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| Nota di contenuto | SYNTHETIC APERTURERADAR POLARIMETRY; CONTENTS; NOTE FROM THE SERIES EDITOR; FOREWORD; PREFACE; ACKNOWLEDGMENTS; AUTHORS; 1 SYNTHETIC APERTURE RADAR (SAR) IMAGING BASICS; 1.1 Basic Principles of Radar Imaging; 1.2 Radar Resolution; 1.3 Radar Equation; 1.4 Real Aperture Radar; 1.5 Synthetic Aperture Radar; 1.6 Radar Image Artifacts and Noise; 1.6.1 Range and Azimuth Ambiguities; 1.6.2 Geometric Effects and Projections; 1.6.3 Signal Fading and Speckle; 1.7 Summary; References; 2 BASIC PRINCIPLES OF SAR POLARIMETRY; 2.1 Polarization of Electromagnetic Waves 2.2 Mathematical Representations of Scatterers2.3 Implementation of a Radar Polarimeter; 2.4 Polarization Response; 2.5 Optimum Polarizations; 2.5.1 General (Bistatic) Case; 2.5.2 Backscatter (Monostatic) Case; 2.5.3 Special Case: Single Scatterer in Backscatter (Monostatic) Case; 2.5.4 Special Case: Multiple Scatterers with |

Reflection Symmetry; 2.5.5 A Numerical Example; 2.6 Contrast Enhancement; 2.6.1 Numerical Example; 2.6.2 Image Example; 2.7 Summary; References; 3 ADVANCED POLARIMETRIC CONCEPTS; 3.1 Vector-Matrix Duality of Scatterer Representation 3.2 Eigenvalue- and Eigenvector-Based Polarimetric Parameters 3.2.1 Parameters Used to Describe Randomness in Scattering; 3.2.2 Alpha Angle; 3.3 Decomposition of Polarimetric Scattering; 3.3.1 Scattering Decomposition in the Incoherent Case Using Orthonormal Bases; 3.3.2 Model-Based Scattering Decomposition in the Incoherent Case; 3.4 Image Classification; 3.4.1 Supervised Classification; 3.4.2 Physics-Based Unsupervised Classification; 3.4.3 Combined Unsupervised and Bayes Classification Algorithms; 3.5 Polarimetric SAR Interferometry; 3.6 Summary; References; 4 POLARIMETRIC SAR CALIBRATION 4.1 Polarimetric Radar System Model 4.2 Cross Talk Estimation and Removal; 4.3 Copolarized Channel Imbalance Calibration; 4.4 Absolute Radiometric Calibration; 4.4.1 Effect of Topography on Scattering Area; 4.4.2 Effect of Topography on Antenna Pattern Corrections; 4.4.3 AIRSAR Image Example; 4.5 Faraday Rotation; 4.6 Summary; References; 5 APPLICATIONS: MEASUREMENT OF SURFACE SOIL MOISTURE; 5.1 Surface Electrical and Geometrical Properties; 5.1.1 Geometrical Properties; 5.1.2 Electrical Properties; 5.1.3 Penetration Depth; 5.1.4 Soil Moisture Profile; 5.2 Scattering from Bare Rough Surfaces 5.2.1 First-Order Small-Perturbation Model 5.2.2 The Integral Equation Model; 5.3 Example Bare Surface Soil Moisture Inversion Models; 5.3.1 The First-Order Small-Perturbation Model; 5.3.2 Algorithm Proposed by Oh et al. (1992); 5.3.3 Algorithm Proposed by Dubois et al.; 5.3.4 Algorithm Proposed by Shi et al. (1997); 5.4 Comparison of the Performance of Bare Surface Inversion Models; 5.5 Parameterizing Scattering Models; 5.6 Inverting the IEM Model; 5.6.1 Using a Data Cube; 5.7 Scattering from Vegetated Terrain; 5.7.1 Scattering from the Vegetation Layer (Scattering Path 1) 5.7.2 Backscatter from the Underlying Ground Surface (Scattering Path 4)

Sommario/riassunto

"This book describes the application of polarimetric synthetic aperture radar to Earth remote sensing based on research at the NASA Jet Propulsion Laboratory (JPL). This book synthesizes all current research to provide practical information for both the newcomer and the expert in radar polarimetry. The text offers a concise description of the mathematical fundamentals illustrated with many examples using SAR data, with a main focus on remote sensing of the Earth. The book begins with basics of synthetic aperture radar to provide the basis for understanding how polarimetric SAR images are formed and gives an introduction to the fundamentals of radar polarimetry. It goes on to discuss more advanced polarimetric concepts that allow one to infer more information about the terrain being imaged. In order to analyze data quantitatively, the signals must be calibrated carefully, which the book addresses in a chapter summarizing the basic calibration algorithms. The book concludes with examples of applying polarimetric analysis to scattering from rough surfaces, to infer soil moisture from radar signals"--