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Nota di contenuto	Coordinate Frames and Transformations -- Coordinate Frames -- Inertial Frame -- Earth-Centered-Earth-Fixed Frame -- Navigation Frame -- Transformations -- Direction Cosines -- Euler Angles -- Quaternions -- Axial Vectors -- Angular Rates -- Differential Equation of the Transformation -- Specific Coordinate Transformations -- Fourier Transforms -- Ordinary Differential Equations -- Linear Differential Equations -- General Solution of Linear Differential Equations -- Homogeneous Solution -- An Example -- Fundamental Set of Solutions -- Particular Solution -- The Example, Continued -- Numerical Methods -- Runge-Kutta Methods -- Numerical Integration of Functions -- Inertial Measurement Units -- Gyroscopes -- Mechanical Gyroscopes -- SDF Gyro -- Principal Error Terms -- TDF Gyro -- Optical Gyroscopes -- Ring Laser Gyro -- RLG Error Sources -- Fiber-Optic Gyro -- FOG Error Sources -- Accelerometer -- Accelerations in Non-Inertial Frames -- Force-Rebalance Dynamics -- Pendulous Accelerometer Examples -- Vibrating Element Dynamics -- Error Sources -- Inertial Navigation System -- Mechanizations -- Space-Stabilized Mechanization -- Local-Level Mechanization -- Schuler Tuning -- Wander Azimuth Mechanization -- Strapdown Mechanization -- Numerical Determination of the Transformation Matrix -- A Second-Order Algorithm -- A Third-Order Algorithm -- Specializations -- Navigation Equations -- Unified Approach -- Navigation Equations in i-Frame -- Navigation Equations in e-Frame --

Sommario/riassunto

This book covers all aspects of inertial navigation systems (INS), including the sensor technology and the estimation of instrument errors, as well as their integration with the Global Positioning System (GPS) for geodetic applications. Complete mathematical derivations are given. Both stabilized and strapdown mechanizations are treated in detail. Derived algorithms to process sensor data and a comprehensive explanation of the error dynamics provide not only an analytical understanding but also a practical implementation of the concepts. A self-contained description of GPS, with emphasis on kinematic applications, is one of the highlights in this book. The text is of interest to geodesists, including surveyors, mappers, and photogrammetrists; to engineers in aviation, navigation, guidance, transportation, and robotics; and to scientists involved in aerogeophysics and remote sensing.
