1. ELECTROMAGNETIC WAVES

Joint Services Electronics Program (Contract DAAG29-78-C-0020)

Jin Au Kong

Electromagnetic waves are studied with applications to remote sensing of the earth, geophysical subsurface probing and communication with a dipole antenna, microstrip antennas, and beam diffraction by periodic structures. We also studied acoustic waves in geophysical exploration. Papers on research in the past year which have been published, accepted for publication, submitted for publication, or presented at meetings are listed in the references.\textsuperscript{1-14} Second-order coupled-mode equations have been developed to treat diffraction of plane waves as well as beams by periodic structures.\textsuperscript{1-3} Geophysical probing and communication with dipole antennas has been studied for half-space and two-layer media.\textsuperscript{4-6} Microstrip antennas are being studied.\textsuperscript{7} Extensive work has been done in the field of active and passive microwave remote sensing.\textsuperscript{8-22} The use of acoustic waves in geophysical exploration has been investigated.\textsuperscript{23-24}

References


2. REMOTE SENSING WITH ELECTROMAGNETIC WAVES

National Science Foundation (Grant ENG76-01654)

Jin Au Kong

Active sensing with dipole antennas has been studied\textsuperscript{1-6} for both monochromatic and pulse excitations. Extensive work has been accomplished on theoretical modelling and data interpretation for passive microwave remote sensing with radiometers.\textsuperscript{7-22} Active remote sensing with radars has also been investigated.\textsuperscript{23-26}

References


3. ACTIVE AND PASSIVE MICROWAVE REMOTE SENSING

National Aeronautics and Space Administration (Contract NAS5-24139)

Jin Au Kong

In active microwave remote sensing radiative transfer theory \(^1-2\) has been applied and derived from the wave theory. Energy conservation and asymptotic solution for the reflectivity of a very rough surface are being studied.\(^3-4\) In passive remote sensing theoretical modeling, experimentation, and data matching have been extensively investigated and conclusive results are being documented.\(^5-11\)
(XV. ELECTRODYNAMICS OF MEDIA)

References


4. PREDICTION OF BACKSCATTER AND EMISSIVITY OF SNOW AT MILLIMETER WAVELENGTHS

U.S. Air Force – Eglin (Contract F08635-78-C-0115)

Jin Au Kong

Radiative transfer theory has been applied to the active remote sensing of half-space random media. The validity of the radiative transfer theory was justified by a rigorous wave theoretical approach. Energy conservation and asymptotic solutions for remote sensing of rough surfaces are being considered. Passive microwave remote sensing of snow fields has been extensively investigated.
(XV. ELECTRODYNAMICS OF MEDIA)

References


5. ACOUSTIC-WAVE PROPAGATION STUDIES

Schlumberger Doll Research Center

Jin Au Kong, Leung Tsang

Transient solutions due to a line source in a slab medium have been obtained with a modified modal theory applying the technique of double deformation.\(^1\),\(^2\) Asymptotic solutions for the first compressional head wave arrival in a fluid-filled borehole are also being investigated.\(^3\)

References