Van Trees, Harry L., Kristine L. Bell with Zhi Tian. *Detection, Estimation, and Modulation Theory – Part I – Detection, Estimation, and Filtering Theory.* Hoboken, New Jersey: John Wiley & Sons, Inc., 2013, 1151 pp. $110.00 (Hardbound).

The *First Edition of Detection, Estimation, and Modulation Theory, Part I*, enjoyed a long useful life. However, in the forty-four years since its publication, there have been a large number of changes:

1. The basic detection and estimation theory has remained the same but numerous new results and algorithms have been obtained.

2. The exponential growth in computational capability has enabled us to implement algorithms that were only of theoretical interest in 1968.

3. The theoretical results from DEMT have been widely applied in operational systems.

4. Simulation became more widely used in system design and analysis, research, and teaching.

The *Second Edition* is a significant expansion of the first edition with 450 pages of new material. Chapter 2 in the *First Edition*, Classical Detection and Estimation Theory, is expanded into four chapters. Many more examples are developed in detail to enhance readability, and more non-Gaussian models are included. A large number of significant developments that are appropriate for an introductory text – including global Bayesian bounds, efficient computational algorithms, equivalent estimation algorithms, sequential estimation, and importance sampling – are added. The Fisher and Bayesian linear Gaussian models are studied in more detail. The *First Edition* emphasized continuous-time random processes. The *Second Edition* includes a comprehensive development of linear estimation of discrete-time random processes leading to discrete-time Wiener and Kalman filters. A brief introduction to Bayesian estimation of non-Gaussian processes is included. An expanded version of material from Part III develops optimum detectors for continuous-time and discrete-time random processes that can be implemented using Wiener or Kalman filters.

As imperative today as it has been since its original publication in 1968, this work is sure to remain the leading reference for engineers who need to apply detection and estimation theory in diverse systems.

Harry L. Van Trees, ScD., received his BSc. from the United States Military Academy and his ScD. from Massachusetts Institute of Technology. During his fourteen years as a Professor of Electrical Engineering at MIT, he wrote Parts I, II, and III of the DEMT series. On loan from MIT, he served in four senior DoD positions including Chief Scientist of the U.S. Air Force and Principal Deputy Assistant Secretary of Defense (C3I). Returning to academia as an endowed professor at George Mason University, he founded the C3I Center and published Part IV of the DEMT series, *Optimum Array Processing*. He is currently a University Professor Emeritus.

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