radars, tracking for gunfire, bombing-through-overcast, IFF, GEE, Rebecca, and many more. But one's interest is held, not by the detail, but by the whole picture of devices and techniques pushed to if not beyond their reasonable limits. Skepticism, failures, and successes are all put down in words.

As an example of English literature, this is a very bad book. As a story, disjointed at times, of one man's contribution to modern warfare, it makes fascinating reading.

Letter from an Author

Sir:

I would like to answer some of the points raised in the review of my book *Principles and Applications of Random Noise Theory*, John Wiley, New York, 1958 (*Physics Today*, April 1959).

First of all, there is the question of how one should introduce certain fundamental ideas of random processes. The usual procedure is to compel the student to first learn many abstract ideas about probability theory. This book deviates from that approach so as to interest a wider audience in the subject matter, and gradually motivate a study of more difficult concepts. The desired goal requires more physical explanation than is customary and a greater appeal to heuristic arguments. It is believed, however, that this arrangement has considerable merit for the intended audience, even though, at an earlier stage, it may bring in a few concepts intuitively rather than rigorously.

Secondly, the review picks out a few minor errors which are partly differences in attitude, but fails to give proper mention to many worthwhile topics discussed in the book which are not available elsewhere. Fortunately, these matters have been commented upon by other reviewers, cf., *Proceedings of the IRE* (March 1959), *American Scientist* (March 1959), *Electronic Engineering*, Great Britain (February 1959), *Consulting Engineer* (January 1959).

In particular, this book contains: (1) A full treatment of Rice's representation of random noise and its application to various problems. (2) Demonstration of the widespread importance of exponential-cosine autocorrelation functions by analyzing many different possible sources (a matter which deserves greater study and appreciation). (3) Many practical engineering and mathematical details on statistical errors in measuring autocorrelation functions of exponential-cosine form. (4) Useful advanced material on a general class of optimum time-variable filters. (5) Discussion of measurement errors in nonlinear envelope detection and correlation of random noise. (6) An analysis of the important zero-crossing problem, including derivation of some of Rice's significant work (which part was submitted to Rice for examination and check prior to publication). (7) Development of some analog computer techniques for evaluating system response to noise inputs.

The reason that *a mean square error criterion for Gaussian distributions picks out the mean value for special emphasis* is twofold: (1) the mean square error is a minimum at the mean value point independent of the underlying distribution, (2) for a Gaussian distribution, the mean value is also the point which corresponds to the most probable event (i.e., has maximum probability density). This latter feature is not true for arbitrary distributions, but is shared only with a restricted class whose most important member is the Gaussian distribution.

The dual input problem considered in Chapter 4 is of the "distortionless" type in which the choice is deliberately restricted to linear devices which eliminate the distortion term due to the signal components. The resulting optimum system is no longer dependent upon the signal statistics in any way. This procedure is recommended from a practical point of view in many physical situations [see Stewart, R. M. and R. J. Parks, "Degenerate Solutions and an Algebraic Approach to the Multiple-Input Linear Filter Design Problem", *Trans*. IRE, *Circuit Theory*, Vol. CT-4, pp. 10–14 (March 1957)]. The discussion is, of course, applicable only to these important cases.

To conclude, no book can hope to satisfy every possible audience or to cover every aspect of an expanding subject matter. Those who desire great rigor of presentation or highly abstract analysis will prefer other references listed in the Bibliography which are intended for that purpose. This book is written in a form to be understandable by students and practicing engineers having many different backgrounds. The needs of such readers are kept constantly in mind by the author.

Julius S. Bendat

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