Kalman Filtering: Theory and Practice Using MATLAB

By Mohinder S. Grewal, Angus P. Andrews

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This book provides readers with a solid introduction to the theoretical and practical aspects of Kalman filtering. It has been updated with the latest developments in the implementation and application of Kalman filtering, including adaptations for nonlinear filtering, more robust smoothing methods, and developing applications in navigation. All software is provided in MATLAB, giving readers the opportunity to discover how the Kalman filter works in action and to consider the practical arithmetic needed to preserve the accuracy of results.

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From Reviews of the First Edition

"An authentic magnum opus worth much more than its weight in gold!"
—*IEEE Transactions on Automatic Control*

The proven textbook on Kalman filtering—now fully updated, revised, and expanded

This book successfully provides readers with a solid introduction to the theoretical and practical aspects of Kalman filtering. Authors Grewal and Andrews draw upon their decades of experience to offer an in-depth examination of the subtleties, common problems, and limitations of estimation theory as it applies to real-world situations. They present many illustrative examples drawn from an array of application areas including GNSS-aided INS, the modeling of gyros and accelerometers, inertial navigation, and freeway traffic control. In addition, they share many hard-won lessons about, and original methods for, designing, implementing, validating, and improving Kalman filters.

This Third Edition has been updated with the latest developments in the implementation and application of Kalman filtering, including adaptations for nonlinear filtering, more robust smoothing methods, and developing applications in navigation. All software is provided in MATLAB, giving readers the opportunity to discover how the Kalman filter works in action and to consider the practical arithmetic needed to preserve the accuracy of results.

This updated and revised edition of Grewal and Andrews's classic guide is an indispensable working resource for engineers and computer scientists involved in the design of aerospace and aeronautical systems, global positioning and radar tracking systems, navigation, power systems, and biomedical instrumentation.

Kalman Filtering: Theory and Practice Using MATLAB, Third Edition serves as an ideal textbook in advanced undergraduate and beginning graduate courses in stochastic processes and Kalman filtering. It is also appropriate for self-instruction or review by practicing engineers and scientists who want to learn more about this important topic.

About the Author
Mohinder S. Grewal, PhD, PE, is Professor of Electrical Engineering in the College of Engineering and Computer Science at California State University, Fullerton. He has more than thirty-five years of experience in inertial navigation and control, and his mechanizations are currently used in commercial and military aircraft, surveillance satellites, missile and radar systems, freeway traffic control, and the Global Navigation Satellite System.

Angus P. Andrews, PhD, is a retired senior scientist from the Rockwell Science Center. His experience with aerospace systems analysis and design using Kalman filters began with his involvement in the Apollo moon project, and he is credited with the discovery of unknown landmark tracking as an orbital navigation method.

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