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Book Review

Error Analysis With Applications in Engineering, by W. Szczepinski and Z. Kotulski. Lastran Corp., Rochester, NY, 2000.

REVIEWED BY M. OSTOJA–STARZEWSKI[1]

This is a well-laid-out and well-written introductory book for engineers (especially mechanical engineers) interested in analysis of random effects in mechanics. The key word here is introductory—as it would be suitable for an undergraduate (but not really a graduate) course—as opposed to an advanced level which would involve stochastic differential equations plus possibly random processes and fields. As such, the book therefore offers an introduction to statistical error analysis methodology for anyone in solid/structural and/or rigid-body mechanics. With this book, a mechanical (but also civil, aerospace, materials...) engineer can learn concepts of applied probability theory—especially calculus of random variables—through very clear expositions, numerous mechanics problems and examples (e.g., positioning accuracy of robot manipulators). Indeed, many people do need such physical motivation to go through the basics of probability—and this may define the potentially wide market for the book.

The book contains seven chapters plus an appendix. The chapters are 1 Basic characteristics of error distribution; histograms; 2 Sample points, random variables, and probability; 3 Functions of independent random variables; 4 Two-dimensional distributions; 5 Two-dimensional functions; 6 Three-dimensional distributions; 7 Three-dimensional functions of independent random variables; and the Appendix—Some useful definitions and facts of probability theory. In all these chapters much attention has been paid to the practical significance of error analysis, although some background on pertinent mathematical foundations has also been included.

Both authors are well-established mechanicians—the first one being known for his work in plasticity theory, and the second one for his studies in stochastic mechanics (specifically, stochastic wave propagation). Perhaps the only criticism that might be raised is that there are other books on applied probability methods in engineering in the English speaking world. But the presentation and scope of ''*Error*...'' are not in overlap with any one of these, and some aspects are truly original. The book is therefore recommended.

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