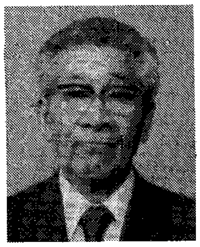

Shuzo Tanaka (SM'68) was born in Kyoto, Japan, on January 10, 1912. He received the B.E. degree in 1938 and the Eng. D. degree in 1959, both from Waseda University, Tokyo Japan.

From 1939 to 1967 he was with Toshiba Corporation and worked with the research laboratories of the company. He participated in the research and development of radar from 1939 to 1945. From 1945 to 1955 he worked on a wide variety of research problems in microwave circuits as the Head of Waveguide Research Group. During that period he published many papers on waveguide analysis, including the paper of the exact equivalent circuit representations of coaxial-to-waveguide junction. Since 1956 his main research activities have changed to the field of microwave antennas. He was especially interested in the researches of double-dish antennas and array antennas. These works resulted in the development of Modified Gregorian Antenna and Electronic Foster Scanner. In 1967 he was appointed Professor of Electrical Engineering in Saitama University, Urawa, Saitama, Japan. Since then he has performed basic researches on the guiding and radiating characteristics of dielectric cylinders and plate. He is now Professor of Electronic Engineering at Saitama Institute of Technology, Okabe, Saitama, Japan.

Dr. Tanaka is a member of the Institute of Electronics and Communication Engineers of Japan.

Sander Weinreb (SM'70–F'78) was born December 9, 1936, in New York, NY. He received the B.S. (1958) and Ph.D (1963) degrees in Electrical Engineering from Massachusetts Institute of Technology, Cambridge, MA.

From 1960 to 1963 he was a Research Assistant at M.I.T. engaged in investigations of varactor frequency multipliers and digital autocorrelation techniques. In 1963 he joined Lincoln Laboratory where he was responsible for the radiometric equipment for the Haystack antenna. In 1965 he joined the National Radio Astronomy Observatory where he was Head of the Electronics Division and responsible for development of radio astronomy equipment for the Green Bank, WV, and Tucson, AZ observatories until 1977. He led the Electronics Design Group for the Very Large Array project from 1972 until 1975. In 1976 he took a two year leave at the Radio Astronomy Laboratory of the University of California, Berkeley and then returned to NRAO to specialize in the development of low noise devices.

Dr. Weinreb is a member of Sigma Xi, Eta Kappa Nu, Tau Beta Pi, and the International Scientific Radio Union. He is an advisor to the Netherlands Foundation for Radio Astronomy and the European Institute for Millimeter Wave Radio Astronomy.

Harry A. Willing (A'54–M'58), received the B.S.E.E. degree from the University of Connecticut, Storrs, in 1952 and the M.S.E.E. degree from the University of Florida, Gainesville, in 1963.

From 1963 to 1967 he was with the Sperry Microwave Electronics Division, where he was engaged in the studies of microwave properties of ferrite materials and the microwave acoustic properties of various single-crystal media. From 1967, to 1971 he was with Texas Instruments, Incorporated, where he was engaged in the design and development of MIC Modules. From 1971 to 1975, he was with the Communications and Electronics Division, Martin Marrietta Aerospace, where he designed solid-state RF power amplifiers for commercial microwave applications. He is presently with the Naval Research Laboratory, Washington, DC.

Overseas Abstracts

Papers from Journals Published in Australia, India, and Japan

Compiled jointly by Prof. T. Okoshi, University of Tokyo (former Associate Editor) and Prof. E. Yamashita, University of Electro-Communications, Tokyo, Japan (new Associate Editor).

The periodicals investigated are: 1) Transactions of the Institute of Electronics and Communication Engineers of Japan (Trans. IECEJ), 2) Journal of the IECEJ, 3) Journals of the Institution of Engineers (J.IE. (India)), Electronics and Telecommunication Engineering Division (Part ET), 4) Proceedings of the Institution of Radio and Electronics Engineers, (Proc. IREE (Australia)), and 5) Australian Telecommunication Research (ATR).

As for the Japanese papers in the Trans. IECEJ, which carry volume numbers J62B or J62C, single-page English summaries (1/4 page for Correspondences) will be found in the "Transactions of IECEJ, Section E" issued in the same month, where "E" denotes English. Papers carrying volume number E62 are papers written originally in English and will be found in Section E. Both the Section-J and Section-E issues are published from the IECEJ, Kikai-Shinko-Kaikan, 3-5-8 Minato-ku, Tokyo 105, Japan.

The fall 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.

Amplifiers and Oscillators

1

External Injection Locking Characteristics in Opposite-Phase Self-Injection-Locked Oscillator, by Y. Iida and M. Morita (Faculty of Engineering, Kansai University, Suita-shi, 564 Japan): *Trans. IECEJ*, vol. J62-B, no. 1, pp. 66–73, January 1979.

An injection-locked oscillator with an additional arrangement of self-injection is described. The transient analysis of the oscillator indicates a fast transient response as a feature of this device. Experimental results are also presented.

2

Locking Stability of a Power Combining Oscillator System, by T. Makino (Wireless Research Laboratory, Matsushita Electric Industrial Co., Ltd., Kadoma-shi, 571 Japan), M. Nakajima, and J. Ikenoue (Faculty of Engineering, Kyoto University, Kyoto-shi, 606 Japan): *Trans. IECEJ*, vol. J62-B, no. 4, pp. 337–344, April 1979.

The steady-state phase differences among several oscillators and the eigenvalues of variational equations are derived for the case where complete power combination is realized. It is shown that only one stable locking state exists under the optimum circuit condition for the complete power combination.

3

Noise Reduction Mechanism of a Power Combining Oscillator System, by T. Makino (Wireless Research Laboratory, Matsushita Electric Industrial Co., Ltd., Kadoma-shi, 571 Japan), M. Nakajima, and J. Ikenoue (Faculty of Engineering, Kyoto University, Kyoto-shi, 571 Japan): *Trans. IECEJ*, vol. J62-B, no. 4, pp. 345–351, April 1979.

The expressions for AM and FM noises in the combined output power of many oscillators are derived by using a locking equation and the noise admittance for the case where complete power combination is realized by synchronized n identical oscillators.

4

Temperature Dependence and Stabilization Conditions of an MIC Gunn Oscillator Using a Dielectric Resonator, by T. Makino (Wireless Research Laboratory, Matsushita Electric Industrial Co., Ltd., Kadoma-shi, 571 Japan): *Trans. IECEJ*, vol. J62-B, no. 4, pp. 352–359, April 1979.

It is shown that the temperature dependence of the oscillation frequency is determined by the temperature stability of the resonator frequency and that of the equivalent diode reactance.

5

Output-Power Characteristics of IMPATT Diode Negative-Resistance Amplifiers, by T. Nakagami (Fujitsu Laboratories, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. J62-B, no. 8, pp. 721–728, August 1979.

The large-signal analysis of output-power characteristics of IMPATT amplifiers is described giving the driving power dependence of the center frequency, the discontinuity in the output power, and gain saturation. Experimental results are shown.

6

Analysis of IMPATT Diode Operation, by O. Ishihara and S. Mitsui (Semiconductor Laboratory, Mitsubishi Electric Corp., Itami-shi, 664 Japan): *Trans. IECEJ*, vol. J62-C, no. 8, pp. 535–541, August 1979.

A large-signal analysis of an IMPATT diode in a wide frequency range is presented. For a given RF electric field at the junction, the maximum power and the maximum efficiency are found at different frequencies.

7

Reliability of UHF Solid State Power Amplifier, by H. Ono (Toshiba Corp., Kawasaki-shi, 210 Japan): *Trans. IECEJ*, vol. J62-B, no. 10, pp. 909–916, October 1979.

500-W and 300-W TV transmitters using UHF solid-state amplifiers have been developed. These amplifiers feature 300,000 -H MTBF and 25-percent efficiency. The design principle for achieving high reliability is described.

8

Linearizer for High-Power Traveling-Wave Tube Amplifier, by G. Satoh (Research and Development Laboratory, Kokusai Denshin Denwa Co., Ltd., Tokyo 153 Japan): *Trans. IECEJ*, vol. J62-B, no. 10, pp. 932–939, October 1979.

In satellite communications, TWT's are employed both in the power amplifier in the earth station and in the transponder in the satellite. This paper describes a new predistortion-type linearizer for reducing intermodulation noise.

9

Parallel Running of Two Oscillators Coupled through a High-*Q* Cavity (Correspondence), by I. Ohota and S. Kitagaki (Faculty of Engineering, Himeji Institute of Technology, Himeji-shi, 671-22 Japan): *Trans. IECEJ*, vol. J62-B, no. 10, pp. 948–949, October 1979.

When two oscillators are in in-phase synchronism, the exact sum of the power is obtained as well as an improved frequency stability. Experiment at 9.7 GHz is described.

10

80-GHz Band High-Power Silicon Diamond-Heatsink IMPATT Diodes, by M. Ino, T. Makimura, T. Ishibashi, and N. Ohmori (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. J62-C, no. 10, pp. 682–688, October 1979.

CW output power of 1 W at 80 GHz was obtained by using silicon double-drift-region IMPATT diodes with diamond heatsinks cooled by liquid nitrogen.

11

Experimental Investigation on Coaxial-Waveguide-Type Diode Mount for Millimeter-Wave IMPATT Diodes, by T. Nakagami and Y. Takeda (Fujitsu Laboratories, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. J62-B, no. 11, pp. 1022–1029, November 1979.

It was found by the experiment at 44–50 GHz that the slope of the device line on the admittance plane had significant influence on the tuning characteristics of the diode mount. IMPATT-oscillator mount for millimeter wavelengths can readily be designed by using the given experimental data.

12

Interference in Synchronized Oscillators (Correspondence), by T. Endo and T. Ohota (Department of Electrical Engineering, National Defense Academy, Yokosuka-shi, 239 Japan): *Trans. IECEJ*, vol. J62-B, no. 11, pp. 1059–1061, November 1979.

A Van der Pol type synchronized oscillator with two input signals is analyzed. The output phase jitter and the hysteresis in synchronization of oscillators are described.

13

Large-Signal Analysis of an IMPATT Diode and its Application to an Oscillator, by I. Suemune, T. Chiang, S. Kawano (Department of Electronics, Hiroshima University, Hiroshima, 730 Japan), and M. Fukushima (Computer Center, Hiroshima University, Hiroshima, 730 Japan): *Trans. IECEJ*, vol. E62, no. 11, pp. 733–740, November 1979.

A large-signal analysis of an IMPATT diode considering harmonic frequency circuits is presented. This analysis uses a Fourier-series expansion of ac voltage across the diode.

Couplers, Filters, and Resonators

1

A New Type of Periodic Diplexer Using Gaussian Beam at 100 GHz Band (Correspondence), by R. Watanabe (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 307–309, March 1979.

A novel reflection-type periodic diplexer is described which consists of a polarization splitter, a polarization-independent 3-dB hybrid, two circular polarizers, and a resonator. It features low loss and easy adjustment.

2

Waveguide-Type Variable Band-Pass Filters Using Varactor-Diode, by S. Toyota (Faculty of Engineering, Osaka Institute of Technology, Osaka-shi, 535 Japan) and T. Makimoto (Faculty of Engineering Science, Osaka University, Toyonaka-shi, 560 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 543–549, June 1979.

A new rectangular-waveguide variable band-pass filter using varactor-diodes is described. It consists of two pairs of diodes and metallic posts mounted in the waveguide. Results of experiment at 4 GHz are shown.

3

A Phenomenological Theory of the *Y*-Junction Circulator (Correspondence), by Y. Akaiwa (Central Research Laboratories, Nippon Electric Co., Ltd., Kawasaki-shi, 213 Japan): *Trans. IECEJ*, vol. J62-B, no. 8, pp. 764–765, August 1979.

A *Y*-junction circulator is analyzed by using an eigenvalue equivalent circuit which phenomenologically describes the nonreciprocity and resonances of a ferrite-loaded *Y*-junction. The theory is in good agreement with experimental results.

4

A Slot-Coupled Waveguide-Type Variable Power Divider, by T. Tanaka (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 10, pp. 865–871, October 1979.

A new variable power divider to be used in satellite communication systems is described. It consists of two dividing sections and a coupling section loaded with a magnetized ferrite toroid. Experimental results are shown.

5

Reflection-Type Periodic Filter with Two Resonators Using Gaussian Beam at Millimeter-Wave Region, by R. Watanabe and N. Nakajima (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 11, pp. 990–997, November 1979.

This paper describes a novel reflection-type periodic filter with two newly added resonators in a quasi-optical form. The filter has the frequency response of the 5th order elliptic function which is sharper than that of conventional periodic filters. Results of experiment at 100 GHz are shown.

6

Waveguide Filters Using Dielectric Slabs Instead of Irises, by S. Kuwano and K. Kokubun (College of Engineering, Nihon University, Koriyama-shi, 963 Japan): *Trans. IECEJ*, vol. J62-B, no. 12, pp. 1147–1154, December 1979.

It is shown by both theory and experiment that microwave block resonators consisting of three dielectric slabs are better than conventional resonators using irises. Theoretical and experimental results of maximally-flat waveguide filters using dielectric slabs are shown.

Microwave Integrated Circuits

1

Resonant Resistance of Rotated Series Slots in Microstrip Line (Correspondence), by K. Nakaoka, K. Itoh, and T. Matsumoto (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 319–321, March 1979.

The resonant resistance of a slot made on the ground plate of a microstrip system is calculated using a method given in a previous paper. Experiment was performed at 3 GHz to verify the theory.

2

Transmission Characteristics of Modified *H*-Guide for Integrated Circuits (Correspondence), by T. Yoshimura, S. Kurazono, and N. Takeuchi (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-B, no. 11, pp. 1063–1064, November 1979.

A modified *H*-guide is proposed which is composed of three dielectric slabs placed between two parallel conductor plates. Fields in this waveguide are expanded in terms of the TES and TMS modes. The propagation constants and power distribution are calculated.

Microwave Thermal Effects

1

Thermal Influence of Microwave Heating on a Luneberg Lens, by S. Washizu and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 1, pp. 25–36, January 1979.

The Luneberg lense can be used for concentrating microwave power in heating systems. The temperature rise and the resulting thermal stress of a Luneberg lense at transient states were calculated with the finite element method.

2

A Simple Method for Observing the Temperature Distribution under Microwave Heating (Correspondence), by S. Washizu and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 2, pp. 173–175, February 1979.

A method for observing the temperature distribution on a body under microwave heating is proposed. This method uses powder-like "toner". The temperature distribution can be preserved in the form of a monochrome photograph.

3

Thermal Stress in a Stripline with Triple-Layer Dielectric (Correspondence), S. Washizu and I. Fukai (Faculty of Engineering, Hokkaido University, Sapporo-shi 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 7, pp. 709–710, July 1979.

This paper deals with the thermal stress caused by power loss in a stripline with three-layer dielectric substrate. The calculation of temperature distribution is performed by using finite element method.

Microwave Propagation in Materials

1

Description of Wave Propagations by a Quantum Mechanical Technique, by Y. Aoki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-C, no. 4, pp. 274–280, April 1979.

Wave fields and wave propagation phenomena are discussed by using state vectors and operators used in quantum mechanics.

Commutator relations are derived to describe a convex lense transform, wave propagation in Fresnel region, and Fraunhofer diffraction fields.

2

The Magnetostatic Surface Waves Propagating through a YIG Magnetized in the Raised Cosine Profile (Correspondence), by T. Ohira, M. Tsutsumi, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 603–604, June 1979.

The dispersion relation of magnetostatic surface waves propagating in an infinite YIG medium magnetized with a raised cosine profile is derived by solving an integral equation numerically.

3

An Analysis of Magnetostatic Surface Wave Propagation in a Nonuniform Magnetic Field (Correspondence), by K. Awai and J. Ikenoue (Faculty of Engineering, Kyoto University, Kyoto-shi, 606 Japan): *Trans. IECEJ*, vol. J62-B, no. 9, pp. 847–849, September 1979.

The propagation characteristics of magnetostatic surface waves in a YIG film are analyzed by a ray-optics method considering the nonuniformity of the magnetic field.

4

On the Relation between a Commutator Relation of Ray Operators and a Wave Equation (Correspondence), by Y. Aoki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-C, no. 10, pp. 729–730, October 1979.

A wave equation is derived from a commutator relation of ray operators associated with the position and slope of light rays, and a geometrical relation between the wavelength and spatial frequency of a plane wave.

5

Description and Analysis of Diffraction by Optical Ray Operators, by Y. Aoki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-C, no. 11, pp. 756–762, November 1979.

Wave diffraction due to objects with periodic structures is analyzed by an optical ray-operator method in which operators transform the state of the position and slope of a light ray into other states.

6

Reflection of a Gaussian Beam Wave by an Inhomogeneous Slab with a Perturbation in Its Permittivity (Correspondence), by S. Nishii and T. Kojima (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-B, no. 12, pp. 1203–1204, December 1979.

In this analysis a small irregularity of the permittivity in a slab is approximated by a δ-function. The electric field of the Gaussian beam reflected by the slab is found to be much different from that reflected by a semi-infinite inhomogeneous medium.

Transmission Lines and Waveguides

1

A Waveguide Radiator with Non-Planar Aperture, by M. Singh and G. S. Sanyal (ITT Kharagpur, India), J.IE. (India), pt. ET, vol. 59, no. ET2-3, pp. 33–38, 1979.

It is shown that when a waveguide end-type radiator has nonplanar aperture, its curvature affects significantly the radiation pattern. Possible application to the beam shaping of a primary feeder is suggested.

2

Mode Transformer for Connection between Rectangular and Circular Dielectric Waveguide (Correspondence), by K. Matsumura and Y. Tomabechi (Faculty of Engineering, Utsunomiya University, Utsunomiya-shi, 321-31 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 316–317, March 1979.

This paper describes a dielectric mode transformer the cross-section of which is gradually changed from a rectangular to a circular shape. Results of experiment at 9.6 GHz are shown.

3

Characteristics of a Cocoon-Section Corrugated Waveguide, by S. Katayama, H. Futatsugi (Engineering Bureau, N.T.T., Tokyo, 100 Japan), K. Abe, and M. Yamasaki (Kamakura Works, Mitsubishi Electric Corp., Kamakura-shi, 247 Japan): *Trans. IECEJ*, vol. J62-B, no. 4, pp. 329–336, April 1979.

This paper describes a method of designing a cocoon-section corrugated waveguide used as an antenna feeder at 4, 5, 6, and 7 GHz, as well as measured electrical and mechanical characteristics.

4

Analysis of Coupled Microstrip-Slot Lines, by H. Ogawa and M. Aikawa (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 4, pp. 396–403, April 1979.

Hybrid modes in a coupled microstrip-slot lines are analyzed by using Galerkin's method in the Fourier-transform domain. Results are compared with those of other papers.

5

Approximate Solution of the Attenuation Constant of Cylindrical Tunnels (Correspondence), by T. Inabe (Yagi Antenna Co., Ltd., Tokyo, 101 Japan), Y. Kuwamoto (Hitachi Ltd., Yokohama-shi, 244 Japan), O. Banno (Hitachi Denshi, Ltd., Koganei-shi, 187 Japan), J. Chiba, and R. Sato (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J62-B, no. 4, pp. 435–436, April 1979.

An symptotic expression for the propagation constant of guided waves in cylindrical tunnels is derived. Results are compared with those of other approximate methods.

6

Fundamental Mode Transmission in Millimeter-Wave Gas-Confining Dielectric Waveguide, by K. Yamamoto (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 503–510, June 1979.

This paper deals with the transmission of fundamental mode along a thin dielectric pipe waveguide confining a gas with high dielectric constant. Results of the experiment using a polythelene pipe and butane gas are described.

7

Transient Analysis of Two-Dimensional Maxwell's Equations by Bergeron's Method, N. Yoshida, I. Fukai, and J. Fukuoka (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 511–518, June 1979.

This analysis is based upon two basic means: the equivalent circuit expression of square lattice networks, and Bergeron's formula of wave propagation along each branch. The new method is compared with the transmission-line matrix method.

8

Analysis of the Bleustein–Gulyaev Waveguides with Gratings, by Z. Kawasaki (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 550–556, June 1979.

The scattering of the Bleustein–Gulyaev wave by a grating on a surface acoustic waveguide is analyzed by means of Tuan's method, and by a newly proposed equivalent transmission-line method. Numerical results of both methods are compared.

9

Analysis of Microstrip Transmission Line on a Sapphire Substrate, by Y. Hayashi (Faculty of Engineering, Kitami Institute of Technology, Kitami-shi, 090 Japan), T. Kitazawa (Faculty of Engineering Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 596–602, June 1979.

The characteristics of the microstrip on a sapphire substrate are investigated by taking the anisotropy of the substrate into account. The results are compared with those of an analysis based on the concept of equivalent isotropic substrate.

10

Dipole-Mode Loss in Multiconductor Transmission Lines (Letter), by M. Nouri (Electrical Engineering Department, Arya Mehr University of Technology, P.O. Box 3406 Teheran, Iran): *Trans. IECEJ*, vol. E62, no. 7, pp. 486–487, July 1979.

Approximate expressions are derived for the calculation of dipole-mode loss in a circularly cylindrical grid structure composed of equispaced parallel wires.

11

Matching Circuit with Discontinuous Transmission Lines and Its Application to the Termination Design (Correspondence), by Y. Kami (Junior Technical College of Electro-Communications, Chofu-shi, 182 Japan), M. Tanaka, and T. Arakawa (The University of Electro-Communications, Chofu-shi, 182 Japan): *Trans. IECEJ*, vol. J62-B, no. 9, pp. 849–850, September 1979.

A matching circuit using discontinuous transmission lines is analyzed and conditions for obtaining necessary bandwidth are derived. A derived formula is applied to the design of a termination having a constant impedance.

12

Experimental Investigation of Phase Constant and Cutoff Wavelength of a Cocoon-Section Corrugated Waveguide, by K. Abe (Kamakura Works, Mitsubishi Electric Corp., Kamakura-shi, 247 Japan), and A. Hashimoto (Engineering Bureau, N.T.T., Tokyo, 100 Japan): *Trans. IECEJ*, vol. E62, no. 11, pp. 762–767, November 1979.

The phase constant and cutoff frequency of the cocoon-section corrugated waveguide, which is used as an antenna feeder, were investigated experimentally to examine the frequency range available and the guide wavelength.

Optical Fibers

1

Theory of Coupled Transmission Lines and Its Application to Optical Fibers, by A. E. Karbowiak and D. H. Irving (School of Electrical Engineering, University of New South Wales, Kensington, N.S.W., Australia), *ATR*, vol. 13, no. 1, pp. 33–39, 1979.

Coupled transmission line theory is applied to signal propagation along multimode optical fibers. It is shown that the coupled-line model is a simple way to obtain results pertaining to optical fibers. Improvement of the bandwidth using two cascaded fibers having complementary characteristics is discussed.

2

Scattering and Mode Conversion of Guided Modes by a Spherical Object in an Optical Fiber, by N. Morita, T. Oda, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-C, no. 4, pp. 251–258, April 1979.

The theoretical basis of this analysis is that the guided modes in an optical fiber can be expressed in terms of spherical vector-waves. Numerical examples for an LP_{01} mode incident wave are shown.

3

On the Accuracy of Scalar Approximation Technique in Optical Fiber Analysis (Correspondence), by K. Morishita, N. Kumagai, and Y. Kondoh, (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-B, no. 5, pp. 493–494, May 1979.

The computational error of the propagation constant is shown for HE_{11} mode in various optical fibers.

4

Bandwidth of Single-Mode Optical Fiber, by K. Furuya, S. Miyamoto, and Y. Suematsu (Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. E62, no. 5, 305–310, May 1979.

The transmission bandwidth of a single-mode optical fiber is analyzed for amplitude-modulation and an intensity-modulation systems.

5

Developments in the Theory of Fiber Optics, by C. Pask and R. A. Sammut (Department of Applied Mathematics, Australian National University, Canberra, ACT 2600 Australia), *Proc. IREE* (Australia), vol. 40, no. 3, pp. 89–101, June 1979.

A tutorial-review paper. Emphasis is placed upon the optimization of the refractive index profile and the relation between loss and dispersion characteristics in single mode fibers.

6

Mode Conversion Caused by Splice of Graded Index Fibers, by Y. Daido, E. Miyauchi, and T. Iwama (Fujitsu Laboratories, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. E62, no. 6, pp. 363–367, June 1979)

The variation of power distribution in graded-index optical fibers caused by splicing is calculated in terms of the number of splice points and the misalignment of fibers.

7

Stranding Pitch Selection of an Optical Fiber Cable (Correspondence), by T. Yabuta, M. Kawase, and K. Ishihara (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-B, no. 7, pp. 704–705, July 1979.

A method for selecting the stranding pitch of an optical cable is proposed. The principle is to optimize the balance between mechanical forces.

8

Transmission Theory of Mode-Coupled Multimode Fiber Based on Scattering Matrix (Correspondence), by H. Kajioka (Research Laboratory, Hitachi Cable, Ltd., Hitachi, 319-14 Japan): *Trans. IECEJ*, vol. E62, no. 8, pp. 546–547, August 1979.

The baseband transfer function of a multimode optical fiber is described assuming uniform coupling between guided modes and a small scattering center.

9

Measurements in Optical Fibers, by P. L. Chu (School of Electrical Engineering, University of New South Wales, Kensington, N.S.W., Australia), *Proc. IREE* (Australia) vol. 40, no. 4, pp. 102–114, September 1979.

Various measurements of optical fiber characteristics, including attenuation, pulse distorsion, fiber bandwidth, mode-dependent attenuation, refractive-index profile, and fiber diameter, are reviewed.

10

On the Accuracy of Matrix Method for Analyzing Mode-Coupling Phenomena in Multimode Optical Fibers (Correspondence), by K. Tatekura, K. Itoh, and T. Matsumoto (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. E62, no. 9, pp. 595–596, September 1979).

A matrix equation was derived from power-flow equations of a multimode optical fiber to analyze the mode-coupling phenomena. The convergence and computation error of eigenvalues calculated by the matrix method are discussed. Results are compared with experiment.

11

Optical Loss Increase due to Stranding in Optical Cable (Correspondence), by N. Nakatani, K. Ishihara, S. Mochizuki, and M. Tateda (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-B, no. 10, pp. 956–958, October 1979.

The loss increase of an optical fiber due to stranding is measured and analyzed using the radiation-loss expression by Marcuse.

12

Propagation Characteristics of Graded-Index Optical Fiber with Polynomial Profiles, by H. Ikuno and H. Watanabe (Faculty of Engineering, Kumamoto University, Kumamoto-shi, 860 Japan): *Trans. IECEJ*, vol. J62-C, no. 10, pp. 719–725, October 1979.

The WKBJ technique is applied to the analysis of the propagation modes of an optical fiber with the refractive index profile expressed by polynomials of the normalized radius.

13

Excess Loss of Jacketed Fiber at Low Temperature (Correspondence), by T. Yabuta, K. Yamashita, K. Ueno, and Y. Negishi (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-B, no. 11, pp. 1061–1063, November 1979.

An abrupt increase of the transmission loss of a jacketed optical fiber was observed at about $-50°C$. This phenomenon is explained by the buckling of fibers.

14

Optical Cable Installation in Subducts and Transmission Experiment (Correspondence), by Y. Nagata (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan), M. Hirai, S. Seikai (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki, 319-11 Japan), K. Takayama (Kanto Bureau, N.T.T., Tokyo, 100 Japan), and H. Osanai (Fujikura Cable Works, Ltd., Chiba, 285 Japan): *Trans. IECEJ*, vol. E62, no. 11, pp. 786–787, November 1979.

An optical cable composed of eight step-index fibers was installed in a duct. Results of a cable-jointing test in a manhole and a 32-Mbit/s transmission through a 5.15-km fiber link are described.

15

A Probe Microphone Using Optical Fiber (Correspondence), by T. Umezu, R. Ohba, and N. Mikami (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-C, no. 11, pp. 782–783, November 1979.

The sound wave in a mouth is detected by small displacement of the end of an optical fiber.

16

Continuous Fabrication Process for High-Silica Fiber Preforms, by T. Izawa (Musashino Electrical Communication Laboratory, N.T.T., 180 Japan), S. Sudoh, and F. Hanawa (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. E62, no. 11, pp. 779–785, November 1979.

A new continuous fabrication process for high-silica fiber preform is described. The transmission loss of the fiber made by this method is 2.3 dB/km at 0.85 μm and 0.75 dB/km at 1.2 μm.

17

Estimation of Bandwidths of Long-Distance Graded-Index Multimode Fibers, by T. Matsumoto, K. Sato, and K. Nakagawa (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 12, pp. 1163–1170, December 1979.

The bandwidth of an optical channel consisting of many fibers having slightly different refractive index profiles are estimated, and the results are compared with experiments.

18

Fusion Splice Loss for Single-Mode Optical Fibers, by I. Hatakeyama (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan), and H. Tsuchiya (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. J62-C, no. 12, pp. 803–810, December 1979.

The core deformation of an optical fiber at a splicing point is treated analytically by using a simplified model. Calculated splicing loss agrees well with measured values.

19

Attenuation-Increase Mechanism of Jacketed and Cabled Fibers at Low Temperature, by Y. Sugawara, T. Kobayashi, N. Tanaka, A. Mogi, K. Inada (Telecommunication Cable Research and Development Department, the Fujikura Cable Works, Ltd., Sakura-shi, 285 Japan), and K. Ishihara (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-C, no. 12, pp. 864–871, December 1979.

The loss increase of three-layer graded-index fibers at low temperature was investigated experimentally. The loss increase is due to the contraction of the secondary coating material.

Optical Waveguides Other Than Fibers

1

Analysis of Thin-Film Waveguides with Refractive Index Fluctuation Using Coupled Power Equations, by J. Yamakita and K. Rokushima (Faculty of Engineering, University of Osaka Prefecture, Sakai-shi, 591 Japan): *Trans. IECEJ*, vol. J62-C, no. 3, pp. 185–192, March 1979.

Coupled power equations are used to express the coupling between guided modes, and that between guided modes and radiation modes to analyze thin-film waveguides having random fluctuation of the refractive index.

2

Light Beam Propagation through Lens-Like Media with Off-Axis Complex Permittivity, by S. Sawa and T. Hayashi (Faculty of Engineering, Ehime University, Matsuyama-shi, 790 Japan): *Trans. IECEJ*, vol. J62-C, no. 5, pp. 329–335, May 1979.

General expressions for the spot size and the curvature of the phase front of a Gaussian beam in lense-like media having complex permittivity are described.

Optical Components and Optical Integrated Circuits

1

Quasi-Optical Beam Splitter Independent of Polarization (Correspondence), by R. Watanabe (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 306–307, March 1979.

A new quasi-optical beam splitter is described; it is composed of metal grids with quartz-backing. Experimental results indicate that the reflection and transmission losses of the splitter are both within 3 ± 0.5-dB in 80–110 GHz.

2

Characteristics of SEM-Written Gratings for Integrated Optical Circuits, by. Y. Handa, T. Suhara, H. Nishihara, and J. Koyama (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-C, no. 3, pp. 199–206, March 1979.

The refractive-index increase induced by an electron beam is used to make an optical grating on an amorphous chalcogenide thin film.

3

Single-Mode Optical Fiber Connectors, by N. Shimizu and H. Tsuchiya (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. J62-C, no. 4, pp. 237–243, April 1979.

A low-loss detachable connector for single-mode optical fibers is described. The average loss is 0.5 dB.

4

One-Dimensional Hologram Recording with the Use of an Acusto-Optic Deflector, by T. Kaneko (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan), and A. Ishii (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 190 Japan): *Trans. IECEJ*, vol. J62-C, no. 4, pp. 288–295, April 1979.

An acousto-optic deflector was used as a page composer to realize an one-dimensional hologram narrower than 10 μm. Experiments using a TeO_2 deflector are described.

5

Improvement of Permissible Incident Angle of Transverse Light Modulator by Complex Constitution, by O. Shimomura (Faculty of Engineering, Yamanashi University, Kofu-shi, 400 Japan): *Trans. IECEJ*, vol. J62-C, no. 7, pp. 497–504, July 1979.

The electro-optic characteristics of a transverse modulator composed of two 45° Z-cut bars and a Z-cut bar of KDP crystal are investigated to widen the incident angle.

6

Polarization-Independent Isolators for Fiber Optics, by T. Matusmoto (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-C, no. 7, pp. 505–512, July 1979.

A principle for constructing polarization-independent isolators is presented. Experiment of the proposed isolator using two calcite plates, a YIG plate, and a quartz plate is described.

7

Optical Demultiplexer Using a Diffraction Grating in the 0.8-μm Wavelength Region with a Litrow Mounting (Correspondence), by Aoyama and J. Minowa (Yokosuka Electrical Communication Laboratory), N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-C, no. 7, pp. 526–527, July 1979.

An optical demultiplexer is proposed; it uses a diffraction grating to decrease loss and a Litrow mounting to reduce size.

8

A Quasi-Optical Circular Polarization Duplexer Using an Artificial Anisotropic Dielectric Medium, by R. Watanabe (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan), and S. Shindo (Research and Development Bureau, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. J62-B, no. 9, pp. 819–826, September 1979.

A novel circular-polarization duplexer is proposed; it consists of a polarization splitter and a circular polarizer made of an artificial anisotropic dielectric material. Experiment is also described.

9

Quasi-Optical Diplexer Using Two Fabry–Perot Resonators, by R. Watanabe and N. Nakajuma (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 9, pp. 835–942, September 1979.

Theoretical and experimental investigation of a novel quasi-optical diplexer are described. This diplexer consists of two Fabry–Perot resonators, a polarization splitter, and two quarter-wave plates.

10

A Design of Optical Multi-/Demultiplexers for Optical Wavelength-Division Multiplexing Transmission, by K. Nozu and H. Ishio (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 11, pp. 1030–1036, November 1979.

The optimum parameters of multi-/demultiplexers can be obtained theoretically by this design method. Channel separation, light-source characteristics, loss, and cross talk are considered.

11

Light Deflector Using Chalcogenide Amorphous Film Loaded on a Graded-Index $LiNbO_3$ Waveguide, by S. Zembutsu, J. Noda, and H. Iwasaki (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. J62-C, no. 11, pp. 763–770, November 1979.

Several waveguide-type Bragg light-deflectors are proposed; these use electrooptic effects or acoustic effects of $LiNbO_3$ crystal, or surface corrugation formed by ion etching.

12

InGaAsP/InP Photodetectors for Wavelength Demultiplication, (Correspondence), by M. Umeno (Department of Engineering Science, Nagoya Institute of Technology, Nagoya, 466 Japan), M. Tobe, S. Sakai, and Y. Amemiya (Faculty of Engineering, Nagoya University, Nagoya-shi, 464 Japan): *Trans. IECEJ*, vol. J62-C, no. 11, pp. 787–788, November 1979.

New photodetectors for optical communication with wavelength multiplexing are proposed. These detectors are composed of two homojunctions with two different values of band-gap energy.

13
Magneto-Optic Bistable Device Using Magnetic Thin Film Waveguide, by M. Hano (Faculty of Engineering, Yamaguchi University, Ube, 755 Japan) and H. Kayano (Faculty of Science, University of Yamaguchi, Yamaguchi, 753 Japan): *Trans. IECEJ*, vol. E62, no. 11, pp. 792–793, November 1979.

An optical bistable device can be constructed using the discontinuous transmission characteristics of a magnetic thin-film waveguide modulator.

Measurements

1
An Experimental Equation for Attenuation Constant of the Circular Concrete Tunnels (Correspondence), by T. Inaba (Yagi Antenna Co., Ltd., Tokyo, 101 Japan), Y. Kuwamoto (Hitachi, Ltd., Jokonama-shi, 244 Japan, O. Banno (Hitachi Denshi, Ltd., Koganei-shi, 178 Japan), J. Chiba, and R. Sato (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J62-B, no. 1, pp. 85–86, January 1979.

An empirical formula for the attenuation constant of electromagnetic waves in tunnels is derived in terms of an equivalent tunnel radius $r[m]$ and wavelength $\lambda[m]_0$. The formula is $\alpha = 1460\lambda^2/r^3$ [dB/km].

2
A Technique for Measuring Low Insertion Losses at Microwave Frequencies, J. W. Brooks (Division of Radiophysics, CSIRO, Sydney, Australia), *Proc. IREE* (Australia), vol. 40, no. 2, pp. 8–12, March 1979.

The problems inherent in measuring small insertion losses (~0.1 dB) of microwave devices by conventional methods such as substitution techniques may be alleviated by using a lesser known procedure involving only an accurate measurement of high VSWR's. In this paper, the measuring techniques are described; the theory is reviewed and the rationale of the method explained.

3
A Broad-Band Radio Astronomy Spectrometer, by D. K. Milne and T. W. Cole (Division of Radiophysics, CSIRO, Sydney, Australia), *Proc. IREE* (Australia), vol. 40, no. 2, pp. 43–47, March 1979.

A 512-channel acousto-optical spectrometer has been developed for processing millimeter-wave signals in radio astronomy. This spectrometer is currently used in the Parkes 64-m radio telescope.

4
Amplification Experiments of Magnetostatic Surface Wave in Ferromagnet-Semiconductor Composite System, by S. Yamada, N. S. Chang, and Y. Matsuo (Institute of Scientific and Industrial Research, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 185–192, March 1979.

This paper describes an experiment of the interaction between a drifting electron beam in *n*-GaAs and a magnetostatic surface wave propagating in a thin YIG slab. Relatively large gain and low insertion loss as compared with previously reported ones were observed.

5
Microbending Loss Measurement in Optical Fibers (Correspondence), by M. Kawase, K. Yamashita, and Y. Miyajima (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 309–311, March 1979.

A new method for measuring microbending loss in an optical fiber is described; it uses microbubble grains of alumina to apply nonuniform pressure to the fiber.

6
The Dielectric Measurement by *H*-Plane Dielectric Loaded Waveguide with Three-Layers, by H. Yamanaka (Faculty of Engineering, Utsunomiya University, Utsunomiya-shi, 321-31 Japan): *Trans. IECEJ*, vol. J62-B, no. 7, pp. 652–658, July 1978.

A method of measuring dielectric constant is described; the measuring system uses three dielectric layers (air, a known material, and unknown material) placed in a rectangular waveguide. Experimental results are shown.

7
Experimental Observation of Delay of Magnetostatic Waves in a Partially Magnetized YIG (Letter), by M. Tsutsumi, Y. Masaoka, T. Ohhira and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. E62, no. 7, pp. 481–482, July 1979.

The delay time of magnetostatic waves in a YIG slab was measured for the nonuniform magnetic field applied in the direction normal to the slab surface.

8
Transmission Experiment in the 1.2~1.6-μm Wavelength Region Using Graded-Index Optical Fiber Cables, by K. Nakagawa, K. Aida (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan), and S. Seikai (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-B, no. 8, pp. 736–743, August 1979.

The signal transmission characteristics for 400 Mbit/s, 100 Mbit/s, and 32Mbit/s were measured for a system using a low-loss (0.57 dB/km at 1.27 μm), wide-band (1.275 MHz-km at 1.27 μm) fiber, a LED source, and a Ge-APD detector.

9
Strain Measurement in Coated Optical Fibers and Optical Cables Using Resistance Wire, by Y. Mitsunaga, Y. Katsuyama, and K. Ishihara (Ibaraki Electrical Communication Laboratory, N.T.T., Ibaraki-ken, 319-11 Japan): *Trans. IECEJ*, vol. J62-B, no. 9, pp. 812–818, September 1979.

In this measurement the resistance change due to the deformation of a long resistance wire is measured. This method is applied to obtain the relation between the strain and loss-increase of a single-mode fiber at low temperatures.

Microwave and Optical Systems

1
An Imaging Method by Means of Hologram Matrix—Experimental Study of Image Reproduction, by J. Nakayama, T. Miyashita, N. Akagi, H. Ogura, Y. Yoshida, and T. Soma (Faculty of Industrial Arts, Kyoto University of Industrial Arts and Textile Fibers, Kyoto-shi, 060 Japan): *Trans. IECEJ*, vol. J62-B, no. 2, pp. 93–100, February 1979.

A two-dimensional imaging method is developed by extending the concept of a hologram matrix. Experiment is also described.

2
A Multilevel Pulse Transmission by Pulse Width Modulation over Optical Fiber, by K. Nakagawa and E. Yoneda (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi,

238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 2, pp. 147–153, February 1979.

Multilevel pulse transmission over a low-loss multimode fiber is investigated theoretically and experimentally. Emphasis is placed upon the possible repeater spacing, modulation characteristics, and signal-to-noise ratio.

3

Field Intensity Distribution of Reconstructed Image for Point Object in Long Wavelength Hologram (Correspondence), by T. Seko, H. Narita (Department of Electrical Engineering, Nara Technical College, Yamatokoriyama-shi, 639-11 Japan), and T. Azakami (Faculty of Engineering, Nagoya Institute of Technology, Nagoya-shi, 466 Japan): *Trans. IECEJ*, vol. J62-B, no. 2, pp. 178–180, February 1979.

The field intensity distribution of a reconstructed hologram image is calculated in the Fresnel region.

4

The Effect of Intensity Fluctuations in Longitudinal Modes of a Laser on a High Bit-Rate Optical Transmission, Y. Okano, K. Nakagawa, and T. Ito (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J62-B, no. 3, pp. 199–206, March 1979.

It is shown for example that the spectrum width of output optical pulses must be less than 1.5 μm to make the power level degradation less than 1 dB when transmitting 400-Mbit/s signal over 8 km.

5

Image Reconstruction from Multi-Frequency Microwave Holography, by M. Nishimura (Maizuru Technical College, Maizuru-shi, 625 Japan) and H. Shigesawa (Faculty of Engineering, Doshisha University, Kyoto-shi, 602 Japan): *Trans. IECEJ*, vol. J62-B, no. 6, pp. 589–595, June 1979.

This paper describes an efficient method for improving the resolution in microwave holography when an antenna array is used to collect hologram data quickly. Results of simulation are shown.

6

A Synthesis of Optical Guided-Wave Signal Transformers, by K. Tsutsumi (Faculty of Industrial Arts, Kyoto University of Industrial Arts and Textile Fibers, Kyoto-shi, 606 Japan), and T. Sueta (Faculty of Engineering Science, Osaka University, Toyonaka-shi, 560 Japan): *Trans. IECEJ*, vol. J62-C, no. 6, pp. 381–388, June 1979.

A novel optical guided-wave Hadamard transformer is proposed; it consists of channel optical waveguides incorporating directional couplers and phase shifters.

7

Estimation Method of Focusing Parameters of Long-Wavelength Hologram by the Focused Pattern, by Y. Suzuki, Y. Aoki, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J62-C, no. 6, pp. 437–444, June 1979.

A new method for estimating focusing parameters in the reconstruction of an image from a hologram is described. This method features the use of sampled intensity values of the image and the hologram. Experiment with a sound-wave hologram is presented.

8

Optimization of Analogue Optical Repeater Lines, by Y. Arakawa, Y. Taki, and N. Hatori (Faculty of Engineering, University of Tokyo, Tokyo, 113 Japan): *Trans. IECEJ*, vol. J62-B, no. 7, pp. 629–636, July 1979.

An optimum design of an analog repeater for optical communications is presented. The principle is to minimize the mean square error of the signal considering thermal and shot noises.