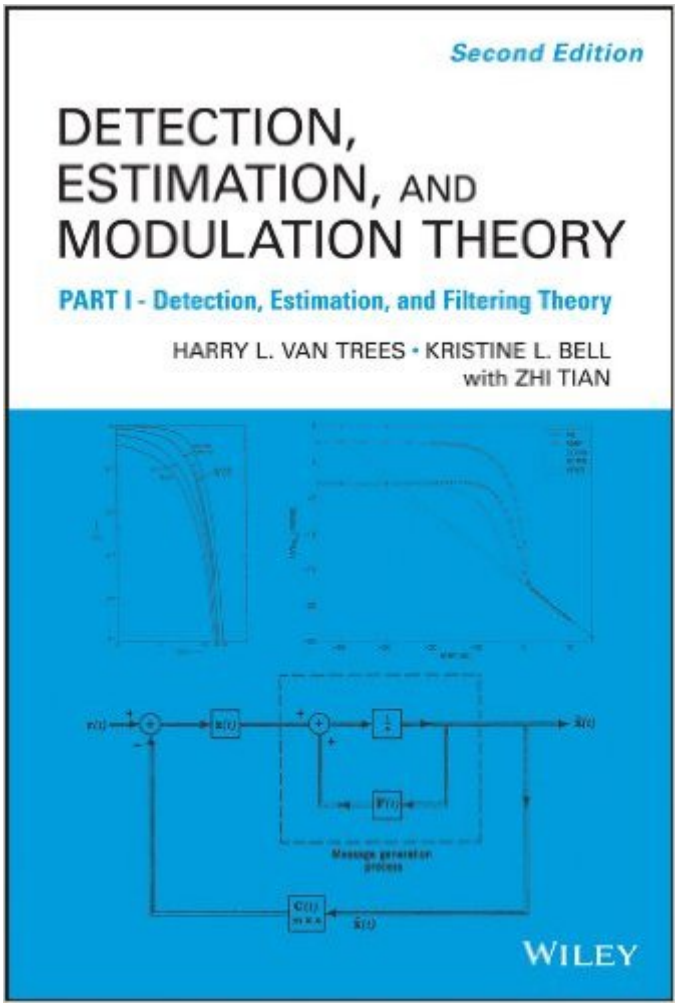
Detection Estimation And Modulation Theory, Part I: Detection, Estimation, And Filtering Theory



Synopsis

Originally published in 1968, Harry Van Treesâ ™s Detection, Estimation, and Modulation Theory, Part I is one of the great time-tested classics in the field of signal processing. Highly readable and practically organized, it is as imperative today for professionals, researchers, and students in optimum signal processing as it was over thirty years ago. The second edition is a thorough revision and expansion almost doubling the size of the first edition and accounting for the new developments thus making it again the most comprehensive and up-to-date treatment of the subject. With a wide range of applications such as radar, sonar, communications, seismology, biomedical engineering, and radar astronomy, among others, the important field of detection and estimation has rarely been given such expert treatment as it is here. Each chapter includes section summaries, realistic examples, and a large number of challenging problems that provide excellent study material. This volume which is Part I of a set of four volumes is the most important and widely used textbook and professional reference in the field.

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Customer Reviews

As a graduate student in the 1980's, I was very excited when I finally obtained my very own copy of the first edition of DEMT. It was never available in the library (it was always checked out), and no one wanted to let their copy out of their sight for fear of it never returning. Finally I had my own copy that I could refer to anytime, and DEMT became a valuable research reference for me as I completed my Ph.D., and then later as I taught courses in detection and estimation theory. It was truly the "bible" of the field.The new second edition contains many significant and welcome updates on performance bounds, procedures for numerical optimization, and filtering/estimation for discrete-time random processes. The book is still very focused on fundamental Gaussian formulations, but it has greatly expanded presentation of examples and numerical results that offer considerable insight into both the limitations and advantages of the resulting approaches. Discussion of applications is kept relatively simple; if you are looking for details about communications, radar or array processing scenarios, then you should go elsewhere (in particular, Part IV of Van Trees series, Optimum Array Processing). DEMT Part 1 is foremost a book about understanding and appreciation of the fundamentals. One topic the book does not treat is the currently "hot" area of sparse estimation (compressive sensing, L1 optimization, etc), which I think would have provided a nice complement to the standard least-squares Gaussian case. Nonetheless, I still consider the new DEMT to be the most complete and comprehensive single-volume treatment of detection and estimation theory available today.

Having a copy of the original edition, encyclopedic in itself, this new 2nd edition, truly reveals how Gaussian processing has evolved over the years, mainly with computer/ digital methods, often unknown way back in 1968. Truly a work of genius, and one that will surely last at last as long as its predesessor, it actually has to be read (perhaps in small pieces) to be believed! No other source can approach this volume in its intricate knowledge of the subject. Some fairly hi-level math is probably necessary to really understand the ideas here, but this text provides a self-learning process so even this can be acquired thru reading and studying the book.

This book is almost surely geared towards Engineering students in this particular field. It is not a stand alone text, it very much requires instructor discussion and interaction. It is a very thorough and well presented textbook, but it is that: a textbook.Recommended. Though if you're buying this, it's probably because a professor required it.

Whether your a engineer applying the theory, a graduate student looking for a primer to what can be

a very confusing topic, or a professor teaching a beginner or intermediate course on detection and estimation, this is the book for you.It weighs in at a venerable 1151 pages and is absolutely packed with information that is useful to a wide audience. Every chapter includes both a summary and problems to test and hone understanding.The book sprints out of the starting gates in chapter two by an in depth discussion of estimation and simulation.Chapter three deals with generalized Gaussian detection, the foundation of much of basic statistics.Chapter four flips things around and describes how to estimate the parameters of distributions. Section 4.5 on composite hypotheses is especially noteworthy as it is a topic that many texts shy away from.Chapter five covers generalized Gaussian estimation, and chapter six is a little misleadingly labelled. It is called "Representation of Random Processes," but it is not the general, theoretic approach I was expecting. Instead the chapter's main aim is to get us to section 6.4 where we tackle the hugely important topic of integral equations and Eigenfunctions.Chapters seven, eight, and nine begin the I depth look at signals processing in continuous and then discrete cases.Chapter ten puts much of the earlier signal work together in the detection of Gaussian signals.Chapter eleven is an epilogue that is a summary of previous summaries, i.e., prep for the final exam.This is a highly recommended, very thorough text.In service,Rich

Van Trees has, due to the sheer quality of its presentation and approaches, managed to remain a central text for over 40 years. The Second Edition is expanded and is probably most notable because it includes more non-Gaussian material. Additionally, Bayesian linear Gaussian models are given more extensive coverage. This seems to be to have always been more of a text than a reference book.

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