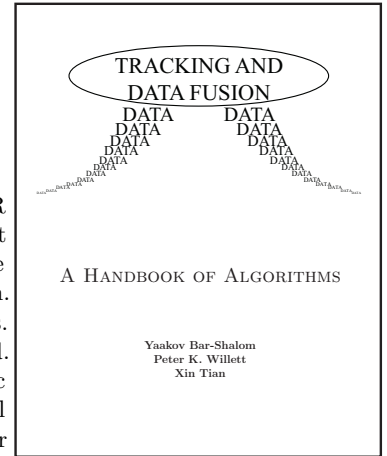




TRACKING AND DATA FUSION

A HANDBOOK OF ALGORITHMS

Yaakov Bar-Shalom, Peter K. Willett and Xin Tian



This book, which is the revised version of the 1995 text MULTITARGET-MULTISENSOR TRACKING: PRINCIPLES AND TECHNIQUES, at double the length, is the most comprehensive state of the art compilation of **practical algorithms** for the estimation of the states of targets in surveillance systems operating in a multitarget environment using data fusion. This problem is characterized by measurement origin uncertainty, typical for **low observables**. The tools for **design** of algorithms for the association of measurements and tracking are presented. Explicit consideration is given for measurements obtained from different sensors under realistic assumptions — lack of synchronicity and different detection and accuracy characteristics. Several real-data examples are given to illustrate the techniques discussed. The modeling accounts for target maneuvers, non-unity detection probability, false alarms, interference from other targets and the finite resolution capability of sensors. The problems of track initiation, maintenance and multisensor data fusion are considered. The optimization of certain signal processing parameters based on tracking performance is also discussed. The latest results on **measurement extraction** for unresolved targets, **sensor management** and **data fusion** are included.

Many of these techniques have applications to state estimation when using multiple sensors in control systems, autonomous vehicle navigation, robotics and wireless communication. An extensive index is provided with all the indexed terms highlighted in the text for the convenience of the reader.

From a review of the 1995 book in the IEEE Aerospace and Electronic SYSTEMS Magazine:

Professor Bar-Shalom is one of the world's experts in this field... A major attraction of this book is the realistic examples, using sensors including radar, sonar, passive infrared... It is clearly written, buzzword-free and a pleasure to read... (with) humorous and insightful nuggets sprinkled throughout the text... (This) book helps balance the literature by deriving practical algorithms using mathematics that is relevant and readily accessible to engineers...
Fred Daum, Raytheon Corp.

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