Asian Abstracts

Papers from Journals Published in Australia, India, and Japan in 1983

Compiled by Prof. E. Yamashita (with the assistance of Dr. Y. Suzuki), University of Electro-Communications, Tokyo, 182 Japan.

The periodicals investigated are: 1) Transactions of the Institute of Electronics and Communication Engineers of Japan (Trans. IECEJ), 2) Journal of the Institution of Engineers, Electronics and Telecommunication Engineering Division, India, (JIE, Part ET), 3) Journal of the Institution of Electronics and Telecommunication Engineers, India, (JIETE), 4) Journal of Electrical and Electronics Engineering, Australia, (JEEE), and 5) Australian Telecommunication Research (ATR).

As for the Japanese papers in the Trans. IECEJ, which carry volume numbers J66-B or J66-C, short English summaries are found in the Trans. IECEJ, vol. E66, issued in the same month. Papers carrying volume number E66 are papers originally written in English. These issues are published from the IECEJ, Kikai-Shinko-Kaikan, 3-5-8, Minato-ku, Tokyo 105, Japan.

The full translations of some Japanese papers will appear in Electronics and Communications in Japan, published by Scripta Publishing Co., 7961 Eastern Avenue, Silver Spring, MD 20910.

The abstracts of these papers are grouped as follows:

1) Active Microwave Devices
2) Passive Microwave Devices
3) Transmission Lines and Waveguides
4) Microwave Integrated Circuits
5) Microwave Field and Circuit Theory
6) Microwave Antennas
7) Microwave Propagation
8) Microwave Thermal Effects
9) Optical Fibers
10) Optical Waveguides Other Than Fibers
11) Optical Devices
12) Measurements

Active Microwave Devices

1

Parallel Running Oscillators with High Q Stabilizing Cavity, by I. Ohta and S. Kitagaki (Faculty of Engineering, Himeji Institute of Technology, Himeji-shi, 671-22 Japan): *Trans. IECEJ*, vol. J66-B, pp. 9–16, Jan. 1983.

Magic-T coupled parallel running oscillators with a high-Q band rejection filter are studied. The exact sum of power as well as improved frequency stability is obtained in the case of two oscillators with in-phase synchronism.

2

Coupling of Oscillators Through Distributed-Constant Transmission Lines and Power Combination, by T. Hirota (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan), M. Nakajima, and J. Ikenoue (Faculty of Engineering, Kyoto University, Kyoto-shi, 606 Japan): *Trans. IECEJ*, vol. J66-B, pp. 103–109, Jan. 1983.

A general analysis of oscillator systems is shown in which two van der Pol-type oscillators are coupled through transmission lines. Results of the analysis have been confirmed by experiments of 8-GHz Gunn oscillators.

3

Propagation Properties of Dielectric Waveguides with Optically Induced Plasma Layers, by K. Ogusu (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan), I. Tanaka (College of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan), and H. Itoh (Faculty of Engineering, Shizuoka University): *Trans. IECEJ*, vol. J66-C, pp. 39–46, Jan. 1983.

The propagation properties of dielectric waveguides with a photo-induced plasma layer are analyzed by the effective dielectric constant method. Results of experiments on a high-resistivity silicon waveguide at 50 GHz are shown.

4

Light-Controlled Dielectric Image Waveguides (Letters), by K. Ogusu (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan), I. Tanaka, and H. Sannomiya (College of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan), and H. Itoh (Faculty of Engineering, Shizuoka University): *Trans. IECEJ*, vol. J66-C, pp. 106–107, Jan. 1983.

The propagation properties of the dielectric image waveguide with a photo-induced plasma layer have been investigated theoretically and experimentally.

5

Mathematical Expression of the Load Characteristics of Microwave Oscillators and Injection-Locking Characteristics, by K. Fukumoto, M. Nakajima, and J. Ikenoue (Faculty of Engineering, Kyoto University, Kyotoshi, 606 Japan): *Trans. IECEJ*, vol. J66-B, pp. 239–244, Feb. 1983.

Injection-locked microwave oscillators have been investigated based on a mathematical model described in a previous paper. The usefulness of the numerical expressions of oscillator characteristics is demonstrated.

6

800-MHz Band, Miniaturized, High-Efficiency Power Amplifiers, by Y. Kawakami, M. Akiyama, and K. Kaminishi (Research Lab., OKI Electric Industry Co., Ltd., Tokyo, 193 Japan): *Trans. IECEJ*, vol. J66-C, pp. 226–233, Mar. 1983.

Three-stage C-class amplifiers have been developed on a berrylia substrate. The power gain of 24 dB, and the total efficiency of 40 percent have been obtained for the output power of 10 W at 800 and 900 MHz.

7

Effect of Package Parasitics in Injection-Locked Diode Oscillators, by B. N. Biswas, S. K. Ray, K. Pramanik, M. Sadhu, and D. Bandyopadhyay (Physics Dept., Burdwan University, Burdwan, 713 104 India): *JIETE* (India), vol. 29, no. 3, pp. 112–119, Mar. 1983.

The effect of package parasitics on the locking properties of an injection-synchronized Gunn oscillator is described. Experimental findings are also presented.

8

Some Studies on the Effect of the Resonant Cap on the Oscillator Performance of *X*-Band GaAs and Si IMPATT Oscillators, by K. K. Mallik, M. Sridharan, and S. K. Roy (Centre of Advanced Study in Radiophysics & Electronics, University of Calcutta, Calcutta, 700 009 India): *JIETE* (India), vol. 29, no. 5, pp. 215–218, May 1983.

The maximum efficiency of the *X*-band GaAs IMPATT oscillator was found to be 19 percent at a power level of 1.4 W when the device optimum frequency nearly corresponds to the frequency of oscillation determined by the resonant cap.

9

High Frequency Noise in DAR IMPATT Diode Considering Unequal Ionization Rates and Drift Velocities of Electrons and Holes, by D. N. Datta (Centre of Advanced Study in Radio Physics & Electronics, 1, Girish Vidyaratna Lane, Calcutta, 700 009 India) and B. N. Pal (Electronics Engineering Dept., Banaras Hindu University, Varanasi, 221 005 India): *JIETE* (India), vol. 29, no. 3, pp. 119–123, Mar. 1983.

It has been found that, at the same biasing current level, the negative conductance and noise figure of DAR IMPATT are comparable with those of an equivalent SDR IMPATT.

10

16-QAM Transmission Characteristics in a Nonlinear Amplifier, by T. Yoshida, Y. Saito, and H. Yamamoto (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan): *Trans. IECEJ*, vol. J66-B, pp. 514–520, Apr. 1983.

This paper proposes a new analysis method to determine the equivalent C/N degradation of 16 QAM transmission from the nonlinear characteristics of TWT and FET amplifiers at 4.7 GHz.

11

Microwave Broad-Band GaAs Monolithic Amplifier, by K. Honjo and T. Sugiura (Microelectronics Research Lab., NEC Corp., Kawasaki, 213 Japan): *Trans. IECEJ*, vol. E66, pp. 298–304, May 1983.

Resistive elements are introduced into a GaAs-monolithic amplifier to make it insensitive against circuit parameter variations. The developed amplifier provides the gain over 7.5 dB from 100 MHz to 8.5 GHz without circuit trimming.

12

A Travelling-Wave Analysis of the Stability of Injection-Locked Oscillator, by S. Hamaya (Namazu Technical College, Namazu-shi, 410 Japan): *Trans. IECEJ*, vol. J66-B, pp. 727–734, June 1983.

The stability of an oscillator in free-running conditions and injection-lock conditions is analyzed based on the Rieke diagram in the reflection coefficient plane. This analysis is applied to a tunnel diode oscillator.

13

Response of Nb–Pb–Nb Planar Josephson Junction Under Millimeter-Wave Radiation (Letters), by S. Yoshimori and M. Kawamura (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. J66-C, pp. 488–489, June 1983.

An Nb–Pb–Nb planar Josephson junction was fabricated using the electron-beam lithography. The second-order Shapiro step was observed under the radiation of 70-GHz waves.

14

Si-Monolithic Microwave Wideband Amplifier (Letters), by T. Nakata, S. Miyazaki, H. Kushiyama, and K. Ishida (The Second LSI Division, NEC Corp., Kawasaki, 211 Japan): *Trans. IECEJ*, vol. E66, pp. 502–503, Aug. 1983.

This paper describes the circuit design and performance of an Si monolithic wideband amplifier housed in a TO-5 can with the gain of 17 dB, the bandwidth of 1.4 GHz, and the noise figure of 5 dB.

15

Coherent Characteristics of Superconducting Closed Loop Composed of Josephson Junctions, by T. Kobayashi (Sendai Radio Technical College, Miyagi-ken, 989-31 Japan), N. Kondo, K. Hamasaki, and T. Yamashita (Faculty of Engineering, Technological University of Nagaoka, Nagaoka-shi, 949-54 Japan): *Trans. IECEJ*, vol. J66-C, pp. 660–667, Sept. 1983.

The voltage–current characteristics of a 2N-Josephson junction closed loop and RF-induced constant voltage steps in the $v-i$ curve are discussed by using experimental results at 9.7 GHz.

16

Computer-Aided Numerical Analysis and Design of High-Performance Helix Traveling-Wave Tubes, by K. Tsutaki, Y. Yuasa (Electron Device Division, NEC Corp., Kawasaki-shi, 211 Japan), T. Horigome (Engineering Dept., NEC Kagoshima Ltd., Izumi-shi, 899-02 Japan), and Y. Morizumi (R&D Planning and Technical Service Division, NEC Corp., Kawasaki-shi, 213 Japan): *Trans. IECEJ*, vol. J66-C, pp. 701–708, Oct. 1983.

This paper describes a new design method of helix traveling-wave tubes for high output power (over 100 W) and wide bandwidth (2–4 GHz) at frequencies in 10–20-GHz bands.

17

Operational Characteristics of an RF-Excited CW–HCN Laser, by H. Ute (Presently with Toshiba Corp.), T. Fukuyama, I. Okabayashi, M. Makiuchi (Presently with Fujitsu Lab., Ltd.), and M. Kawamura (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. J66-C, pp. 725–731, Oct. 1983.

The maximum output power of the laser using a Pyrex tube of 1 m is about 160 mW at the wavelength of 337 μm, which is the highest reported value for a CW HCN laser.

18

An Analysis of the Stability of the Oscillation Modes in Parallel Running Oscillators, by S. Hamaya (Numazu Technical College, Numazu-shi, 410 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1378–1385, Nov. 1983.

This paper describes the analysis of the stability of the oscillation mode by introducing the traveling-wave theory and the Rieke diagram. The case of a Gunn diode oscillator is treated theoretically and experimentally at 10 GHz.

19

Microwave Phase Shifters Using GaAs FET's (Letters), by S. Toyoda (Faculty of Engineering, Osaka Institute of Technology, Osaka-shi, 535 Japan), and T. Makimoto (Faculty of Engineering, Setsunan University, Neyagawa-shi, 572 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1436–1437, Nov. 1983.

This paper describes phase shifters using single- and dual-gate GaAs FET's and PIN diodes. Experimental results at 3–4 GHz are shown.

20

Operational Characteristics of Helical Structure Over Dielectric Tube in a Metal Casing, by M. P. Sinha (Electronics Engineering Dept., Institute of Technology, Banaras Hindu University, 221 005 India): *JIETE* (India), vol. 29, no. 11, pp. 554–557, Nov. 1983.

A new configuration of TWT is proposed in which wire helix is wound on a dielectric tube and enveloped by a hollow electron beam. This structure is effective in providing dispersion shaping with reduced dielectric loading.

Passive Microwave Devices

1

Design of Bandpass Filter Using Axially-Coupled Dielectric Rod Resonators, by Y. Kobayashi and S. Yoshida (Faculty of Engineering, Saitama University, Urawa-shi, 338 Japan): *Trans. IECEJ*, vol. J66-B, pp. 95–102, Jan. 1983.

Compact 4-resonator bandpass filters having different bandwidths were designed by using Alford loop coupling and made for the resonant frequency of 6.3 GHz. Measured characteristics agree well with calculated values.

2

A New Composition of Bandpass Filter Using Coupled Transmission Lines with Inhomogeneous Dielectric Medium, by A. Fukasawa (Oki Electric Co., Ltd., Hachioji-shi, 193 Japan): *Trans. IECEJ*, vol. J66-B, pp. 141–148, Jan. 1983.

A new filter is designed by using coupled quarter-wavelength lines. It is pointed out that sufficient coupling for the filter can be obtained by removing part of a dielectric medium. Experimental results are shown.

3

Electromagnetic Coupling Between Transmission Lines Through Apertures (Short Paper), by B. N. Das and V. M. Pandharipande (Electronics and Electrical Communication Engineering Dept., Indian Institute of Technology, Kharagpur, 72 302 India): *JIETE* (india), vol. 29, no. 2, pp. 45–56, Feb. 1983.

A comprehensive survey on the methods of analysis and design of microwave aperture couplers is presented. The relative merits and demerits of various techniques are described.

4

Bandpass Filters Using Electrically-Coupled TM_{010} Dielectric Rod Resonators, by Y. Kobayashi, K. Kojima (Presently with NEC Corp.) and S. Yoshida (Faculty of Engineering, Saitama University, Urawa-shi, 338 Japan): *Trans. IECEJ*, vol. J66-B, pp. 313–320, Mar. 1983.

The Ritz–Galerkin method is applied to the numerical analysis of resonant frequencies and coupling coefficients of the resonators. Filters of 2 to 3 stages were designed for the bandwidth of 1 to 10 percent at 2.7 GHz and compared with experimental data.

5

Bandpass Filter Using Parallel Coupled Strip-Line Stepped Impedance Resonators, by M. Makimoto and S. Yamashita (Matsushita Research Institute Tokyo, Inc., Kawasaki-shi, 214 Japan): *Trans. IECEJ*, vol. J66-B, pp. 353–359, Mar. 1983.

Resonance conditions and slope parameters of an SIR are discussed. Design formulas of bandpass filters are derived from the admittance inverter. Measured values on an experimental filter for 1 GHz are in good agreement with theory.

6

Spectral Domain Analysis of a Coupled Microstrip Resonator, by K. Kuwano (Musashino Electrical Communication Lab., N.T.T., Musashino, 180 Japan): *Trans. IECEJ*, vol. E66, pp. 390–394, June 1983.

Resonance frequencies of a shielded coupled-microstrip resonator are analyzed based on Galerkin's method in the Fourier transform domain. Experimental results are also shown.

7

Dielectric and Dielectric-Coated Metal Structure and Their Applications as Waveguides, Resonators, and Antennas (Review Paper), by R. Chatterjee (Electrical Communication Engineering Dept., Indian Institute of Science, Bangalore, 560 012 India): *JIETE* (India), vol. 29, no. 7, pp. 291–298, July 1983.

A review of the theoretical and experimental work which has been carried out in the Indian Institute of Science on the above subject is given. Some of important applications are indicated.

8

Resonant Characteristics of the Magnetostatic Wave at the Millimeter-Wave Frequency (Letters), by M. Tsutsumi, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1305–1306, Oct. 1983.

Typical experimental results observed in the magnetostatic waves in a YIG film disk resonator excited by an

image line have indicated the Q factor of 1900 with the spurious level of 16 dB at 45.9 GHz.

9

Measurement of Effective Efficiency of Thin-Film Barretter Mount at 10.0 GHz Using Microcalorimetric Technique Established at NPL, New Delhi, by P. C. Kothari, H. M. Bhatnagar, R. Aggarwal, V. K. Agrawal, and K. Chandra (National Physical Lab., Hillside Road, New Delhi, 110 012 India): *JIETE* (India), vol. 29, no. 10, pp. 501–506, Oct. 1983.

The barretter mount is housed in a double-wall enclosure and is kept in a constant temperature oil bath maintained at 25°C ± 0.001°C during the course of measurements. The total uncertainty in the effective efficiency is ±0.58 percent.

Transmission Lines and Waveguides

1

Finite-Element Analysis of Arbitrarily Shaped H-Plane Waveguide Discontinuities, by M. Koshiba, M. Sato, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 82–87, Feb. 1983.

A numerical approach for the solution of scattering problems due to an inhomogeneous H-plane discontinuity in a rectangular waveguide is described. Numerical results on some examples are compared with experimental data.

2

Transient Analysis of Waveguide Having Tuning Window (Letters), by N. Yoshida, I. Fukai, and J. Fukuoka (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 161–162, Feb. 1983.

A transient analysis on electromagnetic fields proposed by the authors is described as a useful method for obtaining the physical meaning of the characteristics of microwave circuits.

3

A Boundary Element Method Using a Fixed Hybrid Boundary for an Analysis of Unbounded Regions of Shielded Strip Lines (Letters), by T. Honma and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J66-B, pp. 556–557, Apr. 1983.

A fixed hybrid boundary with both Dirichlet's and Neumann's condition is considered as the boundary of unbounded regions. Numerical results with high accuracy are shown.

4

On Finite-Element Solutions of the Discontinuity Problems in a Bounded Dielectric Slab Waveguide (Letters), by M. Koshiba, T. Miki (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan), K. Ooishi (Yokosuka Electrical Communication Lab. N.T.T., Yokosuka, 238 Japan), and M. Suzuki (Faculty of Engineering, Hokkaido University): *Trans. IECEJ*, vol. E66, pp. 250–251, Apr. 1983.

The finite-element formulation for the bounded configuration is confirmed to be useful in solving discontinuity problems associated with open-surface waveguides.

5

Calculation of Impedance of Posts in Waveguides by a Current Simulation Method (Letters), by M. Kodama and K. Taira (Faculty of Engineering, University of Ryukyu, Okinawa-ken, 903-01 Japan): *Trans. IECEJ*, vol. J66-B, pp. 689–690, May 1983.

The impedance of a post with circular cross section in a waveguide is estimated with a newly proposed current simulation method. The distribution of assumed currents is determined to give results with the least errors.

6

Application of Pseudo-Infinite Boundary Elements in a Boundary Element Method to Solve Unbounded Regions of Open Strip Lines (Letters), by T. Honma, H. Itoh, and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 325–326, May 1983.

Striplines in unbounded regions are analyzed with the boundary element method. Numerical results indicate that the use of pseudo-infinite elements is effective in reducing the number of elements.

7

Analysis of Strip-Line Circuit by Planar Circuit Approach —Application of Higher-Mode Impedance Concept, by J. P. Hsu and T. Anada (Faculty of Engineering, Kanagawa University, Yokohama-shi, 221 Japan): *Trans. IECEJ*, vol. J66-B, pp. 766–773, June 1983.

It is shown in this paper that circuit equations for the mode voltage and mode current of strip lines can be systematically developed and solved by using properly defined mode impedance.

8

Transmission Charcteristics of Shielded Slot Line (Letters), by A. Nagumo and K. Kokubun (College of Engineering, Nihon University, Koriyama-shi, 963 Japan): *Trans. IECEJ*, vol. J66-B, pp. 928–929, July 1983.

The cutoff wavelength and attenuation constant of a shielded slotline made of thick metal are estimated approximately based on the mode matching method, and compared with those of a groove guide.

9

Dispersion Measurement and Shielding Effect on a Slot Line, by K. Kawano (Musashino Electrical Communication Lab., N.T.T., Musashino, 180 Japan): *Trans. IECEJ*, vol. E66, pp. 423–426, July 1983.

Dispersion measurements on slotlines have been carried out at 26–37 GHz. Experimental results are compared with computed values based on a hybrid-mode analysis.

10

Application of Finite-Element Method of E-Plane Waveguide Discontinuities (Letters), by M. Koshiba, M. Sato, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 457–458, July 1983.

The solution of this problem based on the finite-element method is described, and compared with measured values and numerical results in the literature.

11

Analysis of Broadside-Coupled Strip Lines with Anisotropic Substrate, by T. Kitazawa, K. Fujita (Presently with Toshiba Corp.), H. Mukaihara (Presently with Sony Corp.), and Y. Hayashi (Faculty of Engineering, Kitami Institute of Technology, Kitami-shi, 090 Japan): *Trans. IECEJ*, vol. E66-B, pp. 1139–1146, Sept. 1983.

This paper describes the analysis of the quasi-static and dispersion properties of broadside-coupled striplines on anisotropic substrates with offset crystal axis.

12

An Analytical Method of the Spiral Line, by T. Nakamura, T. Sekine, and S. Yokokawa (Faculty of Engineering, Gifu University, Gifu-shi, 500 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1207–1214, Oct. 1983.

It is proposed to use distributed parameters of the spiral line for the analysis of the propagation constant and the characteristic impedance. Numerical results partly indicate good agreement with experimental data.

13

Attenuation Characteristics of Corrugated Rectangular Waveguides, by M. Suzuki (The Furukawa Electric Co., Ichihara-shi, 290 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1231–1238, Oct. 1983.

The attenuation constants of the waveguides have been calculated with the finite-element method for several shape parameters of corrugation, and compared with experimental data at 6 GHz.

14

Characteristics of a 4, 5, and 6-GHz Bands Oversize Circular Bending Waveguide, by Y. Yamada, N. Nakajima (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan), Y. Huruno and K. Abe (Kamakura Works, Mitsubishi Electric Corp., Kamakura-shi, 247 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1331–1338, Nov. 1983.

The relationship between the cross-polarization factor of this waveguide and the rotation angle in an elliptical waveguide is discussed. The cross-polarization in the waveguide is caused by the deviation of the tube diameter and higher order mode generation due to bending, but is reduced by connecting an elliptical waveguide to the bending waveguide.

15

Bending Losses in Circular Hollow-Core Waveguides Characterized by the Surface Impedance, by M. Miyagi, K. Harada, and S. Kawakami (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J66-C, pp. 880–881, Nov. 1983.

This paper describes a general method to obtain bending losses in circular hollow-core waveguides with the surface impedance and a large bending radius.

16

A Boundary Element Analysis of TEM Cells Based on a Mixed Discretization Using Both of Constant and Linear Elements (Letters), by T. Honma, T. Tsubota, M. Tobise, and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 678–679, Nov. 1983.

The boundary element analysis of transverse electromagnetic transmission cells with high accuracy is described. This method uses the mixture of constant and linear element discretization.

Microwave Integrated Circuits

1

CAD/CAM Techniques in Microwave Circuit Design, by P. Bradley and J. Ness (MITEC, University of Queensland, St. Lucia, QLD 4067, Australia): *JEEE* (Australia), vol. 3, no. 4, pp. 266–274, Dec. 1983.

The characterisation of GaAs MESFET's and the design and optimisation of planar matching networks are outlined in the development of a 14-GHz amplifier. The manufacture of a 5-GHz 58-way power divider is given.

Microwave Field and Circuit Theory

1

A Field Analysis of Electromagnetic Multi-Media Problems by Boundary Element Method (Letters), by S. Washisu (Asahikawa Technical College, Asahikawa-shi, 070 Japan) and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J66-B, pp. 157–158, Jan. 1983.

An analysis procedure of multi-media problems by the boundary element method is presented. An example case of a dielectric rod in a parallel plane waveguide is shown.

2

Approximate Scalar Finite-Element Analysis of Anisotropic Dielectric Optical Waveguides, by K. Hayata, M. Koshiba, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J66-C, pp. 752–759, Oct. 1983.

This paper describes the example analysis of anisotropic embedded-channel waveguides and anisotropic rectangular dielectric waveguides based on the approximate scalar finite element program.

3

The Degeneracy of TE and TM Modes in a Transversely Magnetized Ferrite Slab, by C. Surawatpunya, M. Tsutsumi, and N. Kumagai (Faculty of Engineering, Osaka University, Suita, 565 Japan): *Trans. IECEJ*, vol. E66, pp. 602–607, Oct. 1983.

The theoretical and experimental study of Bragg reflection phenomena in a surface-corrugated polycrystalline YIG slab have been carried out on the basis of an equivalent-circuit model.

Microwave Antennas

1

Modified Three-Dimensional Self-Complementary Array Antenna over a Finite Ground Plane, by T. Kasahara (Sendai Radio Technical College, Miyagi-ken, 989-31 Japan), K. Sawaya and Y. Mushiake (Faculty of Engineer-

ing, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J-66B, pp. 40–47, Jan. 1983.

It is shown that the unbalance-type self complementary antenna can be modified as an antenna with unidirectional pattern and almost constant impedance. Experimental results at 1.5 GHz are shown.

2

Offset Bifocal Reflector Antenna, by Y. Mizugutch and F. Watanabe (Research and Development Labs., K.D.D., Tokyo, 153 Japan): *Trans. IECEJ*, vol. J66-B, pp. 71–78, Jan. 1983.

A design principle of newly developed, offset bifocal reflector antennas having no aberration is presented. The design principle is applicable to realize high performance multi-beam antennas.

3

Aperture-To-Medium Coupling Loss (Gain Degradation) of Large-Size Antennae on 2 GHz Trans-Horizon Path (Letters), by S. C. Jyotipunj, M. M. Malhotra, and P. Govindarajan (Radar & Communication Project Office, Ministry of Defence, Safdarjung, Enclave, New Delhi, 110 029 India): *JIETE*, vol. 29, pp. 28–30, Jan. 1983.

Aperture-to-medium coupling loss for 25.5-m antenna at 2 GHz had been found earlier to be about 10 dB. The results of further experimental studies carried out on a pair of 25.5-m antennas are shown.

4

An Offset Spherical Tri-Reflector Antenna, by F. Watanabe, and Y. Mizugutch (Research and Development Lab., K.D.D., Tokyo, 153 Japan): *Trans. IECEJ*, vol. E66, pp. 108–115, Feb. 1983.

A new antenna is described which is capable of steering its radiation beam without moving a main reflector. An experimental antenna has demonstrated excellent performance at 34 GHz.

5

Unipole-Slot Array Antennas, by T. Ishizone, Y. Yokoyama (Presently with NEC Corp.), S. Nishimura (Presently with NHK Japan Broadcasting Corp.), and Y. Mushiake (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J66-B, pp. 281–288, Mar. 1983.

A quasi-self-complementary unipole-slot array antenna has been investigated. Theoretical results show that the input impedance is independent of frequency. Experimental results at 0.7–2.0 GHz are shown.

6

Radiation of Millimeter Waves from a Corrugated Ferrite-Slab Waveguide, by T. Ohira, T. Yuasa (Presently with Kawasaki Heavy Industries, Ltd.), M. Tsutsumi, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J66-B, pp. 461–468, Apr. 1983.

The behavior of electromagnetic leaky waves on a periodically corrugated ferrite-slab waveguide has been investigated both theoretically and experimentally at 45 GHz.

7

Anti-Fading Polygonal Cylinder Passive Repeater, by Y. Numano (Kawagoe Works, Denki Kogyo Co., Ltd., Saitama-ken, 354 Japan): *Trans. IECEJ*, vol. J66-B, pp. 485–492, Apr. 1983.

The incidence angle of incoming waves varies in the vertical direction due to fading. A passive repeater made of a polygonal cylinder has reduced the above effect at 7 GHz.

8

A *K/C/S* Bands Satellite Antenna with Frequency-Selective Surface, by M. Ando, K. Ueno, H. Kumazawa, and K. Kagoshima (Yokosuka Electrical Communication Lab., N.T.T. Yokosuka-shi, 238 Japan): *Trans. IECEJ*, vol. J66-B, pp. 591–598, May 1983.

A *K/C/S* band satellite antenna is designed which has an S/C band feed horn and a low-pass frequency-selective surface on part of an aperture angle. The design method is confirmed with experimental results.

9

30/20 GHz Multiple/Shaped Beam Satellite Antenna, by K. Ueno, M. Ando, H. Kumazawa (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan): *Trans. IECEJ*, vol. J66-B, pp. 631–638, May 1983.

A satellite antenna, which covers the Japanese territory with its multiple beams and shaped beam, has been studied and fabricated. Experimental results at 20 and 30 GHz are shown.

10

Effect of a Circular Cylindrical Obstacle on the Radiation Pattern of an Aperture Antenna, by K. Nakatsuka (Information Systems and Electronics Development Lab., Mitsubishi Electric Corp., Kamakura-shi, 247 Japan): *Trans. IECEJ*, vol. J66-B, pp. 853–860, July 1983.

This paper estimates the effects of obstacles in front of a rectangular aperture antenna such as conductor or dielectric rod on radiation pattern. The calculated and measured values of antenna gain are compared.

11

Pattern Synthesis for Waveguide Slotted Array Antenna by Linear Programing, by Y. Hara (Japan Radio Co., Ltd., Mitaka-shi, 181 Japan) and N. Goto (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. J66-B, pp. 877–884, July 1983.

This paper describes a method of pattern synthesis for a slotted waveguide antenna with a shaped radiation beam based on the linear programing approach to correct the current amplitude and position of slots.

12

A Design of Microwave Wireless Power Transmission by the Aperture Illumination of Maximum Transmission Efficiency, by T. Uno and S. Adachi (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1013–1018, Aug. 1983.

The maximum receivable power and the average power density of a microwave antenna for the solar power satel-

lite system are discussed assuming the maximum efficiency of power transmission.

13

Radiation Characteristics of Dielectric Loaded Square Horn, by P. S. Bhatnagar and M. D. Singh (Central Electronics Engineering Research Institute, Pilani, India): *JIE* (India), vol. 64, part ET-1, pp. 8–10, Aug. 1983.

Radiation characteristics of this antenna are evaluated by introducing a correction factor in those of a square corrugated waveguide. A comparison is made between theoretical and experimental results at 7–11 GHz.

14

Leaky-Wave Antennas Based on Polarization Transformation in Nonradiative Dielectric Waveguide (Letters), by T. Yoneyama, M. Saito, and S. Nishida (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1177–1178, Sept. 1983.

A leaky wave antenna for integrated configurations is propsed and the measured values of radiation pattern, gain, and other parameters are shown.

15

Wide Band Microstrip Patch Array at *X*-Band, by V. M. Pandharipande (University College of Engineering, Osmania University, Hyderabad 500 007 India) and K. G. Verma (Radar and Communication Centre, Indian Institute of Technology, Kharagpur 721 302, India): *JIETE* (India), vol. 29, no. 10. pp. 497–500, Oct. 1983.

A novel feeding scheme for excitation of microstrip patch array antennas is presented. The results on a single patch and an array of 8 elements show good impedance match over 10% bandwidth at *X*-band.

16

Parasitic Effects and Polarization Diversity of Archimedean Spiral Antenna, by H. Nakano, J. Yamauchi, and Y. Sugiyama (Faculty of Engineering, Hosei University, Koganei-shi, 184 Japan): *Trans. IECEJ*, vol. J66-B. pp. 1418–1425, Nov. 1983.

The frequency characteristics of a two-wire Achimedean spiral antenna with parasitic elements are estimated using an integral equation method. Experimental results at 3–6 GHz are shown.

Microwave Propagation

1

Interference to Satellite Earth Stations Due to Scatter of Terrestrial Transmissions by Aircraft, by J. V. Murphy (Telecom Australia Research Lab., Australia): *A.T.R.*, vol. 17, no. 1, pp. 25–31, May 1983.

This paper describes the specific problem of determining the interference at 4 GHz from repeaters of the Telecom microwave radio-relay network, via aircraft scatter, into a television receive-only ES located in the Sydney suburbs.

2

Study on Flat Radome Loss During Rain, by K. Satoh and Y. Hosoya (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan): *Trans. IECEJ*, vol. J66-B, pp. 782–789, June 1983.

The theoretical estimation of water film thickness on a flat radome and subsequent loss are presented. The differences between calculated and measured values of the radome loss at 17–27 GHz are discussed.

3

A Practical Measurement Method of Scattering Characteristics of the Pyramidal Absorber, by M. Ono, T. Yokoto (Presently with Fujitsu Ltd.), and T. Shibuya (Presently with Nippon Electric Miyagi Ltd.) (Faculty of Engineering, Yamagata University, Yonezawa-shi, 992 Japan): *Trans. IECEJ*, vol. J66-B, pp. 885–892, July 1983.

The direct measurement method of space standing waves at oblique incidence to a sample is proposed. Standing-wave ratio and deflection angle in front of an absorber sample at 4 GHz have been precisely and easily measured.

4

An Analysis of Propagative Character at 34.5 GHz and 11.5 GHz between ETS-II Satellite and Kasima Station—On the Precipitation Model from Stratus, by A. Nishitsuji, M. Hoshiyama (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan), J. Awaka (Radio Research Lab., Ibaraki-ken, 314 Japan), and Y. Furuhama (Radio Research Lab., Koganei-shi, 184 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1163–1170, Sept. 1983.

The height of the bright band, the precipitation rate, and the size distribution of particles have been obtained by using radar echos at 5.33 GHz, the attenuation loss at 34.5 GHz, and a precipitation model.

5

14-GHz FM-CW Radar for Observation of Precipitation, by T. Kozu (Kimitsu Satellite Control Center, Telecommunications Satellite Corporation of Japan, Kimitsu-shi, 292-06 Japan), K. Nakamura, J. Awaka (Kashima Branch, Radio Research Lab., Ibaraki-Ken, 314 Japan), and M. Takeuchi (Kimitsu Satellite Control Center): *Trans. IECEJ*, vol. J66-B, pp. 1394–1401, Nov. 1983.

This paper describes the design and performance of a 14-GHz FM–CW radar which has been developed to investigate the propagation characteristics of centimeter and millimeter waves on the satellite–earth path.

Microwave Thermal Effects

1

Waveguide Applicator with Convergent Lens for Localized Microwave Hyperthermia, by Y. Nikawa (Faculty of Science and Technology, Keio University, Yokohama-shi, 223 Japan), M. Kikuchi (Dept. of Medical Engineering, National Defense Medical College, Tokorozawa-shi, 359 Japan), M. Iwamoto (Presently with Tokyo Broadcasting System in Corp.), and S. Mori (Keio University): *Trans. IECEJ*, vol. J66-B, pp. 1035–1042, Aug. 1983.

Phantoms of simulated fat and muscle tissues have been heated at 2.45 GHz by using a new waveguide applicator,

and the penetration depth of heating power has been increased by 30–40 percent.

2

Characteristics of Microwave Power Absorption in an Insect Exposed to Standing-Wave Fields, by O. Fujiwara, Y. Goto, and Y. Amemiya (Faculty of Engineering, Nagoya University, Nagoya-shi, 464 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1085–1092, Sept. 1983.

Analyses are made to obtain the heating potential and total absorbed power in a dielectric sphere having the same electrical characteristics as those of the pupa in the frequency range of 1–20 GHz.

3

The Distribution of Absorbed Power Inside a Sphere Simulating Human Head in the Near Field of a $\lambda/2$ Dipole Antenna, by Y. Amemiya and S. Uebayashi (Faculty of Engineering, Nagoya University, Nagoya-shi, 464 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1115–1122, Sept. 1983.

The values of absorbed power in a simulated human head in the near field of portable radio transmitters are estimated and compared with the safety level recommended by the American National Standards Institute.

Optical Fibers

1

Local Detection for Splice Loss in Optical Fiber (Letters), by M. Sato and N. Kashima (Ibaraki Electrical Communication Lab., N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J66-B, pp. 255–256, Feb. 1983.

The distribution of light leakage near a splice point has been obtained by covering the splice point with high-refractive index material which contains scattering crystals. The light leakage is related to splice loss.

2

Characteristic of Twisted Single-Mode Optical Fiber for Current Sensor (Letters), by M. Kuribara and Y. Takeda (Central Research Institute of Electric Power Industry, Komae-shi, 201 Japan): *Trans. IECEJ*, vol. J66-C, pp. 173–174, Feb. 1983.

This paper shows the experimental results of the polarization conservation of twisted single-mode optical fibers and the characteristics of the sensitivity for current measurement.

3

Stimulated Raman Scattering in Optical Fibers, by Y. Ohmori, Y. Sasaki, and T. Edahiro (Ibaraki Electrical Communication Lab., N.T.T., Ibaraki, 319-11 Japan): *Trans. IECEJ*, vol. E66, pp. 146–152, Feb. 1983.

Stimulated Raman scattering pumped with a mode-locked and Q-switched Nd:YAG laser or a CW Nd:YAG laser has been investigated. The first and second Stokes have been observed with the CW pump power of 0.6 and 2.1 W.

4

Numerical Analysis of Polarization-Maintaining Single-Mode Optical Fibers with Circular-Pits, by T. Hosono, T. Hinata, and H. Yoshikawa (College of Science and Technology, Nihon University, Tokyo, 101 Japan): *Trans. IECEJ*, vol. J66-B, pp. 399–406, Mar. 1983.

New optical fiber structures with axially nonsymmetrical index distributions are proposed and analyzed by the point-matching method.

5

Characterization of Insert Molded Single Optical-Fiber Connectors Using Ceramic Balls, by H. Murata (Ibaraki Electrical Communication Lab., N.T.T., Ibaraki, 319-11 Japan): *Trans. IECEJ*, vol. E66, pp. 179–185, Mar. 1983.

Demountable single-fiber connectors have been fabricated which contain precision ceramic balls in the plug molding to locate a fiber and align a pair of plugs. Samples exhibited the transmission loss less than 0.2 dB.

6

Effects of Equalization in Graded-Index Optical Fibers Influenced by Mode Coupling, by T. Yamamura, K. Itoh (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan), and H. Itoh (Ibaraki Electrical Communication Lab., N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J66-C, pp. 290–297, Apr. 1983.

The expression of mode conversion occuring at splicing points is derived using the WKB method and Snell's law. The baseband frequency response of a fiber after splicing is given.

7

Optical Fiber Phase Response Measurement, by A. A. Naoom and Q. V. Davis (Dept. of Electronics and Electrical Engineering, University of Surrey, Guildford GU2 5XH, England): *Trans. IECEJ*, vol. E66, pp. 229–233, Apr. 1983.

This paper examines the nature of practical problems associated with measuring the differential phase across a long fiber, and shows how they can be overcome. Some experimental results are given for 900 m of fiber over the range 25 to 1250 MHz.

8

Modal Noise in a Quasi-Single Mode Fiber—Simulation Experiment (Letters), by M. Imai (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 248–249, Apr. 1983.

Modal noise in a quasi-single mode fiber is studied experimentally by simulating lossy connectors and imperfectly coupled detectors. The S/N ratio of two-mode fibers is found to be high.

9

Beat Length Determination of Birefringent Fibers by Measuring Delay of Transmitted Light Pulse (Letters), by Y. Fujii (Electrotechnical Lab., Ibaraki-ken, 305 Japan), and S. Shikano (Tokyo Works, Daiichi Denko Co., Ltd., Higashikurume-shi, 203 Japan): *Trans. IECEJ*, vol. J66-C, pp. 424–425, May 1983.

The proposed determination method of beat length is directly and easily applied to long single-mode birefringent optical fibers at infra-red wavelength region by using a single-pass fiber Raman laser. Experimental results at 1.6 and 1.32 μm are shown.

10

A Classification of Optical Fibers Based on a Polarization-Preserving Property, K. Kusano (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J66-C, pp. 592–599, Aug. 1983.

Optical fibers are classified into two groups based on the polarization-preserving property due to their anisotropy, deformation, and twist.

11

Transmission Characteristics of Image Fiber, by T. Hosono (College of Science and Technology, Nihon University, Tokyo, 101 Japan): *Trans. IECEJ*, vol. J66-C, pp. 843–850, Nov. 1983.

The transmission characteristics of a long image fiber whose cross section has a square or hexagonal multicore periodic structure are analyzed by the variational method within scalar approximation.

Optical Waveguides Other Than Fibers

1

Guided Modes of Parabolic-Core Slab Waveguides, by A. Yata (Kumamoto University College of Medical Science, Kumamoto-shi, 862 Japan) and H. Ikuno (Faculty of Engineering, Kumamoto University, Kumamoto-shi, 860 Japan): *Trans. IECEJ*, vol. J66-C, pp. 17–22, Jan. 1983.

Electromagnetic fields of guided modes in the core are represented by the parabolic cylinder function. Unknown parameters in these fields are determined by solving a characteristic equation. Numerical results are shown.

2

Extremely Low-Loss Optical Waveguide for Vacuum Ultraviolet Light (Letters), by T. Hidaka (Electrotechnical Lab., Ibaraki-ken, 305 Japan): *Trans. IECEJ*, vol. J66-C, pp. 153–154, Feb. 1983.

A new type of optical waveguides is proposed which uses the fact that the refractive index at vacuum ultraviolet frequency is smaller than unity due to plasma vibration of electrons.

3

On Accuracy of Approximate Scalar Finite-Element Analysis of Dielectric Optical Waveguides (Letters), by M. Koshiba, K. Hayata, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo, 060 Japan): *Trans. IECEJ*, vol. E66, pp. 157–158, Feb. 1983.

It is confirmed that this analysis method can give the more accurate results for waveguides with the smaller index variation in the lateral direction.

4

Modal Analysis in Gyrotropic Round-Waveguide Using Matrix Representation (Letters), by K. Kishioka (Faculty of Engineering, Osaka Electro-Communication University, Neyagawa-shi, 572 Japan) and K. Rokushima (Faculty of Engineering, University of Osaka Prefecture, Sakai-shi, 591 Japan): *Trans. IECEJ*, vol. J66-C, pp. 248–249, Mar. 1983.

The guided and radiation modes of gyrotropic dielectric waveguides are treated. A simple orthogonalization method of degenerated radiation modes is shown.

5

Image Transmission Characteristics of Dielectric Slab with Gradient Index, by, T. Hosono, S. Yamaguchi, and K. Mori (College of Science and Technology, Nihon University, Tokyo, 101 Japan): *Trans. IECEJ*, vol. J66-C, pp. 416–423, May 1983.

Several image transmission characteristics of dielectric slab waveguides have been numerically analyzed based on a homogeneous multilayer approximation.

6

Mode Filter Characteristics of Metal-Clad GaAs Waveguide and its Application to Light Intensity Modulator (Letters), by S. Ohke, A. Kusunoki, Y. Cho, and Y. Matsuo (Institute of Scientific and Industrial Research, Osaka University, Ibaraki-shi, 567 Japan): *Trans. IECEJ*, vol. J66-C, pp. 426–427, May 1983.

This paper describes mode filter characteristics of metal-clad GaAs waveguides with Au, Pt–Pd, and Ag at 1.15 μm, and electrooptic light intensity modulation by a unified Schottky junction structure of a modulator section and an analyzer-section.

7

A Consideration on an Efficient Finite-Element Analysis of Planar Inhomogeneous Optical Waveguides (Letters), by M. Koshiba, H. Kumagai, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J66-C, pp. 686–687, Sept. 1983.

This paper describes an efficient finite-element analysis method on inhomogeneous planar optical waveguides to result in high precision without using numerical integration.

8

Analysis of Optical Guided Waves in a Periodically Corrugated Dielectric Film Waveguide by Perturbation Method, by N. S. Chang and Y. Matsuo (Osaka Electro-Communication University, Neyagawa, 572 Japan): *Trans. IECEJ*, vol. E66, pp. 585–590, Oct. 1983.

The symmetric first-order Bragg interactions of optical guided waves in a periodically corrugated dielectric structure are investigated for the case of TE modes.

9

Analysis of the Optical Waveguide Junctions by Means of Integral Equation Method, by T. Nobuyoshi, N. Morita, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J66-C, pp. 828–834, Nov. 1983.

This paper describes the theoretical investigation of the reflection, transmission, and radiation characteristics of incident guided-mode fields due to imperfect junctions between two slab waveguides.

Optical Devices

1

Optical Switching Characteristics in a Multilayered Directional Coupler Using Acousto-Optic Effects by Surface Acoustic Waves, by N. Goto (Faculty of Engineering, Nagoya University, Nagoya, 464 Japan), Y. Miyazaki (Information Engineering Dept., Toyohashi University of Technology, Toyohashi, 440 Japan), and Y. Akao (Faculty of Engineering, Nagoya University): *Trans. IECEJ*, vol. E66, pp. 21–27, Jan. 1983.

This device is composed of $ZnS/Ta_2O_5/Nb_2O_3$ thin films on a Y-cut $LiNbO_3$ substrates. The propagating optical beam collinearly interacts with the SAW of 750 mW along the interaction length of 8 mm and is switched between two waveguides.

2

Effect of Axial Misalignment and Multiple Reflection on Jones Matrix of a Four-Crystal Light Modulator, by A. Moritani and J. Nakai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J66-C, pp. 129–136, Feb. 1983.

The dielectric tensors of ADP 45° X-cut crystals are derived. The Jones matrix representation is obtained by using the Berreman's (4×4) matrix formation. Calculated results show the effects of axial misalignment and multiple reflections.

3

Multistructured Optical IC Elements by Polymer Thin Films, by I. Kato and M. Komatsu (Presently with NEC Corp.) (School of Science and Engineering, Waseda University, Tokyo, 160 Japan): *Trans. IECEJ*, vol. J66-C, pp. 145–148, Feb. 1983.

A photochemical reaction has been used to form waveguides in polymer thin films. Directional couplers have been made by using two and three thin film layers.

4

Buried Mixing Slab Waveguide Having Graded-Index Profile (Letters), by K. Sano, R. Watanabe (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan), and T. Yamazaki (Nippon Sheet Glass Co., Ltd., Itami-shi, 664 Japan): *Trans. IECEJ*, vol. J66-C, pp. 254–255, Mar. 1983.

A burried mixing slab waveguide was fabricated by using the ion-exchange method. The guiding layer loss and the deviation of fiber-to-fiber insertion loss were less than 0.02 dB/cm and 1 dB, respectively.

5

Phase Matched Optical Dielectric Waveguide Using the Artificial Anisotropic Structure, by T. Mizumoto and Y. Naito (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. J66-C, pp. 454–461, June 1983.

A new phase-matching technique is proposed using an artificial anisotropic structure to realize a thin film nonreciprocal mode converter and isolator.

6

Optical Switching Characteristics in Slightly Nondegenerated Multilayered Couplers Using Acousto-Optic Interaction by Surface Acoustic Waves, by N. Goto (Faculty of Engineering, Nagoya University, Nagoya, 464 Japan), Y. Miyazaki (Faculty of Engineering, Toyohashi University of Technology, Toyohashi, 440 Japan), and Y. Akao (Faculty of Engineering, Nagoya University): *Trans. IECEJ*, vol. E66, pp. 442–449, July 1983.

Experimental results on acoustooptic interactions in slightly nondegenerated couplers are compared with theoretical results. The switching device of 71.2 MHz consists of $ZnS/Ta_2O_5/Nb_2O_3$ thin films on Y-cut $LiNbO_3$ substrates.

7

Multi/Demultiplexer for Subscriber Loop System (Letters), by K. Sano, R. Watanabe, and J. Minowa (Yokosuka Electrical Communication Lab., N.T.T., Yokosuka-shi, 238 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1181–1182, Sept. 1983.

This paper describes an optical multi/demultiplexer using four wavelengths with no degradation in analog video signals and low insertion loss.

8

Optical Waveguide Analysis Using the Fourier Transform and Its Application to Intersecting Waveguides, by M. Seino, H. Nakajima, Y. Daido, I. Sawaki, and K. Asama (Fujitsu Lab., Ltd., Atsugi, Atsugi-shi, 243-01 Japan): *Trans. IECEJ*, vol. J66-C, pp. 732–739, Oct. 1983.

An accurate numerical method for calculating light-beam propagation in inhomogeneous waveguides is described which is effective even for the case of radiation modes.

9

Fiber Polarization Coupler for Polarization Maintaining Fibers (Letters), by Y. Fujii (Electrotechnical Lab., Ibaraki-ken, 305 Japan) and O. Koike (Hoya Co., Ltd., Yamanashi-ken, 409-16 Japan): *Trans. IECEJ*, vol. J66-C, pp. 762–763, Oct. 1983.

Fiber polarization couplers have been successfully fabricated by the fusion of twisted birefringent fibers. These couplers are useful to decrease perturbation noise in interferometric sensors.

Measurements

1

Near Field Distributions Around the Dielectric Waveguide Free Ends, by K. Matsumura and H. Kawamura (Presently with NEC Corp.) (Faculty of Engineering, Utsunomiya University, Utsunomiya-shi, 321 Japan): *Trans. IECEJ*, vol. J66-B, pp. 1263–1270, Oct. 1983.

The near-field intensity around the free end of dielectric waveguides has been measured with a moving probe combined with a microcomputer. A simplified theoretical analysis is shown.