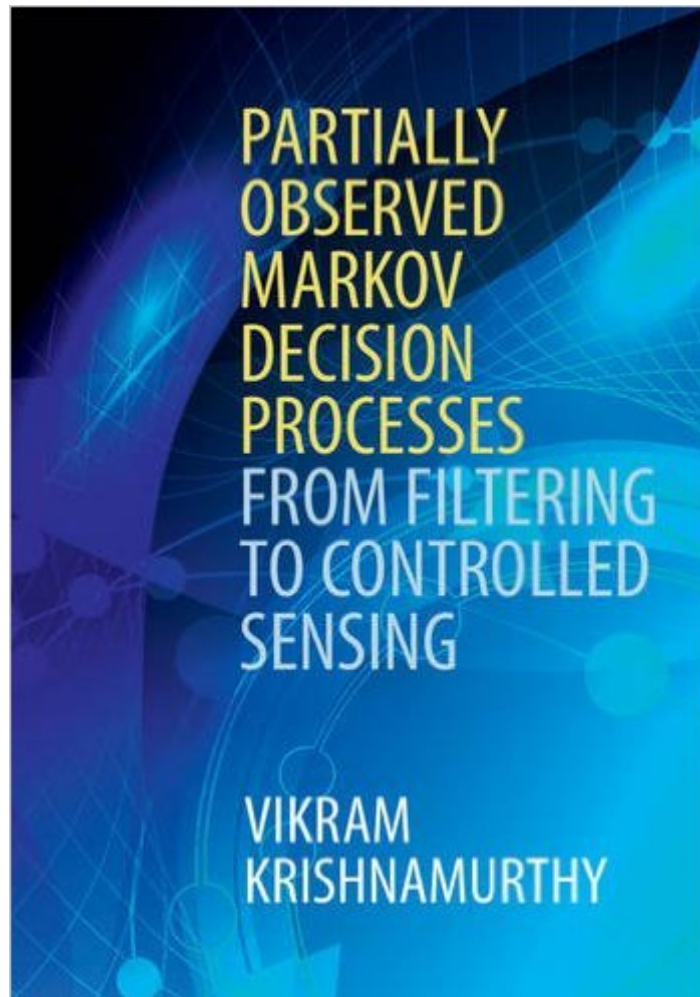# Partially Observed Markov Decision Processes: From Filtering To Controlled Sensing

Synopsis

Covering formulation, algorithms, and structural results, and linking theory to real-world applications in controlled sensing (including social learning, adaptive radars and sequential detection), this book focuses on the conceptual foundations of partially observed Markov decision processes (POMDPs). It emphasizes structural results in stochastic dynamic programming, enabling graduate students and researchers in engineering, operations research, and economics to understand the underlying unifying themes without getting weighed down by mathematical technicalities. Bringing together research from across the literature, the book provides an introduction to nonlinear filtering followed by a systematic development of stochastic dynamic programming, lattice programming and reinforcement learning for POMDPs. Questions addressed in the book include: when does a POMDP have a threshold optimal policy? When are myopic policies optimal? How do local and global decision makers interact in adaptive decision making in multi-agent social learning where there is herding and data incest? And how can sophisticated radars and sensors adapt their sensing in real time?

Book Information

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Customer Reviews

Professor Krishnamurthy's book achieves an excellent balance between the required rigor to understand the principles behind Partially Observed Markov Decision Processes (POMPDs) and their practical application to various engineering problems from optimal scheduling of sensors such as radar to social learning. As somebody with a post-graduate EE background in statistical signal

processing, but without formal training in POMPDs (I'm too old!), I found the book to be challenging but readable (you will need a paper and pencil to work through it). The book brings together a lot of material in a unified framework. Don't miss the online resources including problems - they are valuable.

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