Bifurcation and Chaos in Engineering



This work deals effectively and systematically with the main contents of modern analytical methods of nonlinear science, dynamic systems and the basic concepts of the theory and its applications in engineering. While many books consider systems involving only a few unknowns, a engineering real system involves thousands, and this work emphasises the reduction of the number of these unknowns while capturing the essential physical phenomena. Methods of Liapunov-Schmidt reduction, central manifold, normal form and averaging are discussed in detail. Computational methods for harmonic balance, normal form, symplectic integration and invariant torus are studied. Finally, applications to solid mechanics, rotating shaft, flutter and galloping are given. This book can be used as a textbook or reference guide to the subject by undergraduate and postgraduate students studying in areas such as mechanics, mathematics, physics and a wide range of related scientific disciplines. It will also be valuable as a reference book for teachers, researchers and engineering designers.

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