DESCRIPTION

An updated guide to GNSS, and INS, and solutions to real-world GNSS/INS problems with Kalman filtering

Written by recognized authorities in the field, this third edition of a landmark work provides engineers, computer scientists, and others with a working familiarity of the theory and contemporary applications of Global Navigation Satellite Systems (GNSS), Inertial Navigational Systems, and Kalman filters. Throughout, the focus is on solving real-world problems, with an emphasis on the effective use of state-of-the-art integration techniques for those systems, especially the application of Kalman filtering. To that end, the authors explore the various subtleties, common failures, and inherent limitations of the theory as it applies to real-world situations, and provide numerous detailed application examples and practice problems, including GNSS-aided INS (tightly and loosely coupled), modeling of gyros and accelerometers, and SBAS and GBAS.

Drawing upon their many years of experience with GNSS, INS, and the Kalman filter, the authors present numerous design and implementation techniques not found in other professional references. The Third Edition includes:

- Updates on the upgrades in existing GNSS and other systems currently under development
- Expanded coverage of basic principles of antenna design and practical antenna design solutions
- Expanded coverage of basic principles of receiver design and an update of the foundations for code and carrier acquisition and tracking within a GNSS receiver
• Expanded coverage of inertial navigation, its history, its technology, and the mathematical models and methods used in its implementation

• Derivations of dynamic models for the propagation of inertial navigation errors, including the effects of drifting sensor compensation parameters

• Greatly expanded coverage of GNSS/INS integration, including derivation of a unified GNSS/INS integration model, its MATLAB® implementations, and performance evaluation under simulated dynamic conditions

The companion website includes updated background material; additional MATLAB scripts for simulating GNSS-only and integrated GNSS/INS navigation; satellite position determination; calculation of ionosphere delays; and dilution of precision.

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