



BOOK REVIEW

VIBRATION OF STRUCTURES AND MACHINES: PRACTICAL ASPECTS, (THIRD EDITION), 1999, by Giancarlo Genta. New York, Berlin, Heidelberg: Springer. 591 pp. Price [hard cover] DM 149.00, USD 69.95 ISBN 0-387-98506-9.

This book presents a broad and relatively very deep information on vibration of machines and structures. It contains an introduction, six chapters, bibliography and index. In comparison with the second edition, only some formal changes for better understanding have been made.

The first chapter deals with discrete linear systems, and is a very good guide through the linear theory of oscillatory systems; harmonic, non-harmonic and random excitations are considered.

Chapter 2 is dedicated to continuous linear systems. Vibration of beams, bars, plates and wave propagation are discussed. The classical and finite element methods are explained.

Chapter 3 deals with non-linear discrete systems and also with parametrically excited systems. Although these systems represent a very broad class the most important problems and phenomena are considered and discussed, e.g., stability investigation, periodic and non-periodic resonance vibration, strange attractors, etc. The basic theory of parametrically excited systems is presented (Floquet theory, Mathieu and Hill equations).

Problems of rotor dynamics are treated in Chapter 4. Not only vibration due to the unbalance but also the stability problems and self-excitation are discussed, e.g., the gyroscopic effect, the effect of oil bearings, non-rotating and rotating unisotropy, etc. Also the flexural vibration dampers and balancing technique are discussed.

Chapter 5 deals with dynamic problems of reciprocating machines, e.g., torsional vibration in crank shafts, torsional vibration dampers, axial vibration and problems of balancing. Also the effect of parametric excitation for torsional vibration in the crank shaft mechanism is considered.

A short outline on controlled and active systems is presented in Chapter 6. Different control systems and basic control laws are discussed. A dynamic study of rotors in magnetic bearings close the chapter.

The exercises attached to each chapter represent a very good help for the students. In five appendices, some solution methods are presented. A bibliography and index end the book.

Of course, it would be possible to mention some further problems and phenomena but vibration theory is now so widely developed that is impossible to cover all the material in a limited extent of one book.

The book can serve as a very good text book, especially for postgraduate students, and is a helpful guide for researchers in vibration and for machine designers. The fact that within 6 years after the first edition in 1993 a third one has appeared proves the quality of the book.

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