TRANS BLACK SEA REGION UNION OF APPLIED ELECTROMAGNETISM (BSUAE)

Volume 3 Number 3 December 2000

CONTENTS

An optimal shape of a loop, moving in a magnetic field with a non-sinusoidal structure, ensuring maximum emf
Atanas G. Chervenkov 1

A method for determination of the optimal shape of a loop, moving in a magnetic field with a periodic non-sinusoidal structure, is presented. The optimum criterion is the maximum of the induced electromotive force (EMF). The equivalent loop shape is computed by an iterative solution of an isoperimetric variational problem. The necessary conditions for an extremum are introduced by four-dimensional (4-D) electromagnetic potentials. Magnetic fields with different non-sinusoidal structure are investigated.

Sign area conversion of radar images
M.N.Galabov, M.H.Kalbanov, M.S.Angelov 11

An important trend in contemporary radio-location is the development of methods and facilities for radar image recognition using the received radar images as a base. The authors suggest one possible approach to correlation method of recognition, invariant towards the target aspect angle.

Application of Kummer Functions in the analysis of slow waves in the circular gyrotropic waveguide
Georgi N. Georgiev, Nikolaos K. Uzunoglu, Mariana N. Georgieva Grosse 25

A lemma concerning an important property of the real zeros of Kummer function is proved numerically. Based on it and on some known attributes of the latter, criteria for slow TE_{0n} modes propagation in a circular waveguide with azimuthally magnetized ferrite are drawn. The phase characteristics of the configuration for slow TE_{01} mode are presented.

Utilization of pulsed GaAs diode lasers to complex lidar remote sensing
S.Penchev, S.Naboko, V.Pencheva, V.Naboko, T.Patrikov, P.Simeonov 37

We report application of powerful multichip-stack (In)GaAs/AlGaAs diode lasers feasible for complex atmospheric monitoring. An original method is developed for spectral remote sensing employing this type of pulsed diode lasers of broad radiation line. Mie- scattering lidar signal over 15km range is accessible by the power-characteristics of the developed lidar system. Water vapour absorption spectrum of third oscillatory molecular overtone of 894-904nm, is considered with relevance to the potential for DIAL remote sensing of tropospheric humidity. A specialized digital filter in the accumulation and processing of the lidar information acquires essentially higher sensitivity of the analytical system.

Performance of time division duplex cdma mobile communication
Mihail Kalbanov, Mario S. Angelov, Miroslav Galabov **47**

In this paper an analytical expression for the signal-noise ratio in the output of the user's receiver, worked in cellular mobile system with Pre-Rake diversity combination is determined. On this basis the bit error rate (BER) depending on the input signal to noise ratio (SNR) on the technical peculiarity and on the number of the users in the cell is derived.

Bandwidth efficient concatenated coding system using hybrid trellis 16/8-psk inner code
N. T. Kostov **57**

High rate concatenated coding system with Reed-Solomon (RS) outer code and hybrid (time-varying) trellis 16/8-phase shift keying (PSK) inner code is investigated for application in high-speed satellite communications. The performance results of the proposed coding system over an ideal Gaussian channel indicate a slight energy loss of 0.5-0.6 dB compared to an equivalent (in terms of effective data rate and complexity) conventional coding system. However, a robust performance with an improved carrier tracking over non-Gaussian channels, like channels with phase jitter and Rice fading, is still possible. Furthermore, there is no need for linear or quasi-linear amplification, which is not the case with the near situated concatenated (204, 188)RS / trellis-coded (TC) 16-QAM coding system, considered by the European Standard EN 301 210 V1.1.1.