A COMPARISON OF METHODS FOR OBTAINING THE PROBABILITY DENSITY OF FUNCTIONS RELATED TO RADAR BACKSCATTER

by 8285

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CHAPTER I

INTRODUCTION

1.1 Historical Sketch

In 1821, the French scientist Fresnel, established the formulae for determining the intensities and directions of reflected and refracted rays of light incident on the plane surface of a transparent body. These formulae were based on the "Elastic Theory" of light which assumes the existence of infinitely elastic medium ether, now of only historical interest. However, the formulae themselves had brilliant experimental justification and were used for the verification of every theory of light which was proposed there-after including the Electromagnetic Theory of light developed by Maxwell in 1865.

For electromagnetic waves, the Fresnel reflection laws can be deduced from Maxwell's equations and the appropriate boundary conditions. If a wave, travelling in free space, is incident on the plane surface of a medium of relative dielectric constant K, then, for the horizontal and the vertical polarizations, the respective reflection coefficients R_h & R_v are given by (Harrington, 1961):

$$R_h = \frac{\mathrm{Cos}\theta_1 - \sqrt{K^2 - \mathrm{Sin}^2\theta_1}}{\mathrm{Cos}\theta_1 + \sqrt{K^2 - \mathrm{Sin}^2\theta_1}} \qquad (1.1.1)$$