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Nota di contenuto	Cover; Title Page; Contents; Preface; Introduction; CHAPTER 1. ELECTROMAGNETIC WAVE SCATTERING FROM RANDOM ROUGH SURFACES: BASICS; 1.1. Introduction; 1.2. Generalities; 1.2.1. Maxwell equations and boundary conditions; 1.2.2. Propagation of a plane wave (Helmholtz equation and plane wave); 1.2.3. Incident wave at an interface: polarization; 1.3. Random rough surfaces: statistical description and electromagnetic roughness; 1.3.1. Statistical description of random rough surfaces; 1.3.2. Specific case of sea surfaces; 1.3.3. Electromagnetic roughness and Rayleigh roughness criterion 1.4. Scattering of electromagnetic waves from rough surfaces: basics1. 4.1. Presentation of the problem (2D/3D); 1.4.2. Huygens' principle and extinction theorem; 1.4.3. Green functions (2D/3D); 1.4.4. Scattered powers and scattering coefficients; CHAPTER 2. DERIVATION OF THE SCATTERED FIELD UNDER ASYMPTOTIC MODELS; 2.1. Bibliography on existing models; 2.1.1. Introduction; 2.1.2. Rigorous models; 2.1.3. Asymptotic models; 2.1.4. General properties of scattering; 2.1.5. A few details on the KA and the GO; 2.2. Scattering in reflection and transmission under the KA with shadowing effect

2.2.1. KA in reflection and transmission with shadowing effect for 2D problems
2.2.2. Extension of the KA model to 3D problems; 2.3. Scattering in reflection for 3D problems under various asymptotic models; 2.3.1. Context and specific notations; 2.3.2. The small perturbation model; 2.3.3. The Kirchhoff approximation-high-frequency regime; 2.3.4. The weighted curvature approximation; 2.3.5. The small slope approximation; 2.3.6. The local curvature approximation; 2.3.7. The resonant curvature approximation; 2.3.8. Validation of the different asymptotic numerical models for 2D problems

CHAPTER 3. DERIVATION OF THE NORMALIZED RADAR CROSS-SECTION UNDER ASYMPTOTIC MODELS

3.1. Derivation of incoherent normalized radar cross-section under the GO for 2D problems; 3.1.1. Incoherent NRCS under the GO with shadowing effect for 2D problems;

3.1.2. Calculation of the bistatic shadowing functions in reflection and transmission; 3.2. General properties and energy conservation of the GO for 2D problems; 3.2.1. General properties of the GO for 2D problems; 3.2.2. Study of energy conservation under the GO for 2D problems

3.3. Scattering coefficients under the GO with shadowing effect for 3D problems

3.4. Energy conservation of the GO model for 3D problems; 3.4.1. Case of a perfectly conducting lower medium; 3.4.2. Case of a lossless dielectric lower medium; 3.5. Scattering in reflection for 3D problems under various asymptotic models; 3.5.1. Expression of the NRCS under the SPM1; 3.5.2. Expression of the NRCS under the GO; 3.5.3. Expression of the NRCS under the SSA; 3.5.4. Validation and comparison of the different asymptotic analytical models for 2D problems

3.5.5. Comparison between numerical and analytical asymptotic models for 3D problems

Sommario/riassunto

Electromagnetic wave scattering from random rough surfaces is an active, interdisciplinary area of research with myriad practical applications in fields such as optics, acoustics, geoscience and remote sensing. Focusing on the case of random rough surfaces, this book presents classical asymptotic models used to describe electromagnetic wave scattering. The authors begin by outlining the basic concepts relevant to the topic before moving on to look at the derivation of the scattered field under asymptotic models, based on the Kirchhoff-tangent plane, in order to calculate both the scatterer