forces are dealt with in the next two chapters. A fairly complete outline of various nuclear models is given in Chapter 5 with special attention given to the shell and collective models. It is followed by a chapter on nuclear reactions including recent developments in optical model and direct reactions. Treatments of nuclear disintegration, interaction of nuclei with the electromagnetic field, nuclear beta decay, and an outline of the meson theory of nuclear forces form the last four chapters. Because of his many contributions to several aspects of scattering and reaction problems, the author is able to write authoritatively and lucidly on these subjects.

The problems at the end of each chapter should be useful to the student to test his understanding of the topics discussed. Many are mathematical exercises in the use of quantum mechanics on nuclear physics problems. In the new edition, some mathematical material needed in several chapters is put into an Appendix. A comprehensive, up-to-date, 20-page Table of Nuclear Constants should be useful to both students and research workers in the nuclear field. For detailed studies beyond the scope of the present text, a list of books and adequate references to the original literature is given. Almost all the references listed in the second edition are new, indicating the rapid progress being made in nuclear physics.

The book would have been more challenging and useful with the addition of the general and powerful tools of angular momentum theory often called Racah algebra. Since the deuteron stripping is the best-known direct reaction and plays an important role in nuclear spectroscopy, the omission of its elementary theory based on the plane-wave Born approximation is somewhat disappointing.

The book is, as a whole, by far the best introductory text on nuclear theory available today. The relatively low price is another attractive feature of this excellent book.

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About the Reviewer: J. Y. Park is an assistant professor of Physics at North Carolina State University. He received his BS from Seoul National University, MS from Rensselaer Polytechnic Institute, and PhD from the University of North Carolina at Chapel Hill. His main research interest lies in the areas of nuclear structure and reactions, especially direct reaction theories. He is a member of the American Physical Society, American Association of Physics Teachers, Sigma Xi, and Sigma Pi Sigma.