Russian and Japanese Aerospace Literature

Throughout 1992 the *AIAA Journal* will carry selected abstracts on leading research topics from Russian aerospace literature and, as space permits, from similar Japanese literature. The topics will be chosen and the abstracts reviewed for pertinency by *AIAA Journal* editors. This month features Antenna Arrays from Russia and Antenna Design from Japan.

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Russian Aerospace Literature
This month: *Antenna Arrays*

A92-32042   Algorithms of the method of auxiliary sources for the analysis of waveguide-dielectric periodic structures (Algoritmy metoda vspomogatel'nykh istochnikov dlia analiza volnovodno-dielektricheskikh periodicheskikh struktur). S. P. SKOBELEV and L. L. MUKHAMEDOV, *Radiofizika* (ISSN 0021-3462), Vol. 34, April 1991, pp. 392–402. 11 Refs.

The problem of H-wave radiation from a periodic array of planar waveguides with dielectric plugs and protruding dielectric rods with an arbitrary smooth boundary is considered. Two algorithms for solving the problem which are based on the method of auxiliary sources are presented. Results of algorithm testing are presented along with examples of the calculation of the partial radiation patterns and reflection coefficients of the arrays.

A92-27488   Scattering field of a reflector of spiraphase antenna array type (Pole rasseianiia otrazhatelia tipa spirafaznoi antennoi reshetki). I. D. GLADKOSKOK and P. L. TOKARSKII, *Radiotekhnika* (ISSN 0485-8972), No. 94, 1991, pp. 65–74. 4 Refs.

A method is proposed for the analysis of planar reflectors of circularly polarized waves based on spiraphase antenna arrays. Calculation results on the scattering field are presented for a rectangular reflector.

A92-18271   Radiation pattern of a rectangular microstrip antenna and an array of passive dipoles (Diagramma napravlennosti priamougol'noi mikropoloskovoi antenny i reshetki passivnykh vibratorov). N. N. GOROBETS, M. V. NESTERENKO, V. A. PETLENKO, and A. IA. PCHEL'NIKOV, *Radiotekhnika* (ISSN 0033-8486), Nov. 1991, pp. 75–77. Refs.

A sidelobe-reduction method for a microstrip antenna is proposed which uses resonant dipoles that are arranged symmetrically with respect to the radiator edges. A formula is given for calculating the effective length of a corrugated dipole.

A91-37230   Generalized method of successive reflections in the theory of finite antenna arrays (Obobshchennyi metod posledovatel'nykh otrazhenii v teorii konechnykh antennykh reshetok). V. S. FILIPPOV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 26–32.

A numerical method for determining the characteristics of plane and circular-cylindrical finite antena arrays is examined which is based on a model of a regular radiating structure and the method of successive reflections. The radiation pattern of a plane dipole antenna array is considered as an example.

A92-32043   Statistical analysis of the accuracy characteristics of nonlinear methods for determining the angular coordinates of sources in antenna arrays with an unknown general geometry (Statisticheskii analiz tochnostnykh kharakteristik nelineinykh metodov opredeleniia uglovykh koordinat istochnikov v antennykh reshetkakh s neizvestnoi golbal'noi geometriei). A. B. GERSHMAN, V. I. TURCHIN, and R. A. UGRINOVSKII, *Radiofizika* (ISSN 0021-3462), Vol. 34, April 1991, pp. 403–411. 11 Refs.

The statistical performance of ESPRIT-type bearing estimation methods for antenna arrays with an unknown general geometry is examined for one-dimensional and two-dimensional cases. Analytical and simulation results are compared.

A92-15082   Surface wave diffraction on a grating of metal rods and analysis of a dielectric leaky wave antenna (Difraktsiia poverkhnostnykh voln na reshetke metallicheskikh sterzhnei i analiz dielektricheskoi antenny vytekaiushchei volny). V. I. KALINICHEV and IU. V. KURANOV, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, Oct. 1991, pp. 1902–1909. 10 Refs.

A numerical-analytical method is proposed for solving the electrodynamic problem of diffraction of the surface H-wave of a dielectric plate on an array consisting of a finite number of thin rod oscillators. For normal wave incidence on the array, the two-dimensional Green function is used to obtain a system of linear algebraic equations for oscillator currents, and expressions are obtained for the diffraction characteristics of the structure. An efficient algorithm is developed for the numerical solution of the problem for the case of a large number of array elements. Calculations are made of the characteristics of a highly directional dielectric leaky wave antenna for the millimeter wavelength range.

A92-14292   A study of the efficiency of an adaptive antenna array in the stationary regime in the presence of correlated interference (Issledovanie effektivnosti adaptivnoi antennoi reshetki v statsionarnom rezhime pri nalichii korrelirovannykh pomekh). A. B. GERSHMAN and G. V. SEREBRIAKOV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Aug. 1991, pp. 75–77. 2 Refs.

Expressions are obtained for the principal characteristics of an adaptive antenna array, including an expression for the output signal-to-noise ratio, for the case where a correlation exists between the signal and the noise. The expressions for the output signal-to-noise ratio and the radiation pattern obtained here can be easily extended to the case where the signal and the noise are correlated using methods of spatial smoothing by means of a sliding subarray.

A92-15087 Using special phase modulation of signals in problems involving a conflict between noise protection and noise generation (Ispol'zovanie spetsial'noi fazovoi moduliatsii signalov v konfliktnykh usloviiakh resheniia zadach pomekhozashchity i sozdaniia pomekh). R. V. ANASHKIN, E. I. GLUSHANKOV, L. V. KOLOSOV, and V. V. IATSUK, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, Oct. 1991, pp. 1968-1975. 6 Refs.

A game theory approach is proposed for solving problems of noise protection and noise generation in radio systems with adaptive phased antenna arrays. The method involves the use of special signal phase modulation. Simulation results are presented to demonstrate the efficiency of the approach.

A92-15084 Some methods for the analysis of finite waveguide arrays (O nekotorykh metodakh rascheta konechnykh volnovodnykh reshetok). N. L. ALEKSANDROV and IU. P. VINICHENKO, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, Oct. 1991, pp. 1939-1945. 9 Refs.

A method is proposed for solving the problem of electromagnetic field generation by a finite waveguide array. In accordance with the approach proposed here, the field is represented in free space in the form of a continuous Fourier spectrum. The applicability of the Kirchhoff formula to this problem is demonstrated.

A92-12836 Amplitude-phase control of a phased-array antenna using phase shifters (Amplitudno-fazovoe upravlenie FAR s po-moshch'iu fazovrashchatelei). V. I. SAMOILENKO, V. P. RYZHOV, O. I. ZAROSHCHINSKII, and A. S. PAVLOV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, July 1991, pp. 103-106. 2 Refs.

A method is presented for forming a phase distribution on the surface of a phased array that is equivalent to amplitude-phase control. Procedures are developed for realizing optimal as well as quasi-optimal amplitude-phase control using phase shifters. To illustrate the proposed method, attention is given to an adaptive array whose operation is based on maximization of the SNR.

A92-12800 Gravitational-wave detector based on active recircula-tors as the angle sensor of an antenna array (Gravitatsionno-volnovoi detektor na baze aktivnykh retsirkuliatorov kak uglochuvstvitel'nyi element antennoi reshetki). A. B. BALAKIN, G. V. KISUN'KO, and Z. G. MURZAKHANOV, *Akademiia Nauk SSSR, Doklady* (ISSN 0002-3264), Vol. 319, No. 5, 1991, pp. 1137-1140. 5 Refs.

Two variants of the optical scheme for a modified laser-interferometric gravitational-wave detector for the detection of gravitational waves from periodic sources (relativistic binary systems) are described. The principle of operation of the detector is discussed along with the prospects of developing gravitational-wave antenna arrays.

A91-55379 Estimation of the angular coordinates of closely spaced radiation sources according to their space-time sampling (Otsenivanie uglovykh koordinat blizko raspolozhennykh istochnikov izlucheniia po prostranstvenno-vremennoi vyborke). M. I. SYCHEV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, May 1991, pp. 33-39. 5 Refs.

The paper examines the problem of the separate estimation of the angular coordinates of a certain number of point sources located in a single resolution element according to the Rayleigh criterion. The method used is based on expansion of the received space-time sample in two orthogonal subspaces. The usefulness of this approach is illustrated for a linear equidistant antenna array and for a four-element rectangular array.

A91-55248 Analysis of the steady-state characteristics of adaptive antenna arrays in the presence of signal wavefront fluctuations (Analiz statsionarnykh kharakteristik adaptivnykh antennykh reshetok pri nalichii fluktuatsii volnovogo fronta poleznogo signala). A. A. MAL'TSEV and G. V. SEREBRIAKOV, *Radiofizika* (ISSN 0021-3462), Vol. 34, Jan. 1991, pp. 52-57. Refs.

The paper presents an analysis of the main characteristics of adaptive antenna arrays in cases of rapid or slow temporal distortions of the signal wavefront. The effect of aperture size, and signal fluctuations and power on the output signal-to-noise ratio is evaluated, and the case of angular fluctuations of the signal is considered.

A91-50907 A piezoceramic phase shifter for the millimeter-wave band (P'ezokeramicheskii fazovrashchatel' millimetrovogo diapazona voln). A. I. SHALIAKIN, *Radiotekhnika* (ISSN 0033-8486), June 1991, pp. 74-76. Refs.

A version of a reflection-type piezoceramic phase shifter for millimeter-wave phased-array antennas is examined. Experimental results on the main characteristics of this device are presented.

A91-39146 Attainable suppression of noise in the case of the discrete phase adaptation of an antenna array by means of coordinate-wise gradient descent (Dostizhimoe podavlenie pomekh pri diskretnoi fazovoi adaptatsii antennoi reshetki s pomoshch'iu pokoordinatnogo gradientnogo spuska). D. V. NEZLIN and V. I. DZHIGAN, *Radiotekhnika* (ISSN 0033-8486), March 1991, pp. 55-57.

The paper presents an approximate estimation of the attainable suppression of a specific kind of noise in the case of discrete phase adaptation using a coordinate-wise gradient descent algorithm. The estimates obtained are compared with simulation results, confirming the effectiveness of the proposed approach.

A91-55377 Formation of a sector dip in the radiation pattern of a phased-array antenna in the case of the suppression of broadband noise (Formirovanie sektornogo provala v diagramme napravlennosti FAR pri podavlenii shirokopolosnoi pomekhi). V. I. GUSEVSKII, *Radioelektronika* (ISSN 0021-3470), Vol. 34, May 1991, pp. 23-28. 6 Refs.

The linear relationship between the width of the noise spectrum and the magnitude of the sector dip in the radiation pattern of a linear equidistant antenna array is extended to the case of linear and planar phased-array antennas with arbitrary amplitude-phase distribution and arbitrary boundary of the antenna aperture. The nonlinear phase distribu-tion law in the antenna aperture (necessary for the formation of the dip) is synthesized using the method of aperture orthogonal polynomials and is shown to be optimal according to the criterion of minimum gain losses in the noise-suppression process.

A91-52732 Efficient computational algorithm of orthogonal expan-sions in the analysis of adaptation processes in antenna arrays (Effektivnyi vychislitel'nyi algoritm osushchestvleniia ortogonal'nykh razlozhenii pri analize protsessov adaptatsii v antennykh reshetkakh). IU. I. CHONI, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, July 1991, pp. 1260-1266. 12 Refs.

The paper describes a computationally efficient algorithm for deter-mining the eigenvalues and eigenvectors for the sum of two matrices one of which has a unique nonzero eigenvalue. In the analysis of a specific type of adaptive antenna array, this algorithm makes it possible to avoid the necessity of solving anew the complex eigenvalue problem of the corresponding matrices for each of the noise situations that are analyzed.

A91-52660 A multichannel acoustooptic correlator with time inte-gration for the processing of antenna-array signals (Mnogokanal'nyi akustoopticheskii korreliator s integrirovaniem vo vremeni dlia obrabotki signalov antennykh reshetok). M. G. VYSOTSKII, V. P. KAASIK, and S. A. ROGOV, *Avtometriia* (ISSN 0320-7102), May–June 1991, pp. 93-95. Refs.

The characteristics and operation of a multichannel acoustooptic correlator with time integration are described. It is shown that this system can be used to process orthogonal antenna array signals, making it possible to carry out a real-time survey according to two coordinates.

A91-50831 A vertical antenna array situated above an inclined plane (Vertikal'naia antennaia reshetka, razmeshchennaia nad naklon-noi ploskost'iu). I. S. FAL'KOVICH and M. M. GLIBITSKII, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, June 1991, pp. 1124-1128. 7 Refs.

The possibility of narrowing the radiation pattern of a vertical ultrashort-wave antenna array by placing its base on the slope of a hill is examined. It is demonstrated that this makes possible the efficient formation and cophase summation of three waves: the direct wave; the wave reflected from the slope of the hill; and the wave reflected from the horizontal section of the earth's surface.

A91-43223 Antenna array consisting of large-aperture modules with circular apertures (Antennaia reshetka iz krupnoaperturnykh modulei s kruglymi aperturami). S. A. GANIN and G. A. POLUKHIN, *Radiotekhnika* (ISSN 0033-8486), April 1991, pp. 58-60.

The area utilization coefficient and sidelobe levels of an antenna array consisting of large-aperture modules with circular apertures are analyzed for different types of aperture amplitude distributions. Specifically, atten-tion is given to the dependence of the area utilization coefficient and the level of the large sidelobes on the type of the amplitude distribution.

A91-43222 Synthesis of a systolic computer for realizing a spatial signal processing algorithm (Sintez sistolicheskogo vychislitelia dlia realizatsii algoritma prostranstvennoi obrabotki signalov). E. I. GLUSHANKOV and A. N. KOLESNIKOV, *Radiotekhnika* (ISSN 0033-8486), April 1991, pp. 40-42. Refs.

The paper describes the synthesis of a systolic computer for solving a system of linear algebraic equations for adaptive antenna arrays with Toeplitz correlation matrices. The synthesized systolic computer is used to realize direct methods for the spatial processing of signals with correlation matrices of Toeplitz and block-Toeplitz type.

A91-39149 Synthesis of antenna arrays of open ends of waveg-uides (Sintez antennykh reshetok iz otkrytykh kontsov volnovodov). V. V. RIAPOLOV and V. M. FIDORENKO, *Radiotekhnika* (ISSN 0033-8486), March 1991, pp. 68-70.

A method is proposed for solving inverse problems concerning antenna arrays of open ends of waveguides. Results are presented here for arrays of open ends of rectangular waveguides; it is noted, however, that the method is also suitable for nonrectangular waveguides.

A91-33873 Hybrid microwave fiber-optic system of signal distribu-tion in an active phased-array antenna (Gibridnaia SVCh volokonno-opticheskaia sistema raspredeleniia signalov v aktivnoi FAR). L. D. BLISKAVITSKII and A. A. BAKHRAKH, *Radiotekhnika* (ISSN 0033-8486), Sept. 1990, pp. 62-65. Date: Sep. 1990

The possibility of designing a hybrid microwave fiber-optic system for the distribution of reference radio signals in an active phased-array antenna is demonstrated. The dependence of the gain on the system power and noise is analyzed, and ways to optimize the system characteris-tics are indicated.

A91-42031 **Iterative optimization of the excitation of an antenna array and spatial processing of signals in the case of an enhanced scan rate (Iterativnaia optimizatsiia vozbuzhdeniia antennoi reshetki i prostranstvennoi obrabotki signalov pri povyshennoi skorosti obzora).** A. D. PLUZHNIKOV and S. M. KASHAEV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, March 1991, pp. 3–7. 6 Refs.

The paper describes the optimization of the excitation of an antenna array and the spatial processing of received signals during the detection of targets on a background of clutter. It is shown that this optimization leads to an additional gain in the SNR compared with optimization of only the processing of the received signals in the case of a given array excitation (without taking the noise situation into account).

A91-37242 **Step reduction of the displacement of the difference pattern of a monopulse phased-array antenna (Umen'shenie diskretnosti peremeshcheniia raznostnoi diagrammy napravlennosti monoimpul'snoi FAR).** D. V. NEZLIN and V. I. DZHIGAN, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 73–75.

The paper examines the possibility of improving the direction-finding precision for a monopulse phased array by means of the preliminary synthesis and recording of discrete phase distributions (PDs). The proposed method uses discrete analogs of gradient algorithms, based on coordinate-descent strategies. It is shown that the proposed method for obtaining optimal PDs is an effective means for improving the direction-finding precision of monopulse phased arrays.

A91-37241 **Indirect diagnostics of phased-array antennas via a switching method (Kosvennaia diagnostika FAR kommutatsionnym metodom).** E. M. VORONIN and M. M. GORINA, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 70–72.

A switching technique based on the method of Voronin et al. (1990) is developed for the indirect diagnostics of phased arrays. It is shown that this method is more computationally efficient than the methods described by Bubnov et al. (1988).

A91-37239 **Optically controllable light modulator for the processing of antenna-array signals (Opticheski upravliaemyi moduliator sveta dlia obrabotki signalov antennykh reshetok).** V. S. TEMCHENKO and V. G. OVCHINNIKOV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 65, 66.

An experiment was carried out which made it possible to define the requirements on a optically controllable spatial-temporal light modulator for use in a hybrid optoelectronic processor. Experimental results are presented on noise rejection using a biphase filter.

A91-37229 **Structure of the energy spectrum of the radiation field of active phased-array antenna for the case of the monochromatic signal of the exciter (Struktura energeticheskogo spektra polia izlucheniia aktivnykh FAR pri monokhromaticheskom signale vozbuditelia).** V. L. GOSTIUKHIN and V. N. TRUSOV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 21–26.

The characteristics of secondary radiation of active phased arrays in the presence of noise at the input of the active modules are analyzed. A spectral-correlation investigation of the problem makes it possible to obtain analytical expressions for the components of the complete energy spectrum and to establish their dependence on the spatial coordinates.

A91-37228 **Characteristics of slot radiators in a waveguide-slot antenna array (Kharakteristiki shchelevykh izluchatelei v sostave volnovodno-shchelevoi antennoi reshetki).** V. S. FILIPPOV and I. V. KURZAEV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 16–21. 5 Refs.

A mathematical model is developed for a two-dimensional waveguide-slot traveling-wave array with a periodic system of radiators. The parameters of the slot radiators in the array are determined. Results of a numerical experiment are presented.

A91-33874 **Properties of an optimal weight vector in an antenna array and its estimates (Svoistvo optimal'nogo vesovogo vektora v antennoi reshetke i ego otsenok).** M. B. SVERDLIK, V. E. SHPATAKOVSKII, and O. A. KUSHNERIK, *Radiotekhnika* (ISSN 0033-8486), Sept. 1990, pp. 65–67.

An analysis is made of the properties of a weight vector that is optimal according to the criterion of maximum SNIR and its maximum-likekihood estimates. It is shown that this kind of weight vector in an equidistant antenna array and its estimates based on Toeplitz structural properties of the correlation matrix guarantee the presence of 'strict' zeros in the radiation pattern.

A91-32400 **Estimation of energy losses of a phased-antenna array built from modules with noncophase apertures (Otsenka poter' energii fazirovannoi antennoi reshetki iz modulei s nesinfaznymi aperturami).** G. E. NOVIKOV and G. A. POLUKHIN, *Radiotekhnika* (ISSN 0033-8486), Feb. 1991, pp. 62, 63.

It is shown that additional energy losses connected with scanning occur for phased arrays built from noncophase modules with a quadratic random-phase variation law in the apertures. To reduce these losses, it is not sufficient to compensate for phase errors during scanning via the phase shifters of the array; what is needed is the reduction of the scatter of the module phase diagrams in the scanning sector.

A91-37227 **Characteristics of printed dipole and directional radiators in a plane phased-array antenna (Kharakteristiki pechatnykh vibratornykh i direktornykh izluchatelei v ploskoi FAR).** M. V. INDENBOM, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 13–16.

Dielectric substrates are shown to have a significant effect on the characteristics of printed dipole and directional radiators in a plane phased array. This effect consists in the appearance of a resonance dip and a cross-polarization component in the partial radiation pattern in the E-plane and dissipative losses in the dielectric.

A91-37226 **Optimization of the matching characteristics of few-element phased-array antennas (Optimizatsiia kharakteristik soglasovaniia maloelementnykh FAR).** K. G. KLIMACHEV, *Radioelektronika* (ISSN 0021-3470), Vol. 34, Feb. 1991, pp. 4–8.

The parametric synthesis of matching devices (MDs) for the radiators of few-element phased arrays with a marked boundary effect is examined. Optimization of the array characteristics using various types of MDs in the radiator channels is considered, and recommendations on the choice of the first approximation of the variable MD parameters are presented.

A91-35730 **Natural modes of a grooved waveguide in an infinite periodic grating (Sobstvennye volny zhelobkovogo volnovoda v sostave beskonechnoi periodicheskoi reshetki).** IU. P. VINICHENKO and A. E. TUMANSKAIA, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, Feb. 1991, pp. 308–314.

The natural modes of an infinite periodic grating consisting of asymmetric grooved waveguides are determined on the basis of the Floquet theorem using the method of partial regions. Numerical results are presented to illustrate the solution obtained.

A91-35726 **Convolution-type equations in the theory of antenna arrays (Review) (Uravneniia tipa svertki v teorii antennykh reshetok /Obzor/).** A. F. CHAPLIN and A. D. KHZMALIAN, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, Feb. 1991, pp. 225–238. 71 Refs.

The paper reviews methods for solving convolution-type equations typical for antenna-array analysis problems. Particular emphasis is placed on approaches that lead to effective computer implementations owing to the use of the FFT algorithm.

A91-33872 **Reconstruction of radio-holograms synthesized by orthogonal linear antenna arrays (Vosstanovlenie radiogologramm, sintezirovannykh ortogonal'nymi lineinymi antennymi reshetkami).** P. D. KUKHARCHIK, N. I. KURILO, I. A. TITOVITSKII, E. V. BYCHINOV, and V. V. RUBANIK, *Radiotekhnika* (ISSN 0033-8486), Sept. 1990, pp. 60–62.

An algorithm for the digital reconstruction of radio-holograms is presented which makes it possible to reduce aberrations of the holographic images without a substantial increase in computational time. In particular, spherical aberrations and certain components of astigmatism are completely eliminated.

A91-33857 **Field of random antenna arrays in the Fresnel zone (Pole sluchainykh antennykh reshetok v zone Frenelia).** IA. S. SHIFRIN and V. A. NAZARENKO, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, Jan. 1991, pp. 52–62. 12 Refs.

Expressions are obtained for the mean field intensity and intensity fluctuations in the Fresnel zone of a 'random' antenna array in the presence of random phase errors in the excitation of the radiators. Results are presented which illustrate the dependence of the aforementioned statistical characteristics on the spareseness and the dimensions of the array, the variance of the excitation error, and the location of the observation point.

A91-29820 **Simplified pattern-forming algorithms for a digital antenna array (Uproshchennye algoritmy formirovaniia diagrammy napravlennosti tsifrovoi antennoi reshetki).** A. A. LEMANSKII, M. B. MITIASHEV, and V. S. RABINOVICH, *Radiotekhnika* (ISSN 0033-8486), Jan. 1991, pp. 63–66.

Pattern-forming algorithms for a digital array are examined which make it possible to substantially relax the requirements imposed on the forming processor. It is shown that the proposed algorithms lead to only an insignificant distortion of the characteristics of the digitally formed pattern.

A91-52733 **Numerical simulation of a phased-array antenna consisting of asymmetric log-periodic antennas (Chislennoe modelirovanie fazirovannoi antennoi reshetki iz nesimmetrichnykh logoperiodicheskikh antenn).** V. A. STRIZHKOV, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, July 1991, pp. 1267–1271. 9 Refs.

The problem of calculating the electrodynamic characteristics of a finite phased-array antenna made up of log-periodic dipole antennas is solved. An iterative method that makes possible a substantial speed-up of the solution is considered. The calculation results are confirmed experimentally.

A91-37266 **Synthesis of multilayer hexagonal gratings of metallic disks (Sintez mnogosloinykh geksagonal'nykh reshetok iz metallicheskikh diskov).** V. A. BYCHKOVSKII, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 36, March 1991, pp. 604–607.

A method for the synthesis of multilayer hexagonal gratings of metallic disks according to a given spectrum of resonant frequencies is presented. The proposed method can be used in the design of antennas and resonant absorbers.