Optimal Search for Moving Targets (International Series in Operations Research Management Science)

Lawrence D. Stone, Johannes O. Royset, Alan R. Washburn
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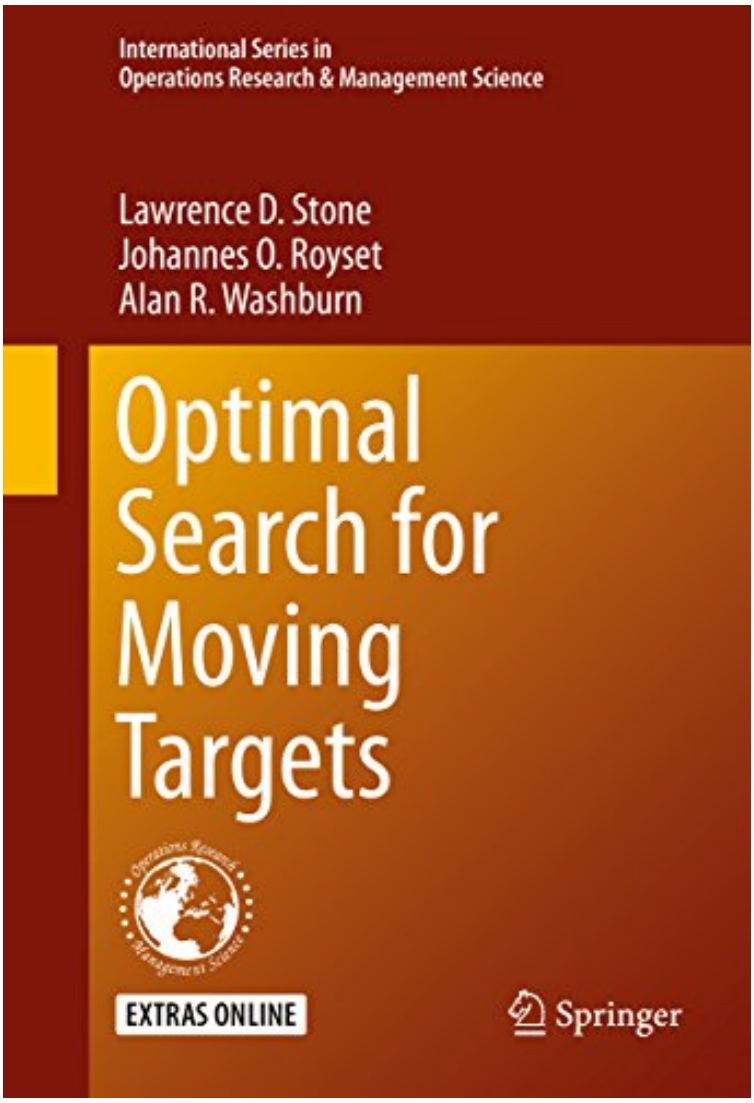

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Lawrence D. Stone, Johannes O. Royset, Alan R. Washburn : Optimal Search for Moving Targets (International Series in Operations Research Management Science) before purchasing it in order to gage whether or not it would be worth my time, and all praised Optimal Search for Moving Targets (International Series in Operations Research Management Science):

1 of 1 people found the following review helpful. An outstanding resource on a vital topicBy Douglas A. SamuelsonAfter almost 40 years, Larry Stone has returned to his claim to fame, the theory of optimal search. His 1975

book on optimal search (for fixed targets) won a Lanchester Prize, awarded by the Operations Research Society of America for outstanding contribution to operations research literature in the English language. The work had great practical value, as well, as it led to the discovery of a lost H-bomb and several wrecked vessels.Here he and his co-authors extend the earlier results to moving targets. The book is a major contribution to the theory in this field. It begins with a concise summary of the earlier results and then presents substantial new theory. Warning: it is a daunting read even for those well-versed in the mathematics of optimization and applied probability. I have made no serious effort to verify the correctness of the many mathematical proofs and doubt that many other readers will, either.What many readers may and, if interested, should do is apply the results to actual searches. The book provides algorithms, conveniently highlighted, for variety of important cases. However, actual programming code implementing these algorithms is left to the reader. It looks straightforward enough for experienced programmers to manage; again, I have not invested the effort to verify this claim. At the very least these highlighted practical sections provide a good overview of the results for the reader unable or disinclined to follow the advanced math.Still unsolved is the problem of how to search for moving targets that are actively trying to avoid detection. The book hints at some approaches, especially some using game theory, and refers to a couple of other books. This area gives us something to look forward to from these authors.In short, this is an outstanding contribution to the literature, both theory and practice, of this fascinating and valuable subject. I highly recommend it for for advanced graduate students and as a resource for mathematically well-versed researchers and practitioners, and I urge others at least to leaf through it and glean the main ideas.

This book begins with a review of basic results in optimal search for a stationary target. It then develops the theory of optimal search for a moving target, providing algorithms for computing optimal plans and examples of their use. Next it develops methods for computing optimal search plans involving multiple targets and multiple searchers with realistic operational constraints on search movement. These results assume that the target does not react to the search. In the final chapter there is a brief overview of mostly military problems where the target tries to avoid being found as well as rescue or rendezvous problems where the target and the searcher cooperate.nbsp; Larry Stone wrote his definitive book Theory of Optimal Searchnbsp;in 1975, dealing almost exclusively with the stationary target search problem. Since then the theory has advanced to encompass search for targets that move even as the search proceeds, and computers have developed sufficient capability to employ the improved theory. In this book, Stone joins Royset and Washburn to document and explain this expanded theory of search. The problem of how to search for moving targets arises every day in military, rescue, law enforcement, and border patrol operations.nbsp;

ldquo;This monograph contains an excellent review of the basic results in optimal search for stationary and moving targets. hellip; The monograph represents a detailed, self-contained, informative resource for the study of optimal search problems for moving targets, which makes it worth reading for anyone interested in the topic!rdquo; (Alexander E. Guterman, Mathematical s, February, 2017)From the Back CoverThis book begins with a review of basic results in optimal search for a stationary target. It then develops the theory of optimal search for a moving target, providing algorithms for computing optimal plans and examples of their use. Next it develops methods for computing optimal search plans involving multiple targets and multiple searchers with realistic operational constraints on search movement. These results assume that the target does not react to the search. In the final chapter there is a brief overview of mostly military problems where the target tries to avoid being found as well as rescue or rendezvous problems where the target and the searcher cooperate.Larry Stone wrote his definitive book Theory of Optimal Search in 1975, dealing almost exclusively with the stationary target search problem. Since then the theory has advanced to encompass search for targets that move even as the search proceeds, and computers have developed sufficient capability to employ the improved theory. In this book, Stone joins Royset and Washburn to document and explain this expanded theory of search. The problem of how to search for moving targets arises every day in military, rescue, law enforcement, and border patrol operations. nbsp;About the AuthorDr. Stone is Chief Scientist at Metron Inc.nbsp; He is a member of the National Academy of Engineering and a fellow of the Institute for Operations Research and Management Science. In 1975, the Operations Research Society of America awarded the Lanchester Prize to Dr. Stone's text, Theory of Optimal Search.nbsp; In 1986, he produced the probability maps used to locate the S.S. Central America which sank in 1857, taking millions of dollars of gold coins and bars to the ocean bottom one and one-half miles below.nbsp; In 2010 he led the team that produced the probability distribution that guided the French to the location of the underwater wreckage of Air France Flight AF447. He is a coauthor of the 2014 book, Bayesian Multiple Target Tracking.nbsp; He continues to work on a number of detection and tracking systems for the United States Navy and Coast Guard including the Search And Rescue Optimal Planning System used by the Coast Guard since 2007 to plan searches for people missing at sea.Dr. Johannes O. Royset is Associate Chair of Research and Associate Professor of Operations Research at the Naval Postgraduate School. Dr. Royset's research focuses on formulating and solving stochastic and deterministic optimization problems arising in data analysis, sensor management, and reliability engineering. Dr. Royset has a Doctor of Philosophy degree from the University of

California at Berkeley (2002). He was awarded a National Research Council postdoctoral fellowship in 2003, a Young Investigator Award from the Air Force Office of Scientific Research in 2007, and the Barchi Prize as well as the MOR Journal Award from the Military Operations Research Society in 2009. He received the Carl E. and Jessie W. Menneken Faculty Award for Excellence in Scientific Research in 2010. Dr. Royset is an associate editor of Operations Research, Naval Research Logistics, Journal of Optimization Theory and Applications, and Computational Optimization and Applications.Alan Washburn received a Ph. D. in Electrical Engineering from Carnegie Institute of Technology in 1965, and has been with the Operations Research Department at the Naval Postgraduate School since 1970. He is a member of the National Academy of Engineering, and is the recipient of several awards and prizes, including the Distinguished Civilian Service Award for his research and tutorial notes on several topics of importance to the Department of Defense. He is the author of over 50 scientific publications, including several books. His research is almost entirely military, emphasizing problems that employ search theory, game theory or both. He is a member of INFORMS and also of thenbsp;Military Operations Research Society (MORS). nbsp;nbsp;