



Book Reviews

Introduction to Optimization of Structures, by N. V. Banichuk (English translation by V. Komkov of the 1986 Russian edition). Springer-Verlag, New York, 1990. 300 pp. Price: \$89.00.

REVIEWED BY C. W. BERT¹

This book presents an introduction and review of the state of the art of structural optimization from a Russian point of view. It has two parts: the first part, consisting of five chapters, presents the theory and techniques of structural optimization. The second part, consisting of three chapters, is devoted to applying the individual criteria of strength, rigidity, and stability.

Chapter 1 presents an overview of static, dynamic, and multicriteria optimal structural design. Chapter 2 introduces the concepts of auxiliary design parameters and dual optimization problems, while Chapter 3 discusses optimality conditions. Chapter 4 covers both analytical and numerical techniques for optimization of distributed-parameter structural systems. The specific techniques discussed include analytical, perturbation, finite difference, finite element, and boundary integral methods. Chapter 5 treats techniques for optimizing discrete structural systems.

Chapter 6 deals with designing for minimum weight on the basis of constraints on strength. Structures considered include beam webs, many-member trusses, shells of revolution, and plates with stress concentration. Chapter 7 is concerned with designing for rigidity criteria in straight and curved beams, torsion bars, shells, and plates subjected to either plane stress or plate bending. Chapter 8 involves optimization for either conservative or nonconservative elastic stability with emphasis on problems involving one physical dimension.

The book, unfortunately, does not give much detail on numerical/computational considerations nor does it consider structures composed of composite materials. However, it contains an extensive number of references (totaling 444) at the end of each chapter plus an additional bibliography listing 72 publications. The book is well written and it is recommended to those involved in structural optimization.

Tyre Models for Vehicle Dynamics Analysis, edited by H. B. Pacejka, Swets & Zeitlinger, Amsterdam, 1993. 192 pp. Price: \$145.00.

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This volume constitutes the Proceedings of the First Inter-

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national Colloquium on Tyre Models for Vehicle Dynamics Analysis, held in Delft, The Netherlands, Oct. 21–22, 1991. It is also a supplement to Vol. 21 of the journal, *Vehicle System Dynamics*.

The volume contains 14 papers and two abstracts. The conference was truly international with papers from Austria, Czechoslovakia, Germany, Italy, Luxembourg, The Netherlands, Sweden, United Kingdom, and the U.S. The topics of the papers ranged from analytical, empirical, and numerical modeling to system identification and experimentation. This book should be of interest to engineers and researchers concerned with the title subject, as well as automotive dynamics specialists.

Concepts in Submarine Design, by Roy Burcher and Louis Rydill. Cambridge University Press, New York, 1994. 300 pages. Price: \$74.95.

REVIEWED BY C. W. BERT¹

This interesting book is the first one on this subject to appear in the past ten years. Its authors have been involved in design of naval submarines for about 30 years. Although emphasis is on naval submarines, much of the information should be applicable to other kinds of manned underwater vehicles.

The objective of the book is to introduce the process of designing a submarine by providing the fundamental principles. More emphasis is placed on creativity and concept synthesis than on methods of analysis.

The first chapter provides a brief introduction to the general principles of submarine design, followed by a short chapter on the history with emphasis on design milestones since 1899. Succeeding chapters cover hydrostatics, the weight/space relationship, structures, propulsion, geometric form and internal arrangements, dynamics and control, major systems, and construction and costs. The final chapter ties all of the previous aspects together in connection with the process of generating a conceptual design to meet the operational requirements. A list of references and bibliography are provided at the back of the book.

This book should be of great assistance to the novice embarking on a career in submarine design or operation. It may also be of interest to naval architects and marine engineers experienced with surface ships but not familiar with the special requirements for underwater vehicles.