Abstracts

Excitation of Surface Waves and the Scattered Radiation Fields by Rough Surfaces of Arbitrary Slope

E. Bahar. "Excitation of Surface Waves and the Scattered Radiation Fields by Rough Surfaces of Arbitrary Slope." 1980 Transactions on Microwave Theory and Techniques 28.9 (Sep. 1980 [T-MTT]): 999-1006.

Surface waves as well as lateral waves are excited when a rough surface is illuminated by the radiation fields. In view of shadowing, these terms of the complete field expansions contribute significantly to the total fields when the transmitter or receiver are near the rough surface. In this work explict expressions are derived for the coupling between the radiation fields and the surface waves which are guided at the irregular interface between two media. In the analysis, the slope of the rough surface is not restricted and the solutions for both the horizontally and vertically polarized waves are shown to satisfy reciprocity and duality relationships in electromagnetic theory. Special consideration is given to Brewster angles of incidence and scatter and stationary phase techniques. The full-wave solutions are also applied to random and periodic rough surfaces.

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