Contributors

Ali E. Atia (S'67–M'69) was born in Cairo, Egypt, on August 10, 1941. He received the B.S. degree with honors from Ain Shams University, Cairo, in 1962, and the M.S. and Ph.D. degrees from the University of California, Berkeley, in 1966 and 1969, respectively, all in electrical engineering.

From 1962 to 1964 he was a Lecturer in the Department of Electrical Engineering, Ain Shams University. From 1965 to 1968 he was a Research Assistant in the Electronics Research Laboratory, University of California. From 1968 to 1969 he was a Teaching Fellow and Assistant Professor in the Department of Electrical Engineering and Computer Sciences, University of California. In 1969 he joined COMSAT Laboratories, Clarksburg, MD, and since then he has been engaged in research and development of various microwave subsystems and antennas for communication satellites.

Hans L. Hartnagel (SM'72) was born in Geldern, Germany, in 1934. He received the Dipl.Ing. degree in 1960 from the Technical University, Aachen, Germany, and the Ph.D. and the Dr.Eng. degrees from the University of Sheffield, Sheffield, England, in 1964 and 1971, respectively.

After having worked for a short period with the Microwave Tube Laboratories, Telefunken, Ulm, Germany, he joined the Institut National des Sciences, Appliquées, Villeurbanne, Rhône, France. In October 1961 he was with the Department of Electronic and Electrical Engineering, University of Sheffield, as a Senior Research Assistant, in October 1962 as a Lecturer, and in October 1968 as a Senior Lecturer. On June 12, 1970, he received the title of Reader in Electronic and Electrical Engineering. Since January 1, 1971, he has been a Professor of Electronic Engineering in the Department of Electrical and Electronic Engineering, University of Newcastle upon Tyne, Newcastle upon Tyne, England. He is the author of two books, one on semiconductor plasma instabilities and one on Gunn-effect logic, and has written numerous papers.

Dr. Hartnagel is a Fellow of the Institution of Electronics and Radio Engineers and a member of the Institution of Electrical Engineers, London.

Dimitrios Pavlidis (S'73) was born in Athens, Greece, on July 9, 1950. He received the B.Sc. degree in physics from the University of Patras, Patras, Greece, in 1972.

Since January 1973 he has been engaged on research on applications of active solid-state devices for microwave communication systems, this research being in preparation for the Ph.D. degree at the Department of Electrical and Electronic Engineering, University of Newcastle upon Tyne, Newcastle upon Tyne, England. He is currently a Research Associate in this department. His interests include injection-locking transient phenomena and broad-band frequency switching of microwave oscillators, wave propagation in dielectric lines, and microstrip applications.

Albert E. Williams (S'66–M'66) was born in Albany, Australia. He received the B.E. in Electrical engineering from the University of Western Australia, Nedlands, in 1962, and the Ph.D. from University College, London, England, in 1966.

From 1966 to 1968 he was a Lecturer in the Department of Electrical Engineering, University of Western Australia. Currently, he is a Technical Staff member of the Antennas Department of the Microwave Laboratory at COMSAT Laboratories, where he is working on antenna and filter theory applicable to future communications satellites.

Dr. Williams was a joint recipient of the Institute of Electrical Engineers (London) Sylvanus P. Thompson Premium award in 1966.

Overseas Abstracts

PAPERS FROM JOURNALS PUBLISHED IN AUSTRALIA, INDIA, AND JAPAN

Compiled by Prof. T. Okoshi, Department of Electronic Engineering, University of Tokyo. The periodicals investigated are: 1) Transactions of the Institute of Electronics and Communication Engineers of Japan (Trans. IECEJ), 2) Journal of the IECEJ, 3) Journal of the Institution of Electronics and Telecommunication Engineers (J. IETE (India)), 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, two-page English summaries ($\frac{1}{3}$ page for Correspondences) will be available in "Abstracts of IECE Transactions" published concurrently from the IECEJ, Kikai-Shinko-Kaikan, 3-5-8 Minato-ku, Tokyo 105, Japan. From January 1976, the title of the journal changed into "Transactions of IECEJ, Section E," where "E" denotes English.

Amplifiers and Oscillators

1

Load-Variation-Detecting Characteristics of a Detector-Diode-Loaded Gunn Oscillator, by M. Kotani, S. Mitsui, and K. Shirahata (Central Research Lab., Mitsubishi Electric, Itami-shi, 664 Japan): *Trans. IECEJ*, vol. 58-B, pp. 203–210, May 1975.

In simple microwave Doppler radars such as those to be used in automobiles, the load variation in the external space is mostly detected by the oscillator-current variation. This paper shows that the detection sensitivity can be much improved by adding a detector diode to the oscillator.

2

Reflection Type IMPATT-Diode Amplifier Using Rectangular Waveguide (Correspondence), by Toyota (Department of Electrical Engineering, Osaka Institute of Technology, Osaka-shi, 535 Japan): *Trans. IECEJ*, vol. 58-B, pp. 169–171, April 1975.

A theoretical analysis. Equivalent circuit parameters, center frequency, gain, and bandwidth are derived.

3

Experimental Studies on the Large-Scale Operations of the BARITT-Diode Amplifiers, by K. Okazaki, N. Chang and Y. Matsuo (Institute of Scientific and Industrial Research, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. 58-B, pp. 218–224, May 1975.

Experimental study of an *X*-band, reflection-type amplifier using a silicon p^+–n–p^+ BARITT diode. Power gain 7 dB and bandwidth 120 MHz are obtained at 10 GHz.

4

Measurements of PM Noise of Bilaterally Injection-Locked Oscillators (Correspondence), by K. Hayashi and Y. Ida (Faculty of Technology, Kanazawa University, Kanazawa-shi, 920 Japan): *Trans. IECEJ*, vol. 58-B, pp. 317–318, June 1975.

The measured characteristics are compared with theory. Theory and experiment show good agreement.

5

Phase-Locked Microwave Oscillator, by A. K. Ghose and S. Kumar (Himalayan Radio Corporation Unit, Raipur, Dehra Dun 248008, India): *J. IETE (India)*, vol. 21, pp. 319–322, June 1975.

Lower *S*-band oscillator with a high long-term stability (1 ppm for 24 h) for use in microwave communication systems has been developed. The phase-lock scheme is employed.

6

Spectral Process of an Injection Oscillator with Amplitude-Modulated External Forces (Correspondence), by M. Ishikawa, M. Morita, and S. Saoda (Faculty of Engineering, Kansai University, Suita-shi, 564 Japan) and N. Takeda (Kamitsu Seisakusho Co., Ltd., Itami-shi, 664 Japan): *Trans. IECEJ*, vol. 58-B, pp. 416–418, August 1975.

The behavior of the oscillation spectrum with an AM injection signal is observed and discussed.

7

Self-Injection Locking Oscillator Using Directional Filter, by T. Ohta, S. Makino and H. Nakano (Engineering Development Division, Oki Electric Industry Co., Tokyo, 108 Japan): *Trans. IECEJ*, vol. 58-B, pp. 457–465, September 1975.

This paper proposes a new method of improving the stability and spectral purity of an oscillator using self-injection locking through a directional filter. The design theory is given.

8

Design and Development of a Wideband Mechanically Tunable Coaxial Cavity *X*-Band Solid-State Signal Source Using Gunn Diode, by D. N. Singh and H. Niwas (Microwave Engrg. Group, TIFR, Homi Bhabha Road, Bombay 400005, India): *J. IETE (India)*, vol. 21, pp. 463–466, September 1975.

The developed oscillator is continuously tunable over 7.0–12.5 GHz, and may deliver more than 20 mW over the entire bandwidth.

9

The Electronically Tunable Gunn Diode Oscillator, by K. Yokoo, and S. Ono (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. 58-B, pp. 497–504, October 1975.

This paper describes the proposal, design theory, and experiment of an electronically tunable oscillator using a long Gunn diode embedded in a transmission-line-type resonator.

10

Plate-Type Oscillators Using Micropill-Type GaAs IMPATT Diodes for 30 GHz Band (Correspondence), by K. Mizuishi, M. Miyazaki, H. Sato, and M. Migitaka (Central Research Laboratory, Hitachi Ltd., Kokubunji-shi, 185 Japan): *Trans. IECEJ*, vol. 58-B, pp. 538–540, October 1975.

The plate-type structure is proposed to realize low-impedance waveguide circuitry for IMPATT oscillators. It features a plate (instead of a rod) inserted in the waveguide for IMPATT diode. A CW output of 350 mW has been obtained at 30 GHz.

11

Waveguide Double-Drift-Region TRAPATT Diode Oscillator with Cap Structure, by M. Yokoyama, N. S. Chang, and Y. Matsuo (Institute of Scientific and Industrial Research, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. 58-B, pp. 570–577, November 1975.

An experimental study of DDR–TRAPATT oscillators mounted in waveguide with a cap resonator proposed by Misawa is described. Maximum power 56 W and efficiency 21 percent have been obtained at 2.85 GHz.

12

***L*-Band Low-Noise Transistor Amplifier,** by M. L. Sharma (Himalayan Radio Propagation Unit, Dehra Dunn 248008, India): *J. IETE (India)*, vol. 21, pp. 574–576, November 1975.

A report of development of an amplifier with 15-dB gain, 4-dB noise figure, and 1–2-GHz frequency band.

13

On the Design and Development of 4 GHz Varactor-Diode Parametric Amplifier, by A. K. Saxena, W. S. Khokle, and A, Singh (Central Electronics Engineering Research Institute. Pilani 333031, India): *J. IETE (India)*, vol. 21, pp. 605–612, November 1975.

A nondegenerate parametric amplifier at 4 GHz with 12.5-dB gain, 75-MHz bandwidth, and 3.5-dB noise figure has been developed.

Frequency Converters

1

Microstrip Balanced Mixer for *S*-Band Receiver, by C. K. Chatterjee and M. L. Sharma (Himalayan Radio Propagation Unit, Dehra Dun 248008, India): *J. IETE (India)*, vol. 20, pp. 415–418, August 1974.

The design techniques are described. The obtained noise figure: 7.7 dB; conversion loss: 7.5 dB; dynamic range: 70 dB.

2

Design Method of Millimeter-Wave Broadband Mixer, by N. Kanmuri and R. Kawasaki (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238 Japan): *Trans. IECEJ*, vol. 58-B, pp. 247–258, May 1975.

An exact broad-band design technique has been developed, which has been used in actual design of mixers for mm-wave communication. Conversion loss below 11 dB and its variation less than 1 dB have been achieved over entire 60–90-GHz band.

3

100 and 150 GHz Band Crossed-Waveguide Type Diode Characteristics, by M. Hirayama (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. 58-B, pp. 345–352, July 1975.

A report of development. When the developed diode was used as a multiplier/mixer at local oscillator frequency 49 GHz, intermediate frequency 4 GHz, and output (transmitting) frequency 10 GHz, conversion loss of 14 dB has been achieved.

4

Fabrication and Performance of Microwave Mixer Diodes, M. C. Kumar *et al.* (TIFR, Colaea, Bombay 400085, India): *J. IETE (India)*, vol. 21, pp. 577–580, November 1975.

Conversion loss below 7 dB and noise figure below 9 dB have been achieved at *X*-band.

Control Circuits

1

Design and Observed Characteristics of *X*-band PIN Diode Limiters, by B. K. Sarkar (Microwave Engrg. Group, Homi Bhabha Road, Bombay 400005, India): *J. IETE (India)*, vol. 21, pp. 378–382, July 1975.

Three types of limiters developed for use at *X*-band: passive limiter, quasi-active limiter, and switched pin-diode limiter, are described. Limiting of power by 23 dB, 25 dB, and 30 dB were obtained for those three types, respectively.

Planar Circuits

1

The Expansion of Electromagnetic Field in Planar Circuits, by T. Miyoshi (Faculty of Engineering, Kobe University, Kobe-shi, 657 Japan): *Trans. IECEJ*, vol. 58-B, pp. 84–91, February 1975.

Open-boundary triplate planar circuits and short-boundary waveguide-type planar circuits are analyzed in a unified manner. Correspondence between circuit elements in the equivalent circuit and field components in actual circuit is discussed.

2

Analysis of Planar Circuits by Segmentation Method, by T. Okoshi and T. Takeuchi (Faculty of Engineering, University of Tokyo, Tokyo 113 Japan): *Trans. IECEJ*, vol. 58-B, pp. 400–407, August 1975.

The segmentation method proposed in this paper is a method in which the characteristics of a planar (two-dimensional) circuit is computed by combining those of the segmented rectangular elements of the circuit. It features short computer time. Examples of analysis are shown.

3

Planar-Circuit-Type 3-dB Hybrid, by T. Okoshi, T. Takeuchi (Faculty of Engineering, University of Tokyo, Tokyo, 113 Japan), and J. P. Hsu (Faculty of Engineering, Kanagawa University, Yokohama-shi, 254 Japan): *Trans. IECEJ*, vol. 58-B, pp. 408–415, August 1975.

The proposal, principle, theory, and experiment of a new planar-circuit-type 3-dB hybrid circuit are described. The circuit consists of a low-Q disk resonator provided with four coupling ports separated by 45, 90, 135, and 90°. Theory and experiment.

4

Analysis of Microwave Planar Circuits by Normal Mode Method, by J. P. Hsu, T. Anada, and O. Kondo (Faculty of Engineering, Kanagawa University, Yokohama-shi, 221 Japan): *Trans. IECEJ*, vol. 58-B, pp. 671–678, December 1975.

An equivalent circuit representation of a planar circuit is derived. Simple formulas expressing the effect of higher order modes in coupled transmission lines are given.

Hybrids

1

A Thick Film Electronic Hybrid Coil, by L. N. Jackson (Royal Melbourne Institute of Technology, Melbourne, Victoria): *Proc. IREE (Australia)*, vol. 36, pp. 117–118, May 1975.

A thick-film microcircuit is described which can replace the conventional hybrid coil as a two-wire/four-wire converter in communication networks.

2

Wide-Band Stripline Reverse-Phase Hybrid Ring in GHz Band, by M. Aikawa (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi 238-03, Japan): *Trans. IECEJ*, vol. 58-B, pp. 521–528, October 1975.

The reverse-phase hybrid circuit is constructed by replacing the (3/4) wavelength line in a rat-race circuit by a $1:-1$ transformer (W. V. Tyminski *et al.*, *Proc. IRE*, Jan. 1953). It features a wide-band hybrid characteristics, but has been used only in UHF because the $1:-1$ transformer was not obtainable in higher frequencies. This paper overcomes this difficulty by using a new stripline circuitry.

Resonators and Filters

1

Small-Size Low-Loss Phase Shifter Built with Directional Coupler, by A. Takahashi (Yagi Antenna Co., Omiya-shi, 330 Japan), I. Otawara (Faculty of Engineering, Iwate University, Morioka-shi, 020 Japan), and R. Sato (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. 58-B, pp. 141–147, April 1975.

A new type of phase shifter is proposed, which uses very short (for example, (1/12) wavelength) coupled lines. A compact VHF variable phase shifter has been realized using this scheme.

2

Residual RF Surface Resistance of the Superconducting Resonator (Correspondence), by S. Washino, A. Takaoka, and K. Ura (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. 58-B, pp. 168–169, April 1975.

The residual RF surface resistance was measured as a function of magnetic field and frequency, by using a hairpin-type resonator.

3

Characteristics of a Window with Higher Mode Incidence in a Rectangular Waveguide, by K. Yanamoto (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. 58-B, pp. 261–268, June 1975.

In an exact analysis of waveguide bandpass filters using inductive windows, equivalent-circuit parameters of the window for higher mode incidence are required. This paper describes the analysis of the circuit parameters using variational method.

4

20 GHz and 30 GHz Transmit-Receive Filter Using Square Waveguide, by S. Shindo (Yokosuka Electrical Communication

Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. 58-B, pp. 513–520, October 1975.

A newly proposed transmit/receive filter for use in domestic satellite communication system is analyzed and experimented with. Bandwidth 3.5 GHz and insertion loss less than 0.75 dB have been obtained.

5

A Design Method of Waveguide Multi-Resonator Traveling-Wave Directional Filters (Correspondence), by H. Ishi and M. Kurono (Shimada Physical and Chemical Industrial Co., Ltd., Chofu-shi, 182 Japan): *Trans. IECEJ*, vol. 58-B, pp. 540–542, October 1975.

Application of the design technique of direct-coupled-resonator filters developed by S. B. Cohn to the multiresonator traveling-wave directional filter is discussed.

Ferrite Devices and Circuits

1

Magnetic Wave Propagation in Periodically Magnetized Ferrite, by M. Tsutsumi and Y. Yuki (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. 58-B, pp. 16–23, January 1975.

A theoretical treatise. Stability criteria, Brillouin curves, and bandpass characteristics are derived for two cases when the wave travels along and normal to the direction of magnetization.

2

Design of Small-Size Coaxial Attenuator Using Ferrite Cylinder, by Y. Kotsuka and K. Suetake (Department of Physical Electronics, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. 58-B, pp. 195–202, May 1975.

The optimum design of an attenuator consisting of a coaxial waveguide and a ferrite cylinder inserted between the inner and outer conductors is described. The broad-band conditions are discussed.

3

Temperature Stabilization of a 1.7 GHz-Band Lumped-Element Circulator, by H. Katoh, H. Takamizawa, and T. Itano (Central Research Lab., Nippon Electric Company, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. 58-B, pp. 464–471, September 1975.

Temperature compensation schemes and newly developed Ca–V garnet have been employed to improve the temperature stability. A circulator with insertion loss 0.95 dB and bandwidth 600 MHz (for 20-dB isolation) usable at $-10 \sim +60$ degree has been constructed at 1.7 GHz.

Piezoelectric Devices and Circuits

1

Reflection Symmetry and Normal Mode Orthogonality in the Two-Dimensional Piezoelectric Waveguide (Correspondence), by S. Sato and T. Makimoto (Faculty of Engineering Science, Osaka University, Toyonaki-shi, 560 Japan): *Trans. IECEJ*, vol. 58-B, pp. 256–257, May 1975.

A theoretical treatise. Conditions for obtaining the reciprocal characteristics are discussed and tabulated.

Elastic Waves

1

Mode Coupling and Conversion Caused by Interface Discontinuities of Elastic Surface Waveguide, by M. Hikita and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. 58-B, pp. 353–360, July 1975.

The propagation of elastic surface wave is critically affected by the surface discontinuities because the propagating energy is concentrated near the surface. In this paper the mode coupling and conversion due to surface and interface discontinuities are analyzed.

Waveguides

1

Optimum Structure and Bend Characteristics of Small Diameter Flexible Helix Waveguide, by I. Inada, T. Akimoto, T. Hayakawa, and N. Sugiyama (Telecommunication Division, Fujikura Cable Works, Ltd., Tokyo 135, Japan): *Trans. IECEJ*, vol. 58-B, pp. 148–155, April 1975.

A new type of flexible helix waveguide having relatively small diameter has been developed. It features slightly inductive wall impedance inside the waveguide; thus the mode-conversion loss at bends can be suppressed.

2

Reflected and Transmitted Waves in a Circular Plasma Waveguide, by K. Uchida (Fukuoka Institute of Technology, Fukuoka-shi, 811-02 Japan): *Trans. IECEJ*, vol. 58-B, pp. 664–670, December 1975.

A theoretical analysis. A system of simultaneous integral equations giving the reflection coefficients is derived, and is solved by using variational method.

3

The Admittance Characteristics of Longitudinal Shunt Slots in the Broad Face of Rectangular Waveguide, by B. N. Das and M. Sihna (Indian Institute of Technology, Kharagpur, India): *J. IETE (India)*, vol. 21, pp. 32–37, January 1975.

The slot admittance is computed from the complex radiation power at the slot. The result shows good agreement with experiment for slot lengths between 0.4–0.6 wavelength.

4

Mode Conversion in a Slightly Titled TE_{01} Mode Semicircular Waveguide, by D. C. Agarwal (Goethe Institute, 78 Frieburg, i.Br., Wilhelmstrasse 17, Freiburg, West Germany): *J. IETE (India)*, vol. 21, pp. 528–530, October 1975.

Expressions for the conversion coefficients for different modes are derived as a function of the bent angle and waveguide radius.

Transmission Lines

1

A Method for Analyzing Shielded Microstrip Lines, by T. Itoh (Dept. of Electrical Engineering, University of Illinois, Urbana, IL 61801, U.S.A.): *Trans. IECEJ*, vol. 58-B, pp. 24–29, January 1975.

A new method of analysis based upon the quasi-TEM approximation is described. The method features use of Galerkin's method and relatively short computer time required. Numerical examples are given.

2

Higher Order Modes in Coplanar-type Transmission Lines, by Y. Fujiki, Y. Hayashi, M. Suzuki, and T. Kitazawa (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. 58-B, pp. 61–67, February 1975.

Galerkin's method is used to derive the proper equation determining the propagation constant. The dispersion characteristics are obtained not only for the fundamental mode but also for hybrid, higher modes.

3

Characteristic Impedance of Rectangular Line with Circular Inner Conductor (Correspondence), by Y. Kami, H. Iwakura, and T. Arakawa (University of Electrocommunications, Chofu-shi, 182 Japan): *Trans. IECEJ*, pp. 166–167, April 1975.

A theoretical treatise. Conformal mapping technique and the extended image method are used in computing the characteristic impedance.

4

Analytical Method for Microstrip Line with Finite Thickness (Correspondence), by Y. Hayashi (Kitami Institute of Technology, Kitami-shi, 090 Japan), T. Kitazawa, Y. Fujiki, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. 58-B, pp. 354–355, May 1975.

A new method of analysis is presented which features the computation in the Fourier-transformed space.

5

Large Permittivity Microstrip Line, by S. N. Das (P.O. Box 19142, Washington DC 20036, U.S.A.): *J. IETE* (*India*), vol. 20, pp. 259–260, May 1975.

Properties of microstrips using large permittivity substrates such as $Pb_{0.315}Sr_{0.685}TiO_3$ are examined theoretically.

6

The Coupling of Modes in Three Dielectric Slab Waveguides, by K. Iwasaki, S. Kurazono, and K. Itakura (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. 58-C, pp. 443–450, August 1975.

A theoretical analysis. The characteristic equation is derived and solved numerically. Approximate analytical solutions are also given.

7

Dispersion Characteristics of Coplanar Waveguides (Correspondence), by K. Ogusu and K. Matsumoto (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan): *Trans. IECEJ*, vol. 58-B, pp. 420–421, August 1975.

The technique developed by Mittra and Itoh for the analysis of microstrips (*IEEE Trans. MTT*, Jan. 1971) is applied to a coplanar waveguide. This method features relatively short computer time.

8

Approximate Formulae for Microstrip Transmission Lines, by L. W. Cahill (Australian Post Office Research Laboratories, Melbourne): *Proc. IREE* (*Australia*), vol. 35, pp. 317–327, October 1974.

Some new approximate formulas for microstrip-line parameters are proposed, and their accuracy is investigated experimentally.

9

Analysis of the Coplanar Waveguide Characteristics by Conformal Mapping Method (Correspondence), by Y. Noguchi and N. Okamoto (Faculty of Science and Technology, Kinki University, Higashi-Osaka-shi, 577 Japan): *Trans. IECEJ*, vol. 58-B, pp. 679–680, December 1975.

The characteristic impedance is computed taking the finite width of ground plates into account.

Optical Waveguides

1

Optical Coupler between Thin-Film Light Waveguide and Optical Fiber, by T. Funayama and M. Nakamura (Fujitsu Laboratories, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. 58-C, pp. 49–56, February 1975.

A new type of the coupler is proposed and experimented with. A normally truncated tail of a multimode optical fiber is laid on a thin-film light waveguide, and they are fixed with viscous resin. Coupling efficiency above 70 percent can be obtained.

2

Propagation of Optical Beam Through Complex-Permittivity Lens-Like Medium, by S. Sawa (Faculty of Engineering, Ehime University, Matsuyama-shi, 790 Japan): *Trans. IECEJ*, vol. 58-B, pp. 133–140, April 1975.

Propagation of light beam in a lenslike medium having loss or gain variation in the transverse directions is discussed. Wave behavior in bent guides is considered as well as in straight ones.

3

Theoretical Study on Excitation of Clad Optical Fibers by a Cylindrical Gaussian Beam, by M. Miyagi, T. Yoneyama, and S. Nishida (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. 58-C, pp. 355–362, July 1975.

The excitation characteristics of a uniform-core fiber illuminated by an axially symmetric Gaussian beam is analyzed theoretically. Practical formulas for determining the coupling efficiency are derived.

4

Surface Waves along Nonlinear Dielectric Slab, by M. Miyagi and S. Nishida (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. 58-C, pp. 363–369, July 1975.

Propagation of surface waves along a nonlinear, self-focusing slab waveguide is discussed. The permittivity in the slab is assumed to be proportional to the mean square value of the electric field of the propagating light beam. The characteristic equation is derived, and is solved numerically.

5

Excitation of Optical Fiber Waveguides by Offset Laser Beams, by M. Imai (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. 58-C, pp. 370–375, July 1975.

The coupling efficiency is computed for the fundamental and higher order modes. The allowable offset displacement is computed in terms of the coupling efficiency required, core radius, and the beam-waist radius.

6

A Newly Developed Fiber Connector (Correspondence), by M. Honda and H. Kuwahara (Advanced Technology Laboratory, Fujitsu Laboratories, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. 58-C, pp. 416–417, July 1975.

A new type connector has been developed, in which a very precise machining process is needed only in finishing two stainless sleeves which cover both ends of the fiber to be connected. Average coupling loss obtained is 0.9 dB.

7

Beam Capacity Influenced by Mode Conversion in Lens Waveguide, by H. Nagashima and T. Egashira (Department of

Electronics, Kogakuin University, Tokyo, 160 Japan): *Trans. IECEJ*, vol. 58-C, pp. 524–531, September 1975.

The reduction of the maximum number of beams that can be transmitted in an optical-lens waveguide due to mode conversion is discussed. Numerical examples are presented.

8

Focusing Properties of Thin-Film Lenslike Light Guide, by Y. Suematsu, T. Kambayashi, and K. Furuya (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. 58-C, pp. 575–582, October 1975.

In the first half of this paper, analysis and design theory of a lenslike thin-film light waveguide are described. In the last half experiments are described; the focusing properties show good agreement with the theory.

9

Band Widening of Multimode Optical Fibers by Means of Mode Filters of External Higher-Refractive-Index Surrounding, by Y. Suematsu, J. Nayyer (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan), and H. Tokiwa (Department of Electronics Engineering, Kogakuin University, Tokyo, 160 Japan): *Trans. IECEJ*, vol. 58-C, pp. 639–646, November 1975.

A band-widening scheme for multimode optical fibers using mode filters inserted at certain intervals is proposed and discussed. The mode filter is a special optical-fiber section consisting of core, low refractive-index cladding, and high refractive-index outer surrounding. A numerical example indicates that the multimode dispersion can be reduced to a value comparable to the material dispersion.

10

Mode-Filter Characteristics of Lens-Like Medium with External-Higher-Index Surrounding, by K. Furuya and Y. Suematsu (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. 58-C, pp. 662–669, November 1975.

This paper deals with a mode filter similar to that described in the above paper (same issue, pp. 639–646), but consisting of a core with quadratic refractive-index distribution and high refractive-index cladding. The analysis is performed on a two-dimensional slab model.

Microwave Holography

1

A High-Speed Data Collection Method of Informations in Microwave Holography (Correspondence), by H. Shigesawa, K. Takiyama, and N. Kiriyama (Faculty of Engineering, Doshisha University, Kyoto-shi, 602 Japan): *Trans. IECEJ*, vol. 58-B, pp. 46–47, January 1975.

A new method is proposed in which a relatively small number of antennas are used, but the hologram information between them are supplemented by frequency-modulating the signal.

Measurement

1

Method of Improved Accuracy of Measurement of Q of Single-Port Microwave Cavities, by D. W. Griffin (The University of Adelaide): *Proc. IREE* (*Australia*), vol. 35, pp. 265–267, September 1974.

An improved method of achieving a measurement accuracy of 0.2 percent is described; this method is useful for studying material properties.

2

Measurement of the Z_0 of Microstrip Lines, by J. Brown (Imperial College, London), G. B. Babu, and Banmali (S.V.U. College of Engrg., Tirupati 517502, India): *J. IETE* (*India*), vol. 21, pp. 284–287, May 1975.

A method for determining Z_0 and propagation constant from S-matrix components is described. A simple, new technique is used in connecting the microstrip under test to the coaxial measuring setup.

3

Measurement of Admittance of Microwave Nonlinear Devices under the Effect of Harmonic Frequencies, by O. Kurita and S. Okamura (Faculty of Engineering, University of Tokyo, Tokyo, 113 Japan): *Trans. IECEJ*, vol. 58-B, pp. 427–434, September 1975.

The fundamental and second-harmonic signals are injected into the nonlinear device, and the reflection coefficients are measured as functions of the phase difference between two input signals. Thus some of the nonlinear properties can be measured. The proposed method is applied to a Gunn oscillator. The results are compared with computer simulations.

4

A Proposed Method for the Measurement of Coupled Microstrip Line Parameters, by G. B. Babu and Banmali (S.V.U. College of Engrg., Tirupati 517502, India): *J. IETE* (*India*), vol. 21, pp. 541–542, October 1975.

A new method based upon the even- and odd-mode analysis is described.

5

Radiometer Microwave Receiver for the Measurement of Atmospheric Attenuation at 11 and 14 GHz, by R. K. Flavin (Telecom Australia, Research Labs., Melbourne, Victoria): *Proc. IREE* (*Australia*), vol. 36, pp. 353–358, November 1975.

A dual-frequency microwave receiver has been built as part of a radiometer system used for rain-attenuation studies associated with satellite communications. A single antenna is used for 11 and 13 GHz. The system allows a theoretical sensitivity less than 1 K.