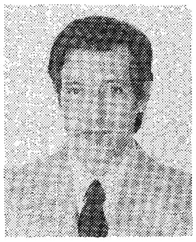

Mario Sannino was born in Cannobio, Novara, Italy, in 1940. He received the Ph.D. degree in electronic engineering in 1964 from the University of Palermo, Palermo, Italy, and the "Libera Docenza" in applied electronics in 1972.

He has been Assistant Professor of Applied Electronics at the University of Palermo since 1965. At present he is interested in noise characterization and measurements of solid-state microwave components, mathematical methods of nonlinear oscillation analysis, and digital instrumentation.

Dr. Sannino is a member of Associazione Elettrotecnica ed Elettronica Italiana (AEI).

Burkhard Schiek received the Diplom-Ingenieur and the Doktor-Ing. degrees in electrical engineering from the Technical University of Brunswick in 1964 and 1966, respectively.

From 1964 to 1969 he was an assistant at the institute for HF Technique at Brunswick, latterly working on m.i.s. interface physics and the development of MIS. varactors. Since 1969 he has been with the Microwave and Measuring Techniques Group of the Philips Research Laboratory Hamburg where he has mainly been concerned with the stabilization of solid-state oscillators, oscillator noise, and microwave integration. More recently he has been engaged in the development of microwave systems, among them a microwave spectroscopy system for gas analysis and microwave distance meters.

Volker Tulaja was born near Hamburg, Germany, on December 7, 1944. He received the Dipl. Ing. degree in electrical engineering from the Technical University of Brunswick, Germany, in 1972.

There he was a Research Assistant working in a project of the "Deutsche Forschungsgemeinschaft" on microwave filtering. Since 1975 he has been a Scientific Assistant at the Institute for General and Theoretical Electrical Engineering of the Fernuniversität Hagen, Germany.

P. N. Wlalker, photograph and biography not available at the time of publication.

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 Engineers (J. IE (India)), 4) Proceedings of the Institution of Radio and Electronics Engineers—Monitor (Proc. IREE (Australia)), and 5) Australian Telecommunication Research (ATR).

As for the Japanese papers in the Trans. IECEJ, which carry volume numbers J60B or J60C, 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 E60 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.

Field Theory and Electromagnetic Compatibility

1

Numerical Analysis of Scattering from Echelette Grating—Smoothing Process on Mode-Matching Method, by K. Yasuura, Y. Okuno (Faculty of Engineering, Kyushu University, Fukuoka-shi, 812 Japan), and H. Ikuno (Faculty of Engineering, Kumamoto University, Kumamoto-shi, 860 Japan): *Trans. IECEJ*, vol. J60-B, pp. 189–196, March 1977.

A new method of analysis is proposed in which the oscillatory solution given by summing up a finite number of modes is smoothed to assure proper matching with physical boundary conditions.

2

A Scattering Technique Using Phase Modulation for Measurement of Microwave Field Distribution (Correspondence), by E. Oka (Faculty of Engineering, Meiji University, Kawasaki-shi, 214 Japan) and Y. Soma (Oki Electric Industry Company, Tokyo, 105 Japan): *Trans. IECEJ*, vol. J60-B, pp. 289–290, April 1977.

A new method is proposed and experimented with, in which a small metallic plate is vibrated in the direction of the incident wave.

3

A Theoretical Analysis of Microwave Attenuation by Salt Water Droplets, by J. A. Bennet and R. C. Boston (Telecom Australia Res. Labs., Melbourne, Australia): *Monitor* (*Proc. IREE Aust.*), vol. 38, pp. 104–105, May 1977.

The situation considered often occurs during cyclones. It is found that the presence of salt water drops brings about a significant increase in attenuation at frequencies lower than 3.5 GHz.

4

Design Method of Electromagnetic Absorbing Walls with Resistive Sheets, by M. Takashima (Faculty of Technology, Tokyo University of Agriculture and Technology, Koganei-shi, 184 Japan): *Trans. IECEJ*, vol. J60-B, pp. 453–460, July 1977.

So far the design theory has been presented for 2-layer and 3-layer models. A new design principle is proposed and applied to 4-layer and 5-layer models.

Amplifiers and Oscillators

1

Rectangular-Waveguide-Type IMPATT-Diode Amplifiers, by S. Toyota (Osaka Institute of Technology, Osaka-shi, 535 Japan): *Trans. IECEJ*, vol. J60-B, pp. 25–31, January 1977.

Equivalent circuit of the amplifier is derived; computed characteristics show good agreement with experimental ones.

2

The Ridged-Waveguide Mount for Broad-Band Operation of Solid-State Devices, by S. Mizushina, H. Kondoh, N. Kuwabara (Research Institute of Electronics, Shizuoka University, Hamamatsu-shi, 432 Japan), and T. Ohsuka (Okazaki Technical High School, Okazaki-shi, 444 Japan); *Trans. IECEJ*, vol. J60-B, pp. 140–146, February 1977.

A resonant cavity consisting of a ridge waveguide and two shorting plungers is used in a Gunn oscillator, giving a tuning range of 8.5–26 GHz.

3

Output Spectra of Mutually but Asymmetrically Driven Oscillators (Correspondence), by I. Ohta (Department of Electronics, Himeji Institute of Technology, Himeji-shi, 671-22 Japan): *Trans. IECEJ*, vol. J60-B, pp. 216–217, March 1977.

A general theory is presented first, and is then used to explain various phenomena found in coupled oscillators (see H. L. Stover, *Proc. IEEE*, Feb. 1966).

4

An Inexpensive, Solid-State, 100 GHz Oscillator, by J. W. Archer and F. Eigenstetter (School of E.E., University of Sydney, Sydney, Australia): *Monitor* (*Proc. IREE Aust.*), vol. 38, pp. 78–89, April 1977.

Design and construction of an inexpensive IMPATT oscillator is described. Output power exceeds 20 mW in 95–105 GHz range.

5

Output Spectra of Unlocked Bilaterally Driven Oscillators, by K. Hayashi and Y. Ida (Faculty of Technology, Kanazawa University, Kanazawa-shi, 920 Japan): *Trans. IECEJ*, vol. J60-B, pp. 260–266, April 1977.

This paper deals with a subject similar to the above paper (I. Ohta, IECEJ, March 1977), but the coupling circuit is considered to be nonreciprocal. Experimental and theoretical frequency-pulling characteristics are compared.

6

Temperature Compensation of Gunn Oscillators by Dielectric Materials for Temperature Compensation (Correspondence), by T. Kanda (Nippon Electric Company, Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. J60-B, pp. 292–293, April 1977.

Frequency deviation as low as 2 MHz for $-50\sim+50$ C has been achieved in X-band.

7

A Novel Method of Modulation of Microwave Output from Gunn-Diode Oscillators Connected in Parallel, by S. Shinohara (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432, Japan) and Y. Okabe (Faculty of Engineering, University of Tokyo, Tokyo 113 Japan): *Trans. IECEJ*, vol. J60-B, pp. 313–319, May 1977.

Two oscillators, a varactor diode, and an external load are coupled to four ports of a microwave 3 dB coupler. With such a circuit configuration, keying of the output with a high on–off ratio (up to 45 dB) is possible. Proposal, theory, and experiment with Gunn oscillators are described.

8

Characteristics of 30 GHz-Band TWT High-Power Amplifier (Correspondence), by M. Nakamura, M. Kuramoto, and T. Saitoh (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 361–362, May 1977.

Design and performance of a high power (200 W) amplifier for use in satellite ground stations are described.

9

Broad-Band Low-Noise 20 GHz Parametric Amplifier (Correspondence), by M. Kuramoto, M, Kaji (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan), and M. Kajikawa (Satellite Communication Development Dept., Nippon Electric Company, Yokohama-shi, 226 Japan): *Trans. IECEJ*, vol. J60-B, pp. 363–364, May 1977.

Bandwidth of 2.5 GHz and noise temperature of 80 K have been obtained with a gas-helium-cooled PA.

10

Asymmetrical Parallel Running of Two Oscillators, by I. Ohta (Department of Electronics, Himeji Institute of Technology, Himeji-shi, 671-22 Japan) and F. Fukui (Faculty of Engineering, Okayama University, Okayama-shi, 700 Japan): *Trans. IECEJ*, vol. J60-B, pp. 403–410, June 1977.

The frequency range for synchronization, synchronized oscillation frequency, and output power are computed as functions of the phase shift in the coupling circuit, and compared with experiments with Gunn and IMPATT oscillators.

11

IMPATT and Gunn-Diode Varactor-Tuned Wide-Band Oscillators Using a Rectangular Waveguide, by S. Toyota (Osaka Institute of Technology, Osaka-shi, 535 Japan): *Trans. IECEJ*, vol. J60-B, pp. 427–433, June 1977.

Two kinds of mounting structures are proposed and experimented with. Tuning range of 8–12 GHz is obtained with the IMPATT oscillator.

12

Wide-Band Varactor-Tuned Waveguide Oscillator (Correspondence), by S. Toyota (Osaka Institute of Technology, Osaka-shi, 535 Japan): *Trans. IECEJ*, vol. J60-B, pp. 526–527, July 1977.

Tunable bandwidth (6.5–13.5 GHz) wider than that reported by the same author (IECEJ, June 1977) is obtained with a waveguide-type Gunn oscillator.

13

Varactor-Tuned X-Band IMPATT and Gunn-Diode Oscillators, by S. Toyota (Osaka Institute of Technology, Osaka-shi, 535 Japan), and Y. Sugio (Setunan University, Neyagawa-shi, 572 Japan): *Trans. IECEJ*, vol. J60-B, pp. 575–582, August 1977.

This paper deals with an oscillator structure somewhat different from the above papers No. 11 and No. 12; the IMPATT or Gunn device is connected in series (for microwave frequencies) with a varactor diode and mounted in a reduced-height waveguide. Tuning range of 2.2 GHz is obtained in X-band.

14

Waveguide-Type K-Band Oscillator with GaAs FET (Correspondence), by K. Suzuki (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 595–596, August 1977.

A wide tuning range of 14–21 GHz and 14.6 percent power efficiency at 18 GHz are obtained.

15

Output Power of GaAs FET Amplifier and Its Circuit Condition (Correspondence), by T. Kouno, Y. Arai, and H. Komizo (Fujitsu Laboratories, Ltd., Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. J60-B, pp. 680–682, September 1977.

Nonlinear characteristics in the output impedance of FET is considered in connection with the optimum circuit design.

16

20 GHz FET Amplifier (Correspondence), by M. Kitamura, S. Fukuda, and I. Haga (Microwave and Satellite Communications Division, Nippon Electric Company, Yokohama-shi, 226 Japan): *Trans. IECEJ*, vol. J60-B, pp. 685–687, Sept. 1977.

Half-micron gate GaAs FET (NEC-V388) is used to make a 20 GHz amplifier having 10 dB gain and 2.5 GHz bandwidth.

17

Analysis of Characteristics of IMPATT Diode Under the Influence of Harmonic Frequencies, by M. Naruse and S. Okamura (Faculty of Engineering, University of Tokyo, Tokyo, 113 Japan): *Trans. IECEJ*, vol. J60-B, pp. 698–704, October 1977.

Oscillation characteristics of a 10 GHz IMPATT oscillator is analyzed taking into account the effect of harmonic frequency components.

18

Broadband IMPATT-Diode Amplifiers, by H. Suzuki, K. Tajima, and O. Kurita (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 916–923, December 1977.

Design procedure aiming at broadband characteristics is described, and actual design and experiment of a 20 GHz amplifier are shown. Maximum gain of 10- dB and 3-dB bandwidth of 1.8 GHz are obtained.

Modulators, Converters, Detectors, and Phase Shifters

1

High Speed Ferrite-Core Ring Modulator in Microwave Region (Correspondence), by K. Yanagimoto (Ibaraki Electrical Communication Laboratory, N.T.T., Tokai, 319-11 Japan), T. Nakamura, and S. Seki (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 150–151, February 1977.

A ring modulator operating at 3 GHz carrier frequency and 1.6 G bit/s pulse rate has been constructed successfully.

2

A High-Speed Balanced Modulator Composed of Slot Lines, by T. Matsumoto and M. Aikawa (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 350–357, May 1977.

A new circuit configuration is proposed and experimented with at 6 GHz carrier frequency. Rise and fall times of 150 ps are obtained assuring modulation rate of 2G bit/s. When used as a demodulator, the 3-dB bandwidth is 6 ± 3.2 GHz.

3

Measurement of Equivalent Circuit Constants of a Waveguide-Wafer-Type Diode by the Matched-Terminator Method, by K. Ohnishi and M. Akaike (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 379–386, June 1977.

A new method of the measurement named "matched-terminator method" is proposed, and applied to a GaAs Schottky-barrier diode mounted on a waveguide wafer for 60 GHz band.

4

A Design Theory for Wide-Band Mixers in the Short Millimeter Wavelengths Region and an Application to a 120-GHz Mixer, by R. Kawasaki and M. Akaike (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 387–394, June 1977.

A design theory for the mixer using GaAs Schottky-barrier diode mounted on a waveguide wafer is presented, and applied to 120-GHz band mixer. Conversion loss of 9.2 ± 0.7 dB has been achieved in 90–120 GHz.

5

Widening of Frequency Bandwidth in Transmission-Line-Type Phase Shifter, by I. Otawara (Faculty of Engineering, Iwate University, Morioka-shi, 020 Japan), A. Takahashi (Yagi Antenna Co., Omiya-shi, 330 Japan), and R. Sato (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J60-B, pp. 492–498, July 1977.

Two novel widebanding schemes are proposed and the design theories are presented.

6

Analytical and Numerical Studies of Diode Phase Shifters with Reduced Drive Power, by T. Yahara, Y. Kadowaki, and H. Miki (Central Research Laboratory, Mitsubishi Electric Corp., Amagasaki-shi, 661 Japan): *Trans. IECEJ*, vol. E60, pp. 391–398, August 1977.

The optimum circuit-design technique is developed for reducing the driving power, and used in the fabrication of X-band 4-bit MIC phase shifter using a PIN diode. The maximum driving power is 0.81 W.

7

Millimeter-Wave Converters Using Packaged Diodes (Correspondence), by R. Kawasaki (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan), H. Ishihara, Y. Horiguchi, and S. Kitazume (Nippon Electric Company, Yokohama-shi, 226 Japan): *Trans. IECEJ*, vol. J60-B, pp. 901–903, November 1977.

Report of development of 60–80 GHz receiving converters (minimum loss: 4 dB) and 50 GHz transmitting converters (maximum output: 14 dBm).

Couplers and Filters

1

A Constant-Resistance Power Divider Using Coupled Lines and Its Optimum Design for Wide Bandwidth Case, by I. Sakagumi (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan), M. Tamori (Research and Development Laboratories, KDD, Tokyo, 153 Japan), and K. Hatori (Research Institute of Applied Electricity, Hokkaido University): *Trans. IECEJ*, vol. J60-B, pp. 47–54, January 1977.

A new dividing circuit having a completely planar structure (without crossover connections) is proposed, analysed, and experimented with. Widebanding schemes are discussed. Theory and experiment show good agreement.

2

Considerations on n-Way Hybrid Power Dividers Using Coupled Multiwire Lines, by N. Nagai and E. Maekawa (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-B, pp. 157–164, March 1977.

Modifications of the basic circuit configurations proposed by Wilkinson are discussed. Proposals and theoretical analyses.

3

Metallic Wall Circular Arc Polygonal-Type TE_{0n}-mode Filter, by K. Inada (Fujikura Cable Works, Ltd., Tokyo, 135 Japan) and T. Hayakawa (Fujikura Cable Works, Ltd., Sakura-shi, 285 Japan): *Trans. IECEJ*, vol. J60-B, pp. 173–180, March 1977.

A new mode filter is proposed, which is a modification of the polygonal-type TE_{0n}-mode filter proposed by the same authors (IECEJ, July 1976). In the new scheme the wall is metallic, and the deformation from circular crossection is given as a function of axial coordinate.

4

Microstrip-Line Directional Coupler with Tight Coupling and High Directivity, by M. Aikawa (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 253–259, April 1977.

In microstrip directional couplers, the difference between the phase velocities of even and odd modes often limits the directivity. This paper proposes a new scheme in which a slot is made on the ground conductor of the microstrip coupler for the velocity match. The slot is useful also for making the coupling closer. Experimental 3 dB, 4 dB, and 8 dB couplers show excellent octave-band characteristics.

5

A Coplanar Power Divider (Correspondence), by T. Matsumoto (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 525–526, July 1977.

A new coplanar-type, multistage structure is proposed and experimented with. Octave bandwidth is obtained.

6

N-Way Planar Hybrid Power Dividers by New Synthesis Method, (Correspondence), by E. Maekawa, K. Ono, N. Nagai, and K. Mizuno (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-B, pp. 621–628, September 1977.

This paper is an extention of the above paper No. 2 by the same authors. Circuit configurations permitting completely planar arrangement (without crossover connections) are proposed and experimented with successfully. Theory and experiment show good agreement.

7

Empirical Studies of Interdigitated Directional Coupler (Correspondence), by T. Yahara (LSI Development Center, Mitsubishi Electric Corp., Itami-shi, 664 Japan), M. Nakatani, and Y. Kadowaki (Central Research Laboratory, Mitsubishi Electric Corp., Amagasaki-shi, 661 Japan): *Trans. IECEJ*, vol. J60-B, pp. 779–780, October 1977.

Relation between the geometrical tolerances and performance of interdigitated directional coupler (see J. Lange, *IEEE Trans.* MTT, Dec. 1969) is studied experimentally.

8

Prism-Type Variable Coupler for Millimeter Wave Dielectric Waveguide (Correspondence), by S. Kurazono, S. Shiomi, and T. Yoshimura (Faculty of Engineering, Osaka University, Suita-shi, 505 Japan): *Trans. IECEJ*, vol. J60-B, December 1977.

The diffraction theory is used to derive the theoretical characteristics, and those are compared with experiments, showing good agreement.

Ferrite and Acoustic Devices

1

Variable Coaxial Attenuator Using Ferrite Cylinder, by Y. Kotsuka (Faculty of Engineering, Tokai University, Tokyo 151 Japan): *Trans. IECEJ*, vol. J60-B, pp. 17–24, January 1977.

A new type of variable microwave attenuator is proposed, in which a thin metallic cylinder slides inside a ferrite cylinder embedded in the outer conductor of a coaxial line. Attenuation of 0–19 dB is obtained at 1–4 GHz with VSWR below 1.2.

2

Theory of Matching Section Obliquely Cut Ferrite Cylinder for Coaxial Attenuator, by Y. Kotsuka (Faculty of Engineering, Tokai University, Tokyo 151 Japan), Y. Shimizu, and K. Suetake (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. J60-B, pp. 117–124. February 1977.

The optimum design theory of the tapered matching section in variable coaxial attenuator using ferrite cylinder proposed by the same authors is presented. Theory and experiment show good agreement.

3

Characteristics of Magnetostatic Modes of a Ferrimagnetic Slab Magnetized in an Arbitrary Direction, by N. Okamoto (Department of Electronic Engineering, Kinki University, Higashi-Osaka-shi, 577 Japan): *Trans. IECEJ*, vol. J60-B, pp. 181–188, March 1977.

Transmission characteristics are analysed in terms of the direction of magnetization. The dispersion formula is derived and conditions for the volume and surface modes are discussed.

4

A Study on the Dispersive Characteristics of the Magnetostatic Surface Waves (Correspondence), by M. Tsutsumi (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J60-B, p. 212, March 1977.

To suppress the strong frequency dispersion, a method is proposed in which the saturation magnetization varies as a function of the depth from the YIG surface.

5

Microwave-Network Methods for (Analysis of) Guided Magnetoelastic Waves (Correspondence), by M. Koshiba, H. Wada (Kitami Institute of Technology, Kitami-shi, 090 Japan), and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-B, pp. 364–365, May 1977.

Expressions for mode functions, characteristic impedance, and propagation constants are derived.

6

On the Miniaturization of a Stripline Circulator, by H. Kurebayashi and N. Orime (Kamakura Works, Mitsubishi Electric Corp., Kamakura-shi, 247 Japan): *Trans. IECEJ*, vol. J60-B, pp. 427–334, May 1977.

The size of UHF circulators can be reduced by providing three folded transmission-line sections between the center disk and terminals. Theory and experiment.

7

Validity of Magnetostatic Approximations in Transversely Magnetized Ferrimagnetic Rectangular Rod and Its Application to Magnetostatic Analogue Phase Corrector, by E. Sawado and N. Ogasawara (Faculty of Engineering, Tokyo Metropolitan University, Tokyo, 158 Japan): *Trans. IECEJ*, vol. J60-B, pp. 705–711, October 1977.

The first purpose of this work is the experimental verification of the dispersion characteristics reported previously by the same authors. The second is to construct an analog phase corrector; bandwidth of 100 MHz and dispersion of 10 nsec/cm have been obtained at 3 GHz.

8

Edge-Guided Mode Resonance Isolator Using the Both-Side-Edge Open Stripline—Mode Characterization and the Discussion about Frequency Bandwidth, by T. Noguchi (Central research Laboratories, Nippon Electric Company, Kawasaki-shi, 213 Japan): *Trans. IECEJ*, vol. J60-B, pp. 736–742, October 1977.

Isolation greater than 25 dB and insersion loss lower than 1 dB are achieved in entire 4–8 GHz band. Theory and experiment.

9

Equivalent Network Representation for SH-Type Magnetoelastic Wave Propagation in a Composite System Consisting of Ferrite and Semiconductor (Correspondence), by M. Kobayashi (Kitami Institute of Technology, Kitami-shi 090 Japan), H. Wada, and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-B, pp. 778–779, October 1977.

A theoretical analysis leading to an equivalent circuit representation.

10

The Magnetostatic Surface-Wave Propagation in a Corrugated YIG Slab (Correspondence), by Y. Sakaguchi, M. Tsutsumi, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan): *Trans. IECEJ*, vol. J60-B, pp. 897–899, November 1977.

The Brillouin characteristics are computed numerically; it is found that the surface magnetostatic wave is influenced by the corrugation more strongly than the bulk magnetostatic wave.

11

Methods of a Transmission-Line Model for SH-Type Guided Elastic Waves in a Composite System Consisting of Magnetoelastic and Piezoelectric Media (Correspondence), by H. Wada and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-B, pp. 899–901, November 1977.

A theoretical analysis leading to an equivalent-circuit representation.

Transmission Lines and Waveguides

1

Analysis of Dielectric Waveguides by Generalized Telegraphist's Equations, by K. Ogusu and K. Hongo (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan): *Trans. IECEJ*, vol. J60-B, pp. 9–16, January 1977.

A new method of generalized analysis is presented. It is a kind of Galerkin's method and is applicable to arbitrary cross sectional shape and permittivity distribution. Numerical solutions for rectangular guides are shown.

2

Analysis of TE_{01} Mode Attenuation in Millimeter Waveguide Line, by F. Nihei and S. Hatano (Ibaraki Electrical Communication Laboratory, N.T.T., Tokai, 319-11 Japan): *Trans. IECEJ*, vol. J60-B, pp. 93–100, February 1977.

Precise estimation of the attenuation became possible by using measured data of the resistivity of the inner surface of the waveguide, geometrical imperfections, and jointing imperfections. Measured and computed attenuation showed very little difference (<7 percent) in 40–87 GHz.

3

Upper and Lower Bounds on the Line Parameters of Strip Transmission Lines, by T. Sugiura (Central Research Laboratories, Nippon Electric Company, Kawasaki-shi, 211 Japan): *Trans. IECEJ*, vol. J60-B, pp. 165–172, March 1977.

A variational expression has been derived for the upper and lower bounds of the capacitance and inductance of a shielded striplines.

4

An Analysis of Coplanar-Type Strip Transmission Lines by Conformal Mapping (Correspondence), by I. Sakagami, K. Ono, S. Yajima, N. Nagai, and K. Hatori (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan). *Trans. IECEJ*, vol. J60-B, pp. 213–214, March 1977.

Design formulas are derived and numerical solutions for the line impedance are given for practical ranges of parameters.

5

Experimental Investigation of Dispersion Characteristics in Rectangular Dielectric Waveguides (Correspondence), by K. Ogusu and K. Hongo (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan). *Trans. IECEJ*, vol. J60-B, pp. 358–359, 1977.

Experiment is performed to substantiate the analysis by the same authors (IECEJ, Jan. 1977), showing good agreement with the analysis.

6

A Ferrite-Loaded Rectangular Waveguide with Two Inductive Irises (Correspondence), by S. Matsunaga (Kushiro Technical College, Kushiro-shi, 084 Japan) and M. Suzuki (Faculty of

Engineering, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-B, pp. 448–449, June 1977.

An approximate equivalent-circuit representation is derived. A theoretical analysis.

7

Mode Coupling and Attenuation by Resistive Sheets in Circular Waveguide, by S. Seikai (Ibaraki Electrical Communication Laboratory, N.T.T., Tokai, 319-11 Japan): *Trans. IECEJ*, vol. J60-B, pp. 499–506, July 1977.

Coupled mode equations for a circular waveguide in which resistive sheets are placed along radial directions are derived. The computed attenuation characteristics for TE_{11} mode shows agreement with experiment much better than conventional theories neglecting the intermodal coupling.

8

Analysis of an Open Waveguide by Computer (Correspondence), by K. Yamamoto and M. Nakayama (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-B, pp. 523–524, July 1977.

Variational method is used in the analysis of the field configuration and propagation characteristics of the "grooved guide."

9

Analysis of Characteristics of the Shielded-Coplanar Waveguide by Conformal Mapping Method, by Y. Noguchi and N. Okamoto (Faculty of Science and Technology, Kinki University, Higashi-Osaka-shi, 577 Japan): *Trans. IECEJ*, vol. J60-B, pp. 561–566, August 1977.

Design formulas are derived and numerical solutions of the characteristic impedance and phase velocity are given. Results are used in designing experimental waveguides used in 1–2 GHz band.

10

Helical Transmission Line Having a Dielectric-Coated Inner Conductor, by M. Kuroda (School of Science and Engineering, Waseda University, Tokyo, 160 Japan): *Trans. IECEJ*, vol. J60-B, pp. 805–811, November 1977.

The dispersion characteristics, attenuation constant and characteristic impedance are derived in terms of design parameters. Tape helix is assumed. Theoretical analysis.

Optical Fibers

1

Transmission Characteristics of Metal-Shielded Optical Fiber Waveguide (Correspondence), by M. Kudo and Y. Mushiake (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J60-C, pp. 54–55, January 1977.

It is concluded that such a structure might be useful as a higher-mode rejection filter. Theoretical analysis.

2

Transmission Characteristics of the Incoherent Chirp Pulse Through a Multimode Optical Fiber, by T. Fukumoto (Matsushita Electric Industrial Company, Kadoma-shi, 238-03 Japan) and T. Suzuki (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-C, pp. 125–132, March 1977.

The optical pulse width at the receiving end can be reduced by the chirping. Proposal and theoretical analysis.

3

Launching and Connection Characteristics of Multimode W-Type Optical Fibers (Correspondence), by T. Tanaka, S. Onoda, S. Yamada, and M. Sumi (Central Research Laboratory, Hitachi, Ltd., Kokubunji-shi, 185 Japan): *Trans. IECEJ*, vol. J60-C, pp. 254–256, April 1977.

Loss-versus-distance characteristics of a fiber system including a connection are investigated experimentally.

4

Propagation Properties of Eigen-Modes in Coupled Transmission Lines with Random Coupling, by T. Miyake and N. Yamauchi (Faculty of Engineering, Nagoya Institute of Technology, Nagoya-shi, 466 Japan): *Trans. IECEJ*, vol. J60-C, pp. 278–286, May 1977.

A generalized coupled mode theory is presented; the transmission characteristics are derived in terms of the statistical parameters of the coupling between lines.

5

An Optimum Condition in Diffusion-Exchange and Heat-Treatment Process for Low Aberration Focusing Fiber, by K. Iga, N. Yamamoto, and Y. Matsuura (Research Laboratory of Precision Machinery and Electronics, Tokyo Institute of Technology, Yokohama-shi, 227 Japan): *Trans. IECEJ*, vol. E60, pp. 239–240, May 1977.

It is shown that the fourth and sixth order terms of the refractive index profile can be optimized by an additional heat treatment.

6

Transmission Theory of Multimode Fibers Based Upon a Perturbation Method, by M. Koyama and I. Kobayashi (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-C, pp. 395–402, June 1977.

Perturbation method is applied to solve the coupled power equation proposed by D. Marcuse for expressing the intermodal coupling phenomena in multimode optical fibers. Physical implications of the zeroth, first, and second order solutions are clarified. Theoretical and experimental loss-versus-bandwidth relations show good agreement.

7

Effect of Mechanical Stress on the Transmission Characteristics of Optical Fiber, by Y. Namihira, M. Kudo, and Y. Mushiake (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J60-C, pp. 391–398, July 1977.

It is found that when pressure is applied in one direction normal to the axis, a wave component polarized in the direction normal to the original one is generated due to the anisotropy produced by the internal stress.

8

The Effects of Excitation Conditions on Fiber Launching and Coupling Losses, by G. P. Kidd (Telecom Australia Res. Labs., Melbourne, Australia): ATR (Aust. Telecom. Res.), vol. 11, no. 3, pp. 4–12, 1977.

Geometrical optics is used to calculate the launching and coupling losses between source and fiber or between two fibers for various practical source and fiber parameters.

9

Optical Power Flow in Bent Step Index Fibers, by M. Tateda and M. Ikeda (Ibaraki Electrical Communication Laboratory, N.T.T., Tokai, 319-11 Japan): *Trans. IECEJ*, vol. E60. pp. 623–628, November 1977.

Geometrical optics is used to analyze the power flow, under assumptions that mode conversion takes place at joints between straight and bent portions. The measured power distribution among modes shows good agreement with the theory.

Optical Waveguides Other Than Fibers

1

Radiation-Coupling Loss in Semi-Leaky Type Thin-Film Optical Waveguide Mode Filter (Correspondence) by S. Yamamoto, H. Hirai, and T. Makimoto (Faculty of Engineering Science, Osaka University, Toyanaka-shi, 560 Japan): *Trans. IECEJ*, vol. J60-C, January 1977.

The radiation loss is computed from the coupling coefficient with the radiation mode. Theoretical analysis.

2

Analysis of Guided Radiation Mode Coupling in Semi-Leaky Type Thin-Film Optical Waveguides with Application to Modulators and Nonreciprocal Devices, by S. Yamamoto, Y. Okamura, H. Hirai, and T. Makimoto (Faculty of Engineering Science, Osaka University, Toyonaka-shi, 560 Japan): *Trans. IECEJ*, vol. J60-C, pp. 98–105, February 1977.

The former half is the theoretical analysis. In the latter half, designs of an electro-optical light modulator using $LiNbO_3$ waveguide and a magneto-optic modulator/isolator using $LiNbO_3$/YIG/GGG are shown.

3

Refractive Index Profile Determination in Optical Waveguides, by P. V. H. Sabine (Telecom Australia Res. Labs., Melbourne, Australia): ATR (Aust. Telecom. Res.), vol. 11, no. 2, pp. 3–13, 1977.

The former half of this paper reviews available measuring techniques. The latter half describes results of measurement on stress-induced channel optical waveguides proposed by the same author (see *Electron. Lett.*, October 1975 and March 1976).

4

Mode Analysis of Diffused Optical Waveguides by a Variational Method (Correspondence), by M. Geshiro, M. Matsuhara, N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan), and M. Otaka (Faculty of Engineering, Fukui University, Fukui-shi, 910 Japan): *Trans. IECEJ*, vol. J60-C, pp. 256–257, April 1977.

Dispersion characteristics and field distribution are computed. Theoretical analysis.

5

An Exact Numerical Analysis of the diffused Optical Waveguides for Measurement of Diffusion Parameters, by H. Kawanishi and Y. Suematsu (Tokyo Institute of Technology, Tokyo, 152 Japan): *Trans. IECEJ*, vol. E60, pp. 231–236, May 1977.

In the former half, the numerical analysis based upon the staircase approximation is presented. In the latter half, diffusion parameters of doped ions is estimated by comparing the measured and computed transmission characteristics of the waveguide.

6

Radiation Loss Caused by Refractive Index Fluctuations in a Symmetric-Slab Optical Waveguide, by S. Miyanaga, M. Imai, and T. Sakura (Research Institute of Applied Electricity, Hokkaido University, Sapporo-shi, 060 Japan): *Trans. IECEJ*, vol. J60-C, pp. 343–350, June 1977.

Radiation loss associated with forward and backward scattering is computed in terms of the correlation length of the fluctuation, waveguide thickness, and index difference between guide and substrate.

7

Radiation and Propagation Along a Uniformly Curved Slab Waveguide, by Y. Takuma, S. Kawakami, and S. Nishida (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan): *Trans. IECEJ*, vol. J60-C, pp. 706–713, November 1977.

Numerical analyses are performed for the displacement of the field distribution, variation of the propagation constant, loss due to bending, and mode-conversion loss at the junction between bent and straight portions of the waveguide.

Optical Components and Optical Integrated Circuits

1

Phase Tuning in Optical Directional Coupler by Loading Chalcogenide Glass Films (Correspondence), by O. Mikami and H. Noda (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan): *Trans. IECEJ*, vol. J60-C, pp. 121–122, February 1977.

The light-induced refractive-index variation of chalcogenide glass is used for controlling the phase match. Proposal and theoretical analysis.

2

Optical Branch for Optical Data Distribution (Correspondence), by T. Matsui, N. Tsukada, and T. Nakayama (Central Research Laboratory, Mitsubishi Electric Corp., Amagasaki-shi, 661 Japan): *Trans. IECEJ*, vol. E60, pp. 133–134, March 1977.

A simple construction is proposed and experimented with. Two fibers are glued together and third fiber is jointed to the end of those glued fibers.

3

Optical Branch Using Graded-Index Rods, by T. Matsui, N. Tsukada, and T. Nakayama (Central Research Laboratory, Mitsubishi Electric Corp., Amagasaki-shi, 661 Japan): *Trans. IECEJ*, vol. E60, pp. 347–350, July 1977.

A new structure is proposed and experimented with. The insersion loss and dividing ratio are 1.1 dB and 1.00:0.98, respectively.

4

A Proposed Integrated-Optical Device for Hadamard Transformation (Correspondence), by T. Tsutsumi and T. Sueta (Faculty of Engineering Science, Osaka University, Toyonaka-shi, 560 Japan): *Trans. IECEJ*, vol. J60-C, pp. 500–502, August 1977.

A new device is proposed in which directional couplers and phase shifters are inserted between parallel optical waveguides.

Measurements

1

An Optical-Fiber Mode-Analyzer Using the Refraction From the Oblique Section, by K. Iga and Y. Kokubun (Research Laboratory of Precision Machinery and Electronics, Tokyo Institute of Technology, Yokohama-shi, 227 Japan): *Trans. IECEJ*, vol. E60, pp. 1–7, January 1977.

A simple, new type of mode analyzer is proposed and experimented with.

2

Measurement of Optical Fiber Transfer Functions Based Upon the Swept-Frequency Technique, by I. Kobayashi, M. Koyama, and K. Aoyama (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan): *Trans. IECEJ*, vol. J60-C, pp. 243–250, April 1977.

The technique for measuring the baseband frequency response of a multimode fiber by sweeping the modulation frequency of a CW laser transmitter is described. Characteristics obtained with uniform-core multimode fibers are presented.

3

Precise Measurement of the Refractive Index Profile of Optical Fibers by a Nondestructive Interference Method, by Y. Kokubun and K. Iga (Research Laboratory of Precision Machinery and Electronics, Tokyo Institute of Technology, Yokohama-shi, 227 Japan): *Trans. IECEJ*, vol. E60, pp. 702–707, December 1977.

The accuracy of the transverse interference method is improved by fully correcting the effect of the refraction of the probing ray due to the index gradient in the fiber. Computer simulations are performed to investigate the accuracy.

Microwave and Optical Systems

1

Optical Transmission Experiments at 400 MB, by T. Ito and S. Machida (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi 180 Japan): *Trans. IECEJ*, vol. E60, pp. 123–130, March 1977.

A feasibility study of a high-speed PCM optical communication system. Requirements for modulator and receiver amplifier are discussed. It is concluded that the repeater spacing can be 5 km with graded-index multimode fibers and 5.9 km with single-mode fibers.

2

Optical Communications, by M. V. Thyagarajan (Indian Army): Jour. of the Inst. of Engineers (India), vol. 58, Part ET-1, pp. 28–30, August 1977.

Present state-of-the-art and future prospects are reviewed.