

ticipants involved in such a major task.

These personal accounts are, of course, not history, but they do record for the benefit of historians and the rest of us insights into a few of the many facets of the Manhattan Project and the events leading up to it. And the authors have managed to convey to the reader the sense of urgency and intellectual excitement that drove the pioneering atomic scientists to initiate the atomic age.

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An Introduction to Invariant Imbedding

R. Bellman, G. M. Wing

250 pp. Wiley, New York, 1975. \$18.95

This text constitutes another welcome volume in the Wiley Interscience series. Richard Bellman and G. Milton Wing take their readers to the forefront of a fascinating region of research conducted in mathematics and applied disciplines, including among others physics, statistics and engineering.

The first three chapters develop the

theory and are accessible to anyone with a knowledge of differential equations and some applied mathematics. These introductory chapters lay the foundation for the following more advanced subject matter, which for the most part has been available mainly in research journals up to the present. Here, invariant imbedding methods are employed to discuss problems formerly attacked by classical techniques.

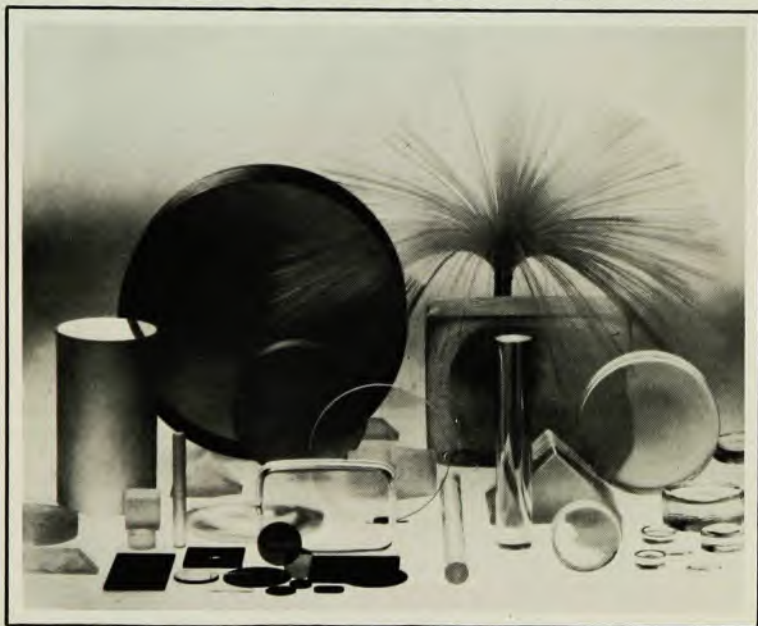
Though the notation is not always standard, I do not know of any other book in this field written so lucidly and containing such a variety of material. The book develops into a remarkable text as the authors progress. The method of invariant imbedding has been discussed by others, but few have focused entirely on the subject matter as have Bellman and Wing.

The authors present their ideas most effectively by means of clear definitions and numerous applications. Theory and computational procedures are combined and given equal emphasis. From the very beginning Bellman and Wing explain precisely what they intend to do. Such topics as wave propagation, time-dependent problems, random walks, transport theory, radiative transfer and integral equations are given special emphasis. There are a number of well chosen problems, references and a summary at the end of every chapter. Among books on invariant imbedding available in English today, this book represents a precise and valuable account. In a letter to me, Bellman states his desire to use it as a text, and indeed it appears suitable for the curriculum of any inquiring university. I highly recommend *Invariant Imbedding* either as a text or as reference material.

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book notes

Topics in Applied Physics, Vol. 7: Integrated Optics. T. Tamir, ed. 315 pp. Springer-Verlag, New York, 1975. \$34.40

In her article in this issue of *PHYSICS TODAY*, Esther Conwell surveys the development of integrated optics, or, in her words, "the use of microwave techniques at optical frequencies to perform such functions as transmission, modulation, switching, mixing and upconversion . . . [and] . . . miniaturization of components such as lasers, modulators, detectors . . . [and] . . . integration of different optical functions on the same substrate." In this book, referenced by Conwell in her article, Theodor Tamir of the Polytechnic Institute of New York, Brooklyn, has brought