BOOK REVIEW

Theory and Design for Mechanical Measurements

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REFERENCE: Figliola, R. S. and Beasley, D. E., *Theory and Design for Mechanical Measurements*, John Wiley and Sons, New York, 1995. Second edition, pp. 607, $72.95, cloth, ISBN 0-471-0089-2.

This is a textbook for the undergraduate engineering curriculum; its authors have developed it from their own teaching experiences. They provide these objectives for the text: "To provide a fundamental background in the theory of engineering measurements and measurement system performance. To convey the principles and practice for the design of measurement systems and measurement test plans, including the role of statistics and uncertainty analyses in design. To establish the physical principles and practical techniques most important to engineering applications."

The book has twelve chapters, with about half devoted to general aspects of measurement such as: "Static and Dynamic Characteristics of Signals," "Measurement System Behavior," "Uncertainty Analysis," and so on, and the remaining to specific applications: "Temperature Measurements," "Pressure and Velocity Measurements," "Flow Measurements," "Strain Measurements," and "Motion, Force, and Power Measurements."

The several measurement instruments associated with the evaluation of a given physical property or characteristic are discussed (thus for *pressure* there are complete descriptions for the McLeod gage, the Fortin barometer, the manometer and micromanometer, and various types of pressure transducers.) The use of each instrument is detailed. The handling of the resulting measurement data is shown explicitly.

Each chapter includes references, a symbol and nomenclature list, and a problem set (386 problems total, no answers given). In addition, there are 106 worked-out example problems or exercises imbedded appropriately in the text. SI units are employed throughout. The many figures are clear and well-chosen.

There are three appendices, the first with two complete (but rudimentary) FORTRAN-77 programs for data analysis: least-squares regression and discrete Fourier transformations; the second a guide for technical writing; and the third a compilation of physical property data. Useful conversion factors are included in the end covers.

There is a short glossary and a well-constructed index. Altogether, the book is a thorough exposition of the theoretical and practical aspects of engineering measurement that meets the stated objectives of the authors. It should be an excellent textbook and a valuable reference.