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GEO Augmented Navigation System (GAGAN); 1.4.8 Ground-Based Augmentation Systems (GBASs); 1.4.9 Inmarsat Civil Navigation; 1.4.10 Satellite Overlay; 1.4.11 Future Satellite Systems; 1.5 Applications; 1.5.1 Aviation; 1.5.2 Spacecraft Guidance; 1.5.3 Maritime; 1.5.4 Land; 1.5.5 Geographic Information Systems (GISs), Mapping, and Agriculture; Problems

2 Fundamentals of Satellite and Inertial Navigation

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3 Signal Characteristics and Information Extraction; 3.1 Mathematical Signal Waveform Models; 3.2 GPS Signal Components, Purposes, and Properties; 3.2.1 50-bps (bits per second) Data Stream; 3.2.2 GPS Satellite Position Calculations; 3.2.3 C/A-Code and Its Properties; 3.2.4 P-Code and Its Properties; 3.2.5 L(1) and L(2) Carriers; 3.3 Signal Power Levels; 3.3.1 Transmitted Power Levels; 3.3.2 Free-Space Loss Factor

3.3.3 Atmospheric Loss Factor

3.3.4 Antenna Gain and Minimum Received Signal Power; 3.4 Signal Acquisition and Tracking; 3.4.1 Determination of Visible Satellites; 3.4.2 Signal Doppler Estimation; 3.4.3 Search for Signal in Frequency and C/A-Code Phase; 3.4.4 Signal Detection and Confirmation; 3.4.5 Code Tracking Loop; 3.4.6 Carrier Phase Tracking Loops; 3.4.7 Bit Synchronization; 3.4.8 Data Bit Demodulation; 3.5 Extraction of Information for Navigation Solution; 3.5.1 Signal Transmission Time Information; 3.5.2 Ephemeris Data; 3.5.3 Pseudorange Measurements Using C/A-Code

3.5.4 Pseudorange Measurements Using Carrier Phase

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## Sommario/riassunto

An updated guide to GNSS and INS, and solutions to real-world GPS/INS problems with Kalman filtering Written by recognized authorities in the field, this second edition of a landmark work provides engineers, computer scientists, and others with a working familiarity with the theory and contemporary applications of Global Navigation Satellite Systems (GNSS), Inertial Navigational Systems (INS), 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 ap

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