Vibration Dynamics and Control
Giancarlo Genta
Springer Science+Business Media, New York NY, (2009). 855 pp, (hardcover), 119.00 USD, ISBN 978-0-387-79579-9

This is reorganization and updating of Genta's *Vibration of Structures and Machines*. The former book was organized into a large number of shorter chapters to make it more helpful to the reader.

The book is composed of 30 chapters, subdivided into three parts.

Part I Dynamics of Linear, Time Invariant Systems—Chapters 1 through 17

Chapters 1 through 10 deal primarily with forced and free vibrations, damped systems, and random vibration. Chapter 11 is an introduction to the dynamics of controlled structural systems (e.g. active system control). Chapters 12 and 13 deal with the dynamics of continuous systems using discretization techniques. Chapter 12 deals exclusively with the vibration dynamics of beams; which leads into Chapter 13 covering rectangular plates, membranes (i.e. very thin plates), taut strings and a brief introduction to the propagation of sound waves in pipes. Chapter 14 is general discussion of discretization techniques described as "the replacement of partial differential equations {with derivatives with respect to time and space coordinates} with a set of linear ordinary differential equations containing only derivates with respect to time which are generally of the same type seen for discrete systems" (hence the term discretization, i.e. process of transferring continuous models and equations into discrete counterparts). Chapter 15 contains a description the finite element method (FEM), describing its main features and comparing it with other discretization techniques. Chapter 16 presents the analysis techniques for multibody systems (i.e. the study of multiple masses and their intervening connections). Chapter 17 explores vibration systems as presented in the previous chapters but with a moving reference frame.

Part II Dynamics of Non-linear and Time Variant Systems—Chapters 18 through 22

Chapter 18 describes the free or natural motion of conservative nonlinear systems. Chapter 19 describes the forced response of a conservative nonlinear system. Chapters 20 and 21 deal with the free and forced (respectively) of damped nonlinear systems. And Chapter 22 deals with time variant and autoparametric systems (i.e. where one part of the system parametrically excites another; the classic example is that of an elastic pendulum).

Part III Dynamics of Rotating and Reciprocating Machinery — Chapters 23 through 30.

These chapters present a more applied approach of vibration mechanics. Chapters 23 through 28 are devoted to the study of the dynamics of rotating machines. Chapters 29 and 30 discuss the vibration aspects of reciprocating machines.

SI units in this book are used with few exceptions (i.e. the use of degrees for angles as opposed to radians). The bibliography is excellent including 173 references for general mechanical vibrations, 26 references for nonlinear and chaotic vibrations and 26 references for dynamics of rotating and reciprocating machines. In addition the index seems well suited for the subject matter presented in the text.

This text is very appropriate for graduate level studies in vibration and machine design; and is perfect as a reference for mechanical engineers involved with the design of machine elements.

Reginald H. Keith
Hoover and Keith Inc.,
11391 Meadowglen Ln., Suite D,
Houston TX 77082 USA
reggie.keith@hoover-keith.com