motivated by the additional response phenomenology of the cross-flow systems and the interesting case of chaotic solutions due to the presence of the Šilnikov bifurcation. Although slightly different in feel to what precedes it this half chapter is invaluable in presenting the reader with a clearly explained digest of the powerful techniques of qualitative analysis, with obvious relevance to the engineering topics which anchor the book. Comprehensive, relevant, and up-to-date references are given throughout this chapter.

Chapter 8 continues the somewhat accelerated level of chapter 7 with an in-depth appraisal of rotor problems, taking flexible supports and gyroscopic coupling into account. A full Lagrange derivation is given showing that the non-linear coupling terms are quadratic. The system is initially linearized showing the presence of combination resonances, then the semitrivial and non-trivial solutions are examined in detail. The book concludes by reviewing appropriate mathematical methods including averaging, Lindstedt–Poincaré, harmonic balance, transformation to normal forms, treatment of Mathieu systems by normalization of the time-dependent vector field, local and global bifurcations, and Mathieu systems with both viscous and non-linear damping.

This is an up-to-date, well-referenced, book which achieves its objective of unravelling much of the complexity in the analysis necessary for understanding autoparametric systems and also in showing that these systems are widespread, and therefore physically important. It is therefore highly recommended for all engineering dynamicists who wish to develop their practical vibration analysis skills into an applications area that is all too frequently considered to be overly difficult and abstruse.

M. P. CARTMELL

MODELS AND REALITY IN SYSTEMS DYNAMICS' 2000, by Hans Günther Natke, Hannover, Germany: UNSER Verlag, 90pp, €19·40, ISBN 3-934208-03-7

The aim of this book is to put dynamics within a framework of systems theory and engineering. Central to this aim is a discussion of mathematical modelling and the inherent uncertainties in models and measurements. In essence, this work is a summary of the modelling philosophy of the author and his significant contributions over many years. The book starts by defining systems and their models within a framework of set theory, and emphasizes that models must be "goal-oriented". Measured data are considered the best information on the actual system, and its use in the model building processes is considered. System identification is interpreted as test supported model building, and the need for validated and verified models is highlighted. The sources of model uncertainties and methods of their reduction are discussed. The author then moves on to methods of model correction (or model updating) and reviews the available residual types, identification methods and regularization. The book ends with a summary approaches to model-based diagnosis, and finally some comments on the future, concentrating on holistic models, non-stationary signals and active systems.

This is a short book, with only 68 pages of text. With such a large scope most topics can only be mentioned briefly. However, there are a large number of references, and the reader is directed to these for more detailed information. Furthermore, space has not allowed the examples to be discussed in depth. Thus, this is not a book for the engineer learning modelling and identification techniques. More it is for the scientist or engineer who is already experienced in these techniques, who would appreciate a more philosophical and fundamental view of the modelling process.

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