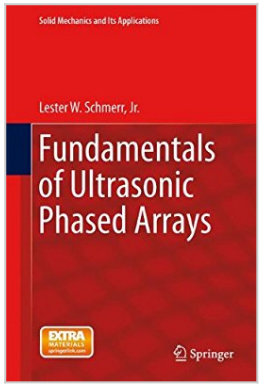

Fundamentals of Ultrasonic Phased Arrays (Solid Mechanics and Its Applications)

By Lester W. Schmerr Jr.

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This book describes in detail the physical and mathematical foundations of ultrasonic phased array measurements. The book uses linear systems theory to develop a comprehensive model of the signals and images that can be formed with phased arrays. Engineers working in the field of ultrasonic nondestructive evaluation (NDE) will find in this approach a wealth of information on how to design, optimize and interpret ultrasonic inspections with phased arrays. The fundamentals and models described in the book will also be of significant interest to other fields, including the medical ultrasound and seismology communities. A unique feature of this book is that it presents a unified theory of imaging with phased arrays that shows how common imaging methods such as the synthetic aperture focusing technique (SAFT), the total focusing method (TFM), and the physical optics far field inverse scattering (POFFIS) imaging method are all simplified versions of more fundamental and quantitative imaging approaches, called imaging measurement models.

To enhance learning, this book first describes the fundamentals of phased array systems using 2-D models, so that the complex 3-D cases normally found in practice can be more easily understood. In addition to giving a detailed discussion of phased array systems, Fundamentals of Ultrasonic Phased Arrays also provides MATLAB® functions and scripts, allowing the reader to conduct simulations of ultrasonic phased array transducers and phased array systems with the latest modeling technology.

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From the Back Cover
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Les Schmerr received a B.S. degree in Aeronautics and Astronautics from the Massachusetts Institute of Technology in 1965 and a Ph.D. in Mechanics from the Illinois Institute of Technology in 1970. Since 1969 he has been at Iowa State University where he is currently Professor of Aerospace Engineering and Associate Director of the Center for Nondestructive Evaluation. He is also the Permanent Secretary of the World Federation of NDE Centers. His research interests include ultrasonics, elastic wave propagation and scattering, and artificial intelligence. He has developed and taught Ultrasonics and Nondestructive Evaluation courses at both the undergraduate and graduate level. He is the author of the book Fundamental of Ultrasonic Nondestructive Evaluation - A Modeling Approach which was published by Plenum Press in 1998 and the book Ultrasonic Nondestructive Evaluations Systems - Models and Measurements which was published by Springer in 2007. He is a member of IEEE, ASME, ASNT and AIAA.

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