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Sommario/riassunto

This book describes the design and performance analysis of satnav systems, signals, and receivers. It also provides succinct descriptions and comparisons of all the world's satnav systems. Its comprehensive and logical structure addresses all satnav signals and systems in operation and being developed. Engineering Satellite-Based Navigation and Timing: Global Navigation Satellite Systems, Signals, and Receivers provides the technical foundation for designing and analyzing satnav signals, systems, and receivers. Its contents and structure address all satnav systems and signals: legacy, modernized, and new. It combines qualitative information with detailed techniques and analyses, providing a comprehensive set of insights and engineering tools for this complex multidisciplinary field. Part I describes system and signal engineering including orbital mechanics and constellation design, signal design principles and underlying considerations, link budgets, quantifying receiver performance in interference, and error characterization in satnav. Part II describes each of the world's satnav systems, summarizing history and plans, system description, and signal characteristics in a consistent framework for easy reference and comparison. Part III provides a comprehensive set of tools for designing satnav receivers and characterizing their performance, sequentially addressing each receiver function while emphasizing modern techniques and their application to various signals and systems. Part IV introduces specialized topics like interference, multipath, augmentation

systems, assisted satnav, and integrated receiver processing. For the student, it offers a comprehensive and rigorous description of this multidisciplinary field. For the practicing engineer, it serves as a valuable reference and unifying treatment of theoretical and practical topics. Theoretical and applied review questions can be used for homework or to obtain deeper insights into the material. Features of this book include: . Clearly structured, and comprehensive depiction of engineering satellite-based navigation and timing systems, signals, and receivers. GPS as well as all new and modernized systems (SBAS, GLONASS, Galileo, BeiDou, QZSS, IRNSS) and signals being developed and fielded. Theoretical and applied review questions, which can be used for homework or to obtain deeper insights into the material. Extensive equations describing techniques and their performance, illustrated by MATLAB plots. New results, novel insights, and innovative descriptions for key approaches and results in systems engineering and receiver design The design and performance information is general, applying to all current and planned systems. At the same time, the specific characteristics of each system and its signals are fully described, guiding application of the material in this book to the use of any signal from any system.