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Book Reviews

Structural Dynamics: Theory and Computation by Mario Paz, Van Nostrand Reinhold Co, New York, 1980, 468 pages, $29.95

REVIEWED BY STANLEY HALPERSON[1]

This book, in the Van Nostrand Reinhold Environmental Engineering Series, is, for the most part, clearly printed with few typographical errors. Its purpose is to serve as a text for engineering students, and as a reference for practicing engineers.

The book is divided into four parts: I, Structures Modeled as a Single Degree-of-Freedom System; II, Structures Modeled as Shear Buildings; III, Framed Structures Modeled as Discrete Multidegree-of-Freedom Systems; and IV, Structures Modeled with Distributed Properties. An appendix of sixteen well-documented computer programs is discussed in the text and used to solve illustrative examples. The reader is encouraged to utilize the programs to become familiar with them; an excellent idea, provided the user is aware of the limitations of the programs. Unfortunately, three of the programs did not reproduce well, limiting their usefulness.

Part I is further subdivided into studies of forced vibrations of single degree of freedom systems (damped and undamped) to general loading, as well as free vibration analysis. Important topics include Fourier analysis methods (with a nice introduction to the Fast Fourier Transform), non-linear structural response (containing elasto-plastic analysis concepts), and response spectra fundamentals.

In Part II stiffness and flexibility matrices are introduced together with their relationships. Also treated are the free, forced, and damped motions of shear buildings. An important chapter on static condensation and its application to dynamic problems is included, a topic necessary in effective utilization of finite element programs for structures with many degrees of freedom.

Part III is a lucid exposition of more complex structural systems such as beams, plane frames, grids, three-dimensional frames, and trusses. This section ends with a good chapter on a nonlinear response of multidegree-of-freedom systems, including a section on the Wilson-θ method. It should be noted that the popular Newmark-β integration method is not discussed explicitly although the linear acceleration method (which is a special case of the Newmark-β method) is the major ingredient of the θ method.

The last major division, Part IV, concerns structures modeled with distributed properties. As with the rest of the book the material is well explained.

This book is well organized and presented. It is suitable as a two-semester course for seniors or first year graduate students, and as a reference for working engineers. It provides a basis for advanced studies in finite element techniques and dynamics of elastic systems. Additional material on the vibration of multi-span beams and energy concepts as applied to structural dynamics would have enhanced the book somewhat, but this is not a major deficiency.

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