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Russian and Japanese Aerospace Literature

During 1995 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 Satellite Observation from Japan.

Support for assembling and publishing the selected abstracts has been provided by the Innovative Science and Technology Directorate of the Strategic Defense Initiative Organization (SDIO), with the sponsorship and technical management of the abstract service by the Office of Naval Research (ONR) under ONR Grant N00014-93-I-1074.

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Russian Aerospace Literature This month: *Antenna Arrays*

A94-25287 mm-wave integrated phased arrays with ferrite control. E. F. ZAJTSEV, Y. P. YAVON, Y. A. KOMAROV, A. B. GUS'KOV, and A. YU. KANIVETS (St. Petersburg State Technical Univ., Russia). *IEEE Transactions on Antennas and Propagation* (ISSN 0018-926X), Vol. 42, No. 3, March 1994, pp. 304–310. 19 Refs. Documents available from Aeroplus Dispatch.

A new class of electrically scanned antenna arrays for the millimeter wave range is described. The antenna is based on a planar integrated ferrite traveling wave structure and is controlled by the magnetization of ferrite elements. Experimental antennas operating in the 8-mm wave range have the following electrical parameters: beamwidth 2 to 4 deg, two-dimensional scanning +/ – 20 deg, loss about 3 to 4 dB. (Author)

A94-23473 A mathematical model for the measurement of angular coordinates by a phased array radar in problems of measurement processing algorithm synthesis (Matematicheskaya model' izmerenij uglovykh koordinat radiolokatorom s fazirovannoj antennoj reshetkoj v zadachakh sinteza algoritmov obrabotki izmerenij). V. N. VINOGRADOV and G. A. GOLUBEV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 39, No. 2, Feb. 1994, pp. 253–258. In Russian. 3 Refs. Documents available from Aeroplus Dispatch.

The linearization principle is employed to develop a mathematical model for the measurement of angular coordinates of located objects by a phased array radar. It is shown that the model can be used for optimizing algorithms for measurement processing, antenna adjustment, and systematic error compensation.

A94-23472 A numerical method for the analysis of the radiation characteristic of a surface antenna on a polyhedron (Chislennyj metod analiza kharakteristik izlucheniya poverkhnostnoj antenny, razmeshchennoj na mnogogrannike). D. D. GABRIEHL'YAN, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 39, No. 2, Feb. 1994, pp. 228–233. In Russian. 12 Refs. Documents available from Aeroplus Dispatch.

A numerical method is proposed for calculating the radiation characteristics of a surface antenna on a perfectly conducting polyhedron of arbitrary shape. The method is based on the analysis of current density distribution on the polyhedron surface. It is shown that the method makes it possible to significantly reduce the computation effort while providing an acceptable accuracy of results for practical applications.

A94-23470 Quasicollimators (for control of radioelectronic systems with antenna arrays) (Kvazikollimatory). V. A. TORGOVANOV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 39, No. 2, Feb. 1994, pp. 177–184. In Russian. 7 Refs. Documents available from Aeroplus Dispatch.

Design principles are presented for compact collimators and quasicollimators intended for the tuning and monitoring of radio electronic systems containing antenna arrays. Results of the testing of multiple-base phase position finders using quasicollimators for the simulation of radiation sources over angles of +/– 60 deg to the antenna aperture normal are presented. Directions of the further development of quasicollimators are predicted.

A94-21681 Diffraction length in microwave energy transmission lines (Difraktsionnaya dlina v liniyakh peredachi SVCh-ehnergii). S. S. SHAPOSHNIKOV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 12, Dec. 1993, pp. 2233–2239. In Russian. Documents available from Aeroplus Dispatch.

Recent research concerned with the diffraction of localized electromagnetic energy beams is reviewed. Some discrepancies between different studies in this field are identified. It is shown, in particular, that the use of different solutions for the wave equation does not lead to qualitative changes in the diffraction length of microwave transmission lines but can lead to significant quantitative changes due to a reduction in transmission efficiency.

A94-20916 Comparison of the characteristics of adaptive antenna arrays using total noise minimization algorithms with signal protection and internal noise limiting (O sravnenii kharakteristik adaptivnykh antennykh reshetok, ispol'zuyushchikh algoritmy minimizatsii summarnoj moshchnosti shumov s zashchitoj poleznogo signala i ogranicheniya urovnya sobstvennykh shumov). O. S. LITVINOV, *Radiofizika* (ISSN 0021-3462), Vol. 35, No. 6–7, July 1993, pp. 533–539. In Russian. 6 Refs. Documents available from Aeroplus Dispatch.

An adaptive antenna array is considered in which the minimization of the total noise level is combined with the limiting of the squared absolute value of the weight coefficient vector. The effectiveness of using such an adaptive array is analyzed by comparing the signal/noise+interference ratio and the output signal of the array with the corresponding values for an adaptive antenna array with signal protection.

A94-17651 Multibeam-operational mode at the RATAN-600 radio telescope G. A. PINCHUK, Y. N. PARIJSKIJ, E. K. MAJOROVA, and D. V. SHANNIKOV, (Special Astrophysical Observatory, Nizhnij Arkhyz, Russia). *IEEE Antennas and Propagation Magazine* (ISSN 1045-9243), Vol. 35, No. 5, Oct. 1993, pp. 18–27. 10 Refs. Documents available from Aeroplus Dispatch.

The possibility of a considerable extension of the RATAN-600 radiotelescope facilities, with the help of linear-feed array, is discussed. This would allow an increase in the fluctuation sensitivity, a decrease in the duration of deep surveys. It would permit realization of the mode for tracking sources and would give new possibilities for antenna adjustments. (Author (revised))

A94-17605 The resonance absorption effect in ribbon arrays and its utilization for mode selection in open resonators (Ehffekt rezonansnogo pogloshcheniya v lentochnykh reshetkakh i ego primenenie dlya selektsii mod v otkrytykh rezonatorakh). M. P. NATAROV, T. L. POPKOVA, V. N. RODIONOVA, V. N. SKRESANOV, and G. Ya. SLEPYAN, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 9, Sept. 1993, pp. 1577–1583. In Russian. 14 Refs. Documents available from Aeroplus Dispatch.

The absorption of E- and H-polarized plane waves by an imperfectly conducting ribbon array, located over the plane surface of a nonideal conductor, is examined. A numerical algorithm for solving the problem is described, and results of computer calculations are presented. A resonance absorption effect in such structures is discovered, and the possibility of using this effect for mode selection in open quasi-optic resonators is demonstrated. The efficiency of mode selection is confirmed experimentally.

A94-17602 Formation of partial sector radiation patterns in an antenna array of coupled two-mode waveguides (Formirovanie sektornykh partsial'nykh diagramm napravlennosti v antennoj reshetke svyazannykh dvukhmodovykh volnovodov). A. S. VYAZIGIN and S. P.

SKOBELEV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 9, Sept. 1993, pp. 1554–1559. In Russian. 7 Refs. Documents available from Aeroplus Dispatch.

An array of two-mode rectangular waveguides, coupled through slots in their narrow walls and fed through single-mode waveguides and stepped junctions, is considered. A method is presented for analyzing the characteristics and optimizing the geometry of the array in order to produce partial sector radiation patterns in the H-plane. A model of an infinite periodic structure and multimode scattering matrices for its elements are employed. An example of an array geometry is considered, and the corresponding partial sector radiation patterns and array reflection coefficients are examined.

A94-12823 Multichannel antenna devices with high noise immunity (Mnogokanal'nye antennye ustrojstva s povyshennoj pomekhozashchishchennost'yu). V. A. BALAGUROVSKIJ, A. S. KONDRAT'EV, and V. N. MOSALOV, *Radiotekhnika* (ISSN 0033-8486), No. 5–6, June 1993, pp. 53–58. In Russian. 6 Refs. Documents available from Aeroplus Dispatch.

The paper examines the ability of the phase method to improve the noise immunity of modular multichannel antenna devices used to measure the angular coordinates of radiation sources in the presence of noise. This technique makes it possible to form deep troughs in the pattern of a module and of the entire antenna device in specified angular directions. Isolated troughs with a depth of about −50 dB can be formed using three phase-shifters.

A94-12812 Calculation of the radiation pattern of a plane resonator array with variable transparency and height (Raschet diagrammy napravlennosti ploskoj rezonatornoj antenny s peremennymi prozrachnost'yu i vysotoj). N. I. VOJTOVICH, N. N. VOJTOVICH, O. F. ZAMORSKAYA, and B. Z. KATSENELENBAUM, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 7, July 1993, pp. 1247–1255. In Russian. 4 Refs. Documents available from Aeroplus Dispatch.

A solution is presented for the two-dimensional problem of a resonator array with a flat semitransparent upper wall, variable height, and waveguide excitation. The method of partial domains is used in combination with the method of cross sections. Numerical results are presented on fields, radiation patterns, and directional action coefficient over a frequency range covering different height variations and transparency distributions.

A93-56304 Forming flat-topped element patterns in antenna arrays of two-mode waveguides S. P. SKOBELEV, and A. S. VYAZIGIN (Research Inst. of Radio Physics, Moscow, Russia), *Electronics Letters* (ISSN 0013-5194), Vol. 29, No. 15, July 22, 1993, pp. 1326–1327. 4 Refs. Documents available from Aeroplus Dispatch.

The results of numerical simulation are presented for an array of two-mode slot-coupled parallel plate waveguides excited by TEM modes through dominant mode waveguides and two-step junctions. It is shown that flat-topped element patterns formed by this simple structure are no worse than those of a known array with power dividers and directional couplers.

A93-53561 Angular superresolution of coherent sources using a planar antenna array on the basis of nonlinear spectral-analysis methods (Sverkhrazreshenie po uglovym koordinatam kogerentnykh istochnikov pri pomoshchi ploskoj antennoj reshetki na osnove nelinejnykh metodov spektral'nogo analiza). E. B. VOLOCHKOV, and V. N. GARMASH, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 8, Aug. 1992, pp. 1413–1422. 21 Refs. Documents available from Aeroplus Dispatch.

The problem of the angular superresolution of point sources of narrowband coherent signals is solved, assuming that the sources are located in the near field of the planar equidistant array. One-dimensional methods of nonlinear spectral analysis are used to develop an approach to sequential and separate 2D spectral analysis, making it possible to determine the number of sources and their angular coordinates with superresolution. Numerical-simulation results on the performance of this approach are presented.

A93-53559 Phase synthesis of zeros in the radiation pattern of linear antenna arrays with different amplitude distributions (Fazovyj sintez nulej v diagramme napravlennosti linejnykh antennykh reshetok s razlichnymi amplitudnymi raspredeleniyami). V. I. GUSEVSKIJ, and N. A. YURKOVA, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 8, Aug. 1992, pp. 1395–1405. 11 Refs. Documents available from Aeroplus Dispatch.

A novel method for the phase synthesis of zeros in linear-array radiation patterns in the case of different fixed amplitude distributions in the antenna aperture is proposed which is based on the use of aperture orthogonal polynomials. The optimality of the solution is guaranteed by the use of constraints on the stability of the position of the main lobe and on the minimum reduction in the array gain. Calculation results are presented.

A93-53558 Impedance approach to the analysis of polarization losses in antenna arrays (Impedansnyj podkhod k analizu polyarizatsionnykh poter' v antennykh reshetkakh). P. L. TOKARSKIJ, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 8, Aug. 1992, pp. 1388–1395. 8 Refs. Documents available from Aeroplus Dispatch.

The powers of the basic and parasitic components of the radiated field are expressed through currents at the inputs of the antenna array using Hermitian forms, whose coefficients comprise two matrices of polarization impedance, while their sum matrix forms the matrix of the array radiation resistance. A method for determining the mutual polarization resistances of arbitrary radiators is developed, and calculation formulas applicable to the Hertz dipole are obtained. This approach was used to calculate the polarization-loss coefficient of a hexagonal array of tourniquet radiators.

A93-53545 Limiting characteristics of the angular superresolution of antenna arrays in the case of the observation of coherent sources (Predel'nye kharakteristiki uglovogo sverkhrazresheniya antennykh reshetok pri nablyudenii kogerentnykh istochnikov). I. V. GANKOV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 4, April 1993, pp. 648–652. 9 Refs. Documents available from Aeroplus Dispatch.

The paper examines the resolution of coherent point sources observed using an extended antenna array. The superresolution characteristics of two coherent sources radiating harmonic signals with a constant phase difference between them are determined using a reversal method, Prony's division method, and a hybrid method. The best results are given by the hybrid method.

A93-53318 Estimation of the effect of the relative width of the radiation pattern during ultrafast scanning along an extended object (Otsenka vliyaniya otnositel'noj shiriny diagrammy napravlennosti pri sverkhbystrom skanirovanii vdol' protyazhennogo ob"ekta). K. A. CHASNYK, *Radiotekhnika* (ISSN 0033-8486), No. 1, Jan. 1993, pp. 48–52. 7 Refs. Documents available from Aeroplus Dispatch.

An algorithm is proposed for calculating the effect of the radiation pattern width of the antenna in systems with ultrafast scanning on the mean square of the received signal reflected from an extended object whose dimensions equal those of the angular scanning sector. A specific example is considered.

A93-51834 Adaptive directing-finding of sources of intense signals in multichannel systems (Adaptivnaya pelengatsiya istochnikov intensivnykh signalov v mnogokanal'nykh sistemakh). O. P. CHEREMISIN, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 12, Dec. 1992, pp. 2199–2209. Documents available from Aeroplus Dispatch.

An adaptive Bayesian approach is used to synthesize algorithms for the direction-finding of sources of intense radiation with an arbitrary modulation law in time in a multichannel reception system with an antenna array. The Rayleigh statistic is found to be the best from the point of view of accuracy for a sufficiently large sample volume.

A93-51833 Generalized radiation pattern of an element of a phased-array antenna (Obobshchennaya diagramma napravlennosti ehlementa fazirovannoj antennoj reshetki). N. L. ALEKSANDROV, YU. P. VINICHENKO, and A. E. TUMANSKAYA, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 12, Dec. 1992, pp. 2174–2181. 6 Refs. Documents available from Aeroplus Dispatch.

A new form of transcription of the multiplication theorem is proposed. The concept of the generalized radiation pattern of an element of a phased array is introduced and analyzed. The application of the multiplication theorem to finite arrays is analytically justified.

A93-51831 The effect of fabrication errors on the characteristics of SAW pattern-forming schemes (Vliyanie tekhnologicheskikh pogreshnostej na kharakteristiki diagrammoobrazuyushchikh skhem na poverkhnostnykh akusticheskikh volnakh). A. V. BELYANSKIJ, and V. G. KARTASHEV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 12, Dec. 1992, pp. 2161–2168. 4 Refs. Documents available from Aeroplus Dispatch.

Methods are described for calculating the variances of random phase and amplitude errors arising in the fabrication of SAW pattern-forming schemes for antenna arrays in the reception mode with a low sidelobe level of the radiation pattern that is formed. The analytical theory is confirmed by numerical simulation.

A93-51830 Sectioned nonequidistant linear antenna arrays based on difference manifolds (Sektsionirovannye neehkvidistantnye linejnye antenny-reshetki na osnove raznostnykh mnozhestv) L. E. KOPILOVICH, and L. G. SODIN, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 12, Dec. 1992, pp. 2155–2160. 5 Refs. Documents available from Aeroplus Dispatch.

A method for the synthesis of nonequidistant sparse phased arrays in the form of a combination of a few identical sections is proposed. In each of these sections the radiators are arranged according to the difference-manifold law. The sidelobes of such arrays are analyzed, and results of numerical calculations are presented.

A93-51090 Analysis of the statistical characteristics of an adaptive antenna array with independent generation of the reference signal (Analiz statisticheskikh kharakteristik adaptivnoj antennoj reshetki s nezavisimym formirovaniem opornogo signala). S. V. IGNATENKO, A. A. MAL'TSEV, and A. M. SILAEV (Nizhegorodskij Gosudarstvennyj Univ., Nizhni Novgorod, Russia) *Radiofizika* (ISSN 0021-3462), Vol. 34, No. 10–12, Oct.–Dec. 1991, pp. 1159–1169. Documents available from Aeroplus Dispatch.

The statistical characteristics of an adaptive array based on the LMS algorithm in the steady state are analyzed. A nonlinear transformation of the array output is used as the reference signal. Attention is given to the case of BPSK modulation of the desired signal with Gaussian interference and noise. The optimal type of nonlinear transformation for the reference signal, providing both minimum mean-square estimation error and maximum output SNR, is found.

A93-51048 Determination of the characteristics of a reflection-type phased-array antenna in a waveguide simulator via the alternating replacement of the reflection elements by a through-pass one (Opredelenie kharakteristik otrazhatel'noj fazirovannoj antennoj reshetki v volnovodnom imitatore metodom poocherednogo zameshcheniya otrazhatel'nykh ehlementov prokhodnym). A. S. BATANOV, V. L. ZUBKOV, YU. A. KARTSEV, D. M. SAZONOV, and N. YA. FROLOV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 11, Nov. 1992, pp. 2089–2092. 10 Refs. Documents available from Aeroplus Dispatch.

The paper describes a method for determining the dynamic reflection coefficient of a reflection-type phased array in a waveguide simulator via the measurement of the reflection coefficient at the input of a through-pass element that alternately replaces elements of a fragment of the phased array placed in a multimode rectangular waveguide. This approach works only for fragments that do not have symmetry planes.

A93-51047 Optical phasing of a centimeter-range three-element radio interferometer (Opticheskoe fazirovanie trekhehlementnogo radiointerferometra santimetrovogo diapazona). N. A. ARMAND, V. P. VARD'YA, I. P. KORSHUNOV, and R. F. MATVEEV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 11, Nov. 1992, pp. 2073–2083. Documents available from Aeroplus Dispatch.

A system for the phasing of local microwave heterodynes of a three-element radio interferometer, based on reference-signal transmission on an optical carrier, has been proposed and realized. For a maximum baseline of 460 m, the transmission range of the reference microwave signal is 1140 m. The intrinsic relative instability of the electrical length of the beam-guiding channel of the phasing, due to variations of air density, is not worse than 4×10 exp -7 per hour. This provides for a phase synchronization of the local oscillators of the interferometer within 1 degree per hour.

A93-51043 Design of SAW devices simulating the operation of receiving antenna systems (Raschet ustrojstv na poverkhnostnykh akusticheskikh volnakh, modeliruyushchikh rabotu priemnykh antennykh sistem). V. G. KARTASHEV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 11, Nov. 1992, pp. 1959–1964. 3 Refs. Documents available from Aeroplus Dispatch.

The operating principle and design methodology for SAW devices simulating the operation of receiving antenna systems are detailed. The simulation of the receiving antennas using SAW devices is based on the identity of propagation laws for electromagnetic and acoustic waves; such simulation makes it possible to test radio systems without radiating electromagnetic waves into the environment. Particular attention is given in the present work to maintaining the simulation bandwidth.

A93-51042 Transient electromagnetic field of an array of TEM horns Nestatsionarnoe ehlektromagnitnoe pole reshetki TEM-ruporov V. P. LISITSYN, G. D. DOMASHENKO, and M. I. UTKIN, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 37, No. 11, Nov. 1992, pp. 1954–1959. 6 Refs. Documents available from Aeroplus Dispatch.

An approximate method for calculating the transient electromagnetic field of a synchronous array of TEM horns is proposed. An analysis is made of the dependences of the basic characteristics of the array radiation field on distance, the dimensions of the horns, the exciting voltage front, and the asynchronism of the horn excitation.

A93-47156 A method for determining the limiting regimes of wideband multipole oscillators (Metod opredeleniya predel'nykh rezhimov shirokopolosnykh mnogopolyusnykh generatorov). V. N. KOTLYAROV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 3, March 1993, pp. 486–493. 9 Refs. Documents available from Aeroplus Dispatch.

A mathematical model is developed which describes the operation of multipole oscillators with independent excitation used in the final stages of wideband radio transmit systems with phased antenna arrays. The limiting values of the output power and system efficiency are calculated as theoretical limits for a narrowband radio signal transmitted along a given direction at a specified frequency, with a specified radiation pattern. The approach proposed here can be used to calculate the absolute energy potential and linearity of wideband radio transmit systems and other systems with coupled complex loading, such as distributed-gain amplifiers.

A93-47154 Modeling of horn waveguide radiators of arbitrary cross section (Modelirovanie volnovodno-rupornykh izluchatelej proizvol'nogo poperechnogo secheniya). YU. N. VASILENKO, A. S. IL'INSKIJ, and YU. YA. KHARLANOV, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 3, March 1993, pp. 440–446. Documents available from Aeroplus Dispatch.

A mathematical model is developed which describes a horn waveguide radiator with an arbitrary cross-section shape. The external electrodynamic problem is solved in the Huygens-Kirchhoff approximation. The tangential components of the aperture electromagnetic field are calculated by using a finite element algorithm. The numerical results are compared with the results of an analytical solution for a rectangular waveguide and with experimental results for a horn radiator with a cross-shaped cross section.

A93-47152 A corner dipole with capacitive loads (Ugolkovyj vibrator s emkostnymi nagruzkami). B. M. LEVIN, *Radiotekhnika i Ehlektronika* (ISSN 0033-8494), Vol. 38, No. 3, March 1993, pp. 400–408. 5 Refs. Documents available from Aeroplus Dispatch.

The paper is concerned with the problem of selecting concentrated loads for a corner dipole in such a way as to obtain a high level of radiation along the beam axis over a wide frequency band. The problem is solved by using the method of the equivalent impedance line. Numerical results are presented.

A93-45721 Resource allocation in a multibeam adaptive antenna array with a parallel pattern-generating circuit (Raspredelenie resursa v mnogoluchevoj adaptivnoj antennoi reshetke s parallel'noj skhemoj diagrammoobrazovaniya). V. P. POSTYUSHKOV, V. F. OLEJNIK, and S. M. TRET'YAKOV, *Radioehlektronika* (ISSN 0021-3470), Vol. 36, No. 6, June 1993, pp. 76–80. 5 Refs. Documents available from Aeroplus Dispatch.

The problem of optimal distribution of the power of the group signal for a decameter-range eight-element antenna array with four adaptive pattern-generating circuits is considered. It is shown that the optimal distribution of the power of the group signal of a multibeam adaptive antenna array with adaptive pattern generating circuits leads to a substantial enhancement of the communication efficiency in the radio lines that are being served.

A93-45717 Investigation of the effect of the mutual coupling of antenna elements on the efficiency of adaptive spatial signal processing (Issledovanie vozdejstviya vzaimnoj svyazi antennykh elementov na effektivnost' adaptivnoj prostranstvennoj obrabotki signalov). L. A. MARCHUK, and V. V. FATTAKHOV, *Radioehlektronika* (ISSN 0021-3470), Vol. 36, No. 6, June 1993, pp. 49–54. 3 Refs. Documents available from Aeroplus Dispatch.

The paper presents an investigation of adaptive spatial signal processing realized in the case of the mutual effect of the antenna elements according to an algorithm that does not take into account a priori information on the signal characteristics. Algorithms synthesized according to the criterion of minimum power of the array output signal are used as the procedure for adjusting the weight factors of the adaptive antenna array. The mutual effect of the antenna elements has a negligible destructive effect in the case of adaptive spatial processing of narrow-band signals.

A93-45710 Multimode matching structures in a phased-array antenna (Mnogomodovye volnovodnye soglasuyushchie struktury v FAR). V. M. MAKSIMOV, and I. G. SUKHAREV (Moskovskij Aviatsionnyj Inst., Moscow, Russia). *Radioehlektronika* (ISSN 0021-3470), Vol. 36, No. 6, June 1993, pp. 3–8. 6 Refs. Documents available from Aeroplus Dispatch.

The feasibility of using multimode waveguide structures for the matching of radiators ion phased arrays is examined. Mathematical models for the matching structures are developed and studied numerically. Common features of the matching structures are identified that lead to a method for their simplified design.

A93-45709 Characteristics of the control algorithm for an adaptive antenna array synthesized according to the criterion of minimum power of the output signal (Osobennosti algoritma upravleniya adaptivnoj antennoj reshetkoj, sintezirovannogo po kriteriyu minimuma moshchnosti vykhodnogo signala). L. A. MARCHUK, and V. V. FATTAKHOV, *Radioehlektronika* (ISSN 0021-3470), Vol. 36, No. 5, May 1993, pp. 74–79. 3 Refs. Documents available from Aeroplus Dispatch.

It is shown that the adaptive adjustment of the weight factors becomes unstable when the number of signals and noise exceeds the number of degrees of freedom of the adaptive antenna array. Conditions for guaranteeing the stability of the adaptation procedure are examined.

A93-45707 Synthesis of the excitation of the inputs of the radiators of a phased array according to a given amplitude-phase distribution (Sintez vozbuzhdeniya vkhodov izluchatelya FAR po zadannomu amplitudno-fazovomu raspredeleniyu). V. M. MAKSIMOV, and I. G. SUKHAREV, (Moskovskij Aviatsionnyj Inst., Moscow, Russia) *Radioehlektronika* (ISSN 0021-3470), Vol. 36, No. 5, May 1993, pp. 57–64. 4 Refs. Documents available from Aeroplus Dispatch.

An input-excitation synthesis method for phased-array radiators is proposed for obtaining a given amplitude-phase distribution of the field at the aperture. A mathematical model is developed that makes it possible to realize the synthesis algorithm for a continuous aperture excited by a radiator array.

A93-45706 Spread of the duration of pulse fronts and phase shifts of modules in active phased arrays (Razbros dlitel'nosti frontov impul'sov i fazovykh sdvigov modulej v aktivnykh FAR). V. L. GOSTYUKHIN, and V. N. TRUSOV (Moskovskij Aviatsionnyj Inst., Moscow, Russia) *Radioehlektronika* (ISSN 0021-3470), vol. 36, no. 5, May 1993, pp. 49–56. 2 Refs. Documents available from Aeroplus Dispatch.

A spectral-correlation analysis method is used to determine the energy spectrum of the radiation field of active phased arrays in pulsed radio systems in the presence of fluctuations of the duration of pulse fronts and phase shifts introduced by the active modules over the pulse-action period. Depending on the character of the distortions, a corresponding redistribution of the level of spectral components in the radiation field occurs. Expressions are obtained for determining the spatial distribution and magnitude of secondary radiation.