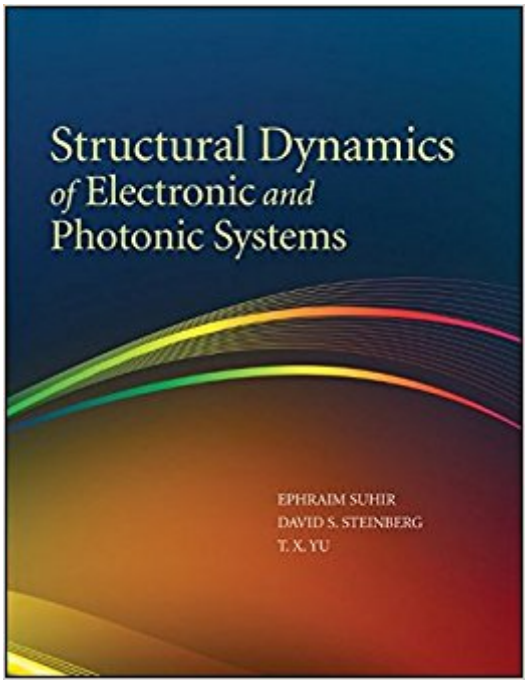
Structural Dynamics Of Electronic And Photonic Systems



Synopsis

The proposed book will offer comprehensive and versatile methodologies and recommendations on how to determine dynamic characteristics of typical micro- and opto-electronic structural elements (printed circuit boards, solder joints, heavy devices, etc.) and how to design a viable and reliable structure that would be able to withstand high-level dynamic loading.Ã Â Particular attention will be given to portable devices and systems designed for operation in harsh environments (such as automotive, aerospace, military, etc.)Ã Â In-depth discussion from a mechanical engineer's viewpoint will be conducted to the key componentsÃ¢â ¬â„¢ level as well as the whole device level.Ã Â Both theoretical (analytical and computer-aided) and experimental methods of analysis will be addressed. The authors will identify how the failure control parameters (e.g. displacement, strain and stress) of the vulnerable components may be affected by the external vibration or shock loading, as well as by the internal parameters of the infrastructure of the device. Guidelines for material selection, effective protection and test methods will be developed for engineering practice.

Book Information

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Customer Reviews

The all-in-one reference on the methods and techniques for solving shock and vibration issues in portable electronic systems This comprehensive exploration of structural dynamics offers versatile methodologies for predicting shocks and vibrations in micro- and opto-electronic systems. In-depth discussion from a mechanical engineer's viewpoint helps demonstrate how to correctly interpret and evaluate data to support the development of robust structures able to withstand high-level dynamic

loadingÃ¢â ¬â •particularly in portable devices. Structural Dynamics of Electronic and Photonic Systems promotes the execution of safer electronic-based products by covering the basic concepts and fundamentals of dynamics and vibration analysis, including the analytical and experimental procedures currently providing the most effective means for reducing structural failure resulting from such issues as handling and delivery. Some of the highlights in this book include: Comprehensive and practical coverage of the physics and mechanics of the dynamic response and structural failure of the typical micro- and opto-electronic structural elements, assemblies, packages, devices, and systems A thorough introduction to the existing test techniques and test methods Guidelines for rugged design against shock and vibration including random vibrations, nonlinear problems, and the existing military and commercial standards Examination of typical failure modes and mechanisms in electronics and photonics structures experiencing dynamic loading This all-inclusive reference serves as an essential introduction to the field as well as a forward-thinking treatise on its future direction. It familiarizes readers with a diverse range of reliability-related problems encountered in electronic and photonic systems, and offers solution techniques that will prove invaluable for anyone pursuingÃ¢â ¬â •or upgradingÃ¢â ¬â •a career in this exciting and rapidly developing area of engineering.

Dr. EPHRAIM SUHIR is Fellow of the IEEE, ASME, APS, IoP (UK), and the SPE. He is Foreign Full Member (Academician) of the National Academy of Engineering, Ukraine; cofounder of the ASME Journal of Electronic Packaging; holds twenty-two U.S. patents; and has authored about 300 technical publications (papers, book chapters, books). Dr. Suhir has received many professional awards, including the 2004 ASME Worcester Read Warner Medal for outstanding contributions to the permanent literature of engineering; 2001 IMAPS John A. Wagnon Technical Achievement Award for outstanding contributions to the technical knowledge of the microelectronics, optoelectronics, and packaging industry; 2000 IEEE-CPMT Outstanding Sustained Technical Contribution Award; 2000 SPE International Engineering/Technology Award for contributions to plastics engineering; 1999 ASME Charles Russ Richards Memorial Award for contributions to mechanical engineering; and 1996 Bell Laboratories Distinguished Member of Technical Staff Award for developing engineering mechanics methods for predicting the reliability, performance, and mechanical behavior of complex structures. DAVID S. STEINBERG is associated with the University of California, Los Angeles, Extension and also at the University of Wisconsin-Extension. He retired from Litton GCS (now Northrop Grumman) after serving as their director of engineering. He is the author of seven popular textbooks related to the design, analysis, testing, and evaluation

of sophisticated electronic equipment for reliable operation in severe vibration, shock, thermal, thermal cycling, acoustic, and pyrotechnic shock environments. His most popular textbooks are Vibration Analysis for Electronic Equipment, Cooling Techniques for Electronic Equipment, and Preventing Thermal Cycling and Vibration Failures in Electronic Equipment, published by Wiley. Dr. Steinberg is currently the President of Steinberg & Associates and has presented seminars, workshops, and consulted for many of the major suppliers of electronics components and equipment such as General Electric, General Motors, Intel, Cisco, Texas Instruments, Microsoft, Harris, Honeywell, Raytheon, Westinghouse, and many others. T. X. YU is Professor Emeritus of Mechanical Engineering at the Hong Kong University of Science and Technology (HKUST). After graduating from Peking University, he got his PhD and ScD from Cambridge University. After teaching at Peking University and UMIST, he joined HKUST in 1995. Before his retirement in July 2010, he was chair professor of mechanical engineering, associate vice-president (R&D), and dean of Fok Ying Tung Graduate School at HKUST. His research interests include impact dynamics, plasticity, energy absorption, textile and cellular materials, and nano-composites. He has published three textbooks, three scientific monographs, 310 journal papers, 170 international conference papers, and four patents. He serves as Associate Editor for the International Journal of Impact Engineering and International Journal of Mechanical Sciences. He is a Fellow of ASME, IMechE, and HKIE.Ã Â

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