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Remote Sensing
Direct and Inverse Scattering

Both theoretical and experimental approaches are welcomed.The journal aims also to promote the cooperation between scientists working on application of electromagnetism internationally and in particular in the Trans Black Sea Region.

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Right-Angle Dielectric Wedge as an Antenna Simulation
Alexander G. Tyzhnenko 1

The method of solving the right-angle dielectric wedge (RADW) boundary-value problem (BVP) consists of integral representation of the inside and outside fields and matching these fields on the boundaries. As a result, a set of integral equations (IE) of the 1-st kind was obtained. A new iterative method is proposed for such equations solving. This method produces a robust and adequate solution to the ill-conditioned matrix equation (ME) resulted from IE while discretization. With the aid of this method, the fields radiated into the empty quarter-space are investigated

Solution of Three-Dimensional Electromagnetic Scattering Problems via a Hybrid Method of Moments / Method of Auxiliary Sources (MOM/MAS) Technique
Dimitrios P. Economou, Dimitra I. Kaklamani and Nikolaos K. Uzunoglu 11

An efficient computational method is developed to solve three-dimensional (3D) electromagnetic (EM) scattering problems. The advantages of a standard Method of Moments (MoM) formulation are combined with those of a standard Method of Auxiliary Sources (MAS) approach, which, especially for the case of -even arbitrarily- curved conducting surfaces, has been proved to give accurate results with significantly low computational cost. Namely, a novel hybrid MoM/MAS technique is developed, in order to determine the response of 3D EM structures to a time harmonic incident field. The electric fields inside the dielectric parts of the examined 3D scatterers are represented by pulse piecewise functions, while equivalent current sources are employed to represent the secondary fields generated by the conducting parts of the scatterers. The validity and accuracy of the method is checked and numerical results are presented, proving the suitability of the proposed technique to treat diverse EM scattering problems.

Investigations of Magnetic Fields and Aurora by the UV Imager UFSIPS and the Magnetometer IMAP-3
K.Palazov, St. Spasov, P.Petkov, A.Atanasov, A.Bochev, I.I.A-Dimitrova,V.Velev 25

We present a space equipment, both an optical instrument and a magnetometer , performing together remote sensing and geophysical observations in situ, respectively, concerning the interaction magnetosphere-ionosphere. The UV Imager UVSIPS and the magnetometer IMAP- 3 operate on board the Auroral satellite - project INTERBALL - program STEP. The triaxial flux-gate magnetometer IMAP-3 measures the three components of the magnetic field (in the range from 0 to ± 700000 nT) .The Imager (3-channel UV spectrometer UVSIPS) performs remote sensing of the polar oval to map ionospheric characteristics in the magnetic field line footprint from the Auroral Probe satellite (apogee 20000 km.).The advantage of the UV-method is its ability to observe the aurora on the night and dayside of the Earth and the simultaneous measurements of both instruments provides correlated results. The obtained results contribute to the presentation of the relation between the magnetospheric and auroral sub-storms as a unified process during the interaction

Solar wind - magnetosphere - ionosphere, to the determination of the auroral oval limits and the magnetosphere configuration. The INTERBALL-2 spacecraft has been successfully launched on 29 August 1996.

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I. Antonov, L. Vatskitchev 41

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Yuri Avetisyan*, Hiromasa Ito 51

It was shown that the periodically poled optical waveguide with period $\Lambda = 2\pi/\beta_s$ *of poling (*β_s *is a propagation constant of nonlinear polarization wave) is capable of emitting the THz-wave difference frequency generation (DFG) in direction normal to the surface of waveguide. The DFG power in cover of periodically poled lithium niobate (PPLN) planar weveguide is numerically calculated. It was shown that efficiency of frequency conversion in the surface emitting geometry is better than for case collinear geometry, especially in THz region where PPLN have a large absorption.*

On Transparent Boundary Conditions Application to the Tropospheric Ducting Propagation Modeling
Irina Sirkova 59

On the basis of the parabolic equation (PE) approximation to the wave equation in conjunction with the finite element (FE) method the applicability of recently reported in the literature nonlocal transparent boundary condition (NTBC) and the simpler local transparent boundary condition (LTBC) to the tropospheric ducting propagation (TDP) problems is studied and discussed. Ground-based, elevated ducts and cascades with smooth and piecewise linear modified refractivity profiles are used. Suggestions about the starting values for the transverse and propagation steps for both boundary conditions are made.