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Nota di contenuto	Computational Modelling and Simulation of Aircraft and the Environment; Contents; Preface; Acknowledgements; List of Abbreviations; How To Use This Book; Series Preface; Chapter 1: Introduction; 1.1 Computational Modelling; 1.2 Modelling and Simulation (M&S); 1.3 Development Processes; 1.4 Models; 1.5 Meta-

models; 1.6 Aerospace Applications; 1.6.1 Synthetic Environment; 1.6.2 Aerospace Vehicles; 1.7 Integration and Interoperability; 1.8 The End of the Beginning; Chapter 2: Platform Kinematics; 2.1 Axis Systems; 2.1.1 Platform Axis System; 2.1.2 Local Axis Systems; 2.1.3 Earth-Centred Axis Systems; 2.1.4 Orientation; 2.1.5 Flight Axis System; 2.2 Changing Position and Orientation; 2.3 Rotating Axis Systems; 2.3.1 Inertial and Non-inertial Frames; 2.3.2 Vector Differentiation; 2.3.3 Poisson's Equation; 2.4 Quaternions; 2.4.1 Method of Construction; 2.4.2 Frame Rotation via Quaternions; 2.4.3 Relationship between Quaternions and Euler Angles; 2.5 Line of Sight; Chapter 3: Geospatial Reference Model; 3.1 Spherical Earth; 3.2 Spherical Trigonometry; 3.3 Great Circle Navigation; 3.4 Rhumb Line Navigation; 3.5 Reference Ellipsoids; 3.5.1 World Geodetic System (WGS84); 3.5.2 Geoid Approximations; 3.6 Coordinate Systems; 3.6.1 Geocentric and Geodetic Latitude; 3.6.2 Parametric or Reduced Latitude; 3.6.3 Cartesian Coordinates; 3.6.4 Approximate Cartesian Coordinates; 3.6.5 Latitude, Longitude and Altitude; 3.7 Navigation on an Ellipsoidal Earth; 3.7.1 Differential Geometry; 3.7.2 Geodesics; 3.7.3 Geodesic Trajectory; 3.7.4 Geodesic Length; 3.7.5 Meridian Distances; 3.7.6 Rhumb Lines; 3.8 Mapping; 3.9 General Principles of Map Projection; 3.10 Mercator Projection; 3.11 Transverse Mercator Projection; 3.11.1 Forward Projection; 3.11.2 National Grid of Great Britain; 3.11.3 Universal Transverse Mercator (UTM) Grid; 3.11.4 Projection Geometry; 3.11.5 Inverse Projection; 3.12 Conformal Latitude; 3.13 Polar Stereographic Projection; 3.13.1 Basic Formulation; 3.13.2 Universal Polar Stereographic (UPS) Projection; 3.14 Three-Dimensional Mapping; 3.15 Actual Latitudes, Longitudes and Altitudes; Chapter 4: Positional Astronomy; 4.1 Earth and Sun; 4.2 Observational Reference Frames; 4.2.1 Horizontal Frame; 4.2.2 First Equatorial Frame; 4.2.3 Second Equatorial Frame; 4.2.4 Frame Transformations; 4.3 Measurement of Time; 4.3.1 Mean Time; 4.3.2 Diurnal Cycle; 4.3.3 Universal Time; 4.3.4 Time Zones; 4.3.5 Sidereal Time; 4.3.6 Terrestrial Time; 4.4 Calendars and the J2000 Reference Epoch; 4.5 Chronological Scale; 4.6 Astrometric Reference Frames; 4.6.1 Inertial Frame; 4.6.2 Rotating Frame; 4.6.3 Precession; 4.6.4 Coordinate Transformations; 4.7 Orbital Mechanics; 4.7.1 Kepler's Laws; 4.7.2 Orbital Energy and Velocity; 4.7.3 Anomalies and Kepler's Equation; 4.7.4 Orbital Elements; 4.8 Solar System Orbit Models; 4.8.1 Planetary Data; 4.8.2 Planetary Trajectories; 4.8.3 Mean Sun and the Equation of Time; 4.9 GPS Orbit Models

Sommario/riassunto

This first volume of Computational Modelling of Aircraft and the Environment provides a comprehensive guide to the derivation of computational models from basic physical & mathematical principles, giving the reader sufficient information to be able to represent the basic architecture of the synthetic environment. Highly relevant to practitioners, it takes into account the multi-disciplinary nature of the aerospace environment and the integrated nature of the models needed to represent it. Coupled with the forthcoming Volume 2: Aircraft Models and Flight Dynamics it represents a c
