Overseas Abstracts

PAPERS FROM JOURNALS PUBLISHED IN AUSTRALIA, INDIA, AND JAPAN

Compiled by Prof. T. Okoshi, Department of Electronic Engineering, University of Tokyo. Microwave Abstracts from Asia will henceforth include papers from Australian and Indian journals. The Abstracts Editor (T. Okoshi) acknowledges the advice given by Prof. A. E. Karbowiak of the University of New South Wales, Sydney, and Dr. V. P. Kodali, Department of Electronics, Government of India, New Delhi. However, this time the collection from Australian and Indian journals is still poor because some important journals were not available in Tokyo. It will be improved in the next issue in which these Overseas Abstracts appear.

As for the Japanese papers in Trans. IECEJ (Institute of Electronics and Communication Engineers of Japan), two-page English summaries (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. Full Translations will be found, with some delay, in Electronics and Communications in Japan published by Scripta Publishing Company, 1511 K. Street, N.W., Washington, D. C. 20005.

1

The Concept and Performance of Wideband Solidstate Microwave Oscillator Having Automatic Frequency Control, by A. K. Bindra *et al.*, (Tata Institute of Fundamental Research, Bombay 5, India); *J. Inst. Electron. Telecommun. Eng.* (India), vol. 19, pp. 358–365, July 1973.

The concepts pertaining to the design of a wide-band microwave oscillator using step-recovery diode harmonic generators are described. Two different automatic frequency control and locking networks have been developed for use in this oscillator.

2

Optimal Microwave System Parameters for Long Range Radars, by R. K. Arora and V. P. Kodali (Tata Institute of Fundamental Research, Bombay 5, India); *J. Inst. Electron. Telecommun. Eng.* (India), vol. 19, pp. 428–437, Aug. 1973.

Considerations pertaining to the parameters of a tracking radar are described and an optimum set of the system parameters for long-range capability are derived.

3

Simple Structure for Microwave Signal Mixing: Their Design and Evaluation, by R. K. Arora (Tata Institute of Fundamental Research, Bombay 400005, India), V. P. Kodali (Department of Electronics, Government of India, New Delhi 110011, India) *et al.*; *J. Inst. Electron. and Telecommun. Eng.* (India), vol. 19, pp. 567–571, Oct. 1973.

Design concepts and performance evaluation of a structurally simple microwave broad-band balanced mixer are given.

4

Circular TE_{0n}-Mode Filters for Millimeter-Wave Communication System, by K. Hashimoto (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ*, vol. 57-B, pp. 37–44, Jan. 1974.

The TE_{0n}-mode filters are inevitable in millimeter-wave communication systems in the cities because the waveguides could not be straight. This paper describes a new type of mode filter featuring (1) simple and short (60–70-cm) structure, and (2) wide frequency band (40–80 GHz).

5

Equivalent Circuit of Inductive Strip, by Y. Konishi and K. Uenakada (NHK Technical Research Laboratories, Tokyo, 157 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 46–48, Jan. 1974.

Determination of the equivalent circuit parameters of inductive strips mounted perpendicularly at the center of a TE_{10}-mode rectangular waveguide is described. This work is related to the following paper.

6

Design of Mounted-Planar-Circuit-Type Filter with Inductive Strips, by Y. Konishi and K. Uenakada (NHK Technical Research Laboratories, Tokyo, 157 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 48–49, Jan. 1974.

The design of a bandpass filter by using the equivalent circuit parameters derived in the preceding paper is discussed. Such circuitry has been devised by one of the authors principally for use in cheap microwave TV receivers for satellite TV broadcast in the future.

7

Conductive Wall Effect on Walker Modes in the Cavity Containing a Ferrite Sphere, by T. Yoshida and M. Umeno (Faculty of Engineering, Nagoya University, Nagoya-shi, 464 Japan); *Trans. IECEJ*, vol. 57-B, pp. 49–51, Jan. 1974.

The effect of the presence of a conductive wall near the ferrite sample on the ferromagnetic resonance characteristics is analyzed.

8

Experiments of the Si-p^+np^+ BARITT Diode Amplifier, by K. Okazaki, S. Chang, and Y. Matsuo (Institute of Scientific and Industrial Research, Osaka University, Suita-shi, 565 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 54–56, Jan. 1974.

A reflection-type amplifier giving 10-dB gain, 1-mW saturation power, and 10-MHz bandwidth at X band is described.

9

Band-Reflection-Type Cavity-Stabilized Gunn Oscillator, by K. Kohiyama and K. Momma (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ*, vol. 57-B, pp. 98–105, Feb. 1974.

A new stabilization technique has been devised. It features a matched termination at the rear end of a Gunn-diode-mounted waveguide section and a stabilizing cavity coupled to the waveguide between the termination and the diode. An experimental oscillator showed a frequency stability of 2×10^{-6}/degree.

10

Broadband Negative Resistance Amplifier Using Ladder Circuit, by S. Toyota and H. Okuno (Department of Electrical Engineering, the Osaka Institute of Technology, Osaka-shi, 535 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 143–144, Feb. 1974.

The possibility of a tunnel-diode amplifier giving 18-dB gain and an almost octave bandwidth with 0.5-dB gain ripple is demonstrated theoretically.

11

18–31-GHz Transmit-Receive Filter Using Square Waveguide, by S. Shindo (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 144–146, Feb. 1974.

A filter for separating 20-GHz and 30-GHz bands for use in the future millimeter-wave satellite communication system is described.

12

A Study on the Tapered Bend Section of the Optical Lens-Waveguide, by S. Sawa and K. Ono (Faculty of Engineering, Ehime University, Matsuyama-shi, 790 Japan); *Trans. IECEJ* (Corresp.), vol. 57-C, pp. 60–61, Feb. 1974.

An optimum design theory of the tapered bend in an optical waveguide consisting of many long-focus lenses is presented.

13

A Waveguide-to-Coaxial-Line Transition with Load Mounted in the Gap, by S. Ohkawa and M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan); *Trans. IECEJ*, vol. 57-B, pp. 169–176, Mar. 1974.

The previously reported analyses of the waveguide-to-coaxial transducers by Schelkunoff, Slater, Kihara, and Lewin were based upon more or less unreal assumptions. This paper proposes a more rigorous analytical approach to the problem. The result shows a good agreement with experiment.

14

A Wide-Band Tapered-Type Semi-Circular TE_{21}-Mode Transducer, by N. Nakajima (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 194–195, Mar. 1974.

A waveguide transducer from rectangular TE_{10}-mode to the semicircular TE_{21}-mode is proposed. Experiment has been performed at 60–90 GHz; transducer loss below 0.25 dB is obtained over the entire band.

15

Dielectric Multi-layer Fabry-Perot Resonator, by Y. Yuba (Faculty of Industrial Arts, Kyoto Technical University, Kyoto-shi, 606 Japan), I. Ohta (Department of Electronics, Himeji Institute of Technology, Himeji-shi, 671-22 Japan), and T. Makimoto (Faculty of Engineering Science, Osaka University, Toyonaka-shi, 560 Japan); *Trans. IECEJ*, vol. 57-B, pp. 229–235, Apr. 1974.

A theory is presented which gives the unloaded and external Q factors of the resonator separately. Experiment has been performed at 70 GHz; loaded Q factors of 200 000–500 000 were obtained with 20–80-cm-long resonators.

16

Error Rate Performance of 20-GHz Digital Radio Repeater, H. Yamamoto, K. Kohiyama, and I. Horikawa (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ*, vol. 57-B, pp. 238–243, Apr. 1974.

A new 20-GHz 400-Mbit/s communication system capable of transmitting 5760 telephone channels per repeater has been developed by the Electrical Communication Laboratory. This paper describes the performance of the developed system, including the distortion, temperature characteristics and the error-rate performance.

17

Analytical Method for Strip Ring Resonator, by Y. Fujiki, M. Suzuki, and T. Kitazawa (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan), and Y. Hayashi (Kitami Institute of Technology, Kitami-shi, 090 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 263–267, Apr. 1974.

A rigorous method of analysis of a ring resonator in an asymmetrical stripline circuitry is proposed. Some results of the computation are presented.

18

Waveform Response of 4-Phase Modulator at 20 GHz, by T. Fujino and A. Okano (Communication Equipment Works, Mitsubishi Electric Corp., Amagasaki-shi, 661 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 265–267, Apr. 1974.

Results of the computer simulation of a 4-phase modulator to be used in a 20-GHz high-bit-rate communication system are presented.

19

Bias-Control-Circuit of a Gunn Oscillator for Frequency Stabilization, by K. Watanabe and I. Takao (Research Institute of Electronics, Shizuoka University, Hamamatsu-shi, 432 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 267–268, Apr. 1974.

An automatic frequency control (AFC) circuit is used in the bias circuit of a Gunn oscillator to reduce the FM noise and to improve the frequency stability. Improvement of the C/N ratio (FM) by about 10 dB has been achieved experimentally.

20

An Integrated-Circuit Broad-Band Lumped-Element Circulator for the 1.7-GHz Band, by H. Katoh (Central Research Laboratories, Nippon Electric Co., Ltd., Kawasaki-shi, 211 Japan); *Trans. IECEJ*, vol. 57-B, pp. 281–288, May 1974.

The achievement of a project for developing a wide-band lumped-element circulator to be used in IF amplifiers in millimeter-wave repeaters is described. The developed circulator showed an isolation above 20 dB and insertion loss below 0.85 dB over 700-MHz bandwidth around 1.65 GHz.

21

A 20 GHz Broad-Band Parametric Amplifier, by S. Egami, K. Izumi, and K. Misada (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ*, vol. 57-B, pp. 304–311, May 1974.

The achievements of a project for developing a wide-band parametric amplifier to be used in the ground-station receiver for satellite communication are described. The developed amplifier showed 10-dB gain and noise figure better than 4 dB for 2.4-GHz bandwidth in 20-GHz band.

22

Computer Analysis of Cavity-Type Planar Circuit, T. Okoshi and S. Kitazawa (Faculty of Engineering, University of Tokyo, 113 Japan); *Trans. IECEJ*, vol. 57-B, pp. 319–326, May 1974.

The contour-integral approach used previously by the same authors for analyzing open-boundary planar circuits (two-dimensional circuits) is applied to arbitrarily shaped short-boundary (cavity-type) planar circuits. Some results of analysis are compared with approximate theories and experimental data, showing good agreement.

23

A Design Method for Interdigital Band-Pass Filter Using Circular Inner Conductors, by Y. Kami, H. Iwakura, and T. Arakawa (University of Electro-Communications, Chofu-shi, 182 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 328–330, May 1974.

A simple design method using only algebraic computations is presented and is used to design an experimental filter. The measured characteristics showed very good agreement with the theory.

24

A 50 GHz Full-Waveguide-Bandwidth Isolator, by T. Suzuki and T. Ohara (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 330–331, May 1974.

Several ferrite pieces having different resonance frequencies were used in a resonant-absorption-type waveguide isolator to obtain wide-band characteristics. The developed isolator shows isolation better than 20 dB, insertion loss below 1.8 dB, and VSWR below 1.7 in the entire 40–60-GHz band.

25

On the Interaction between Electroacoustic Surface Wave and Magnetoelastic Surface Wave, by M. Tsutsumi (Faculty of Engineering, Osaka University, Suita-shi, 564 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 331–333, May 1974.

The surface wave propagating along the interface between a

piezoelectric material (CdS, for example) and a magnetic material (Ga–YIG, for example) is investigated theoretically. A possibility of realizing a surface-wave gyrator is suggested.

26

UHF and Microwave Frequency Active Multiplexers, by N. M. Swamy (Transmission Research Division, ITI, Bangalore, India) and V. P. Kodali (Department of Electronics, Government of India, New Delhi 110011, India); *J. Inst. Electron. and Telecommun. Eng.* (India), vol. 20, pp. 203–208, May 1974.

The realization of UHF and microwave-frequency active multiplexers, and measured characteristics for diplexers and triplexers, with both continuous and noncontinuous channels, are described.

27

Frequency Stabilization of a Millimeter-Wave Solid-State Oscillator by a Reaction Cavity, by S. Nagano and S. Ohnaka (Central Research Laboratories, Nippon Electric Co., Kawasaki-shi, 211 Japan); *Trans. IECEJ*, vol. 57-B, pp. 368–375, June 1974.

The frequency stabilization scheme described in this paper features a reflection-type cavity resonator terminating an IMPATT-diode-mounted waveguide section. An experimental 80-GHz oscillator showed a frequency stability of ±4 MHz for 0–40°C.

28

Circular-Arc-Polygonal-Type Circular-TE_{0n}-Mode Filter, by K. Inada (Telecommunication Engineering Development Department, Fujikura Cable Works, Ltd., Tokyo, 135 Japan) and T. Hayakawa (Sakura Branch, Telecommunication Engineering Development Department, Fujikura Cable Works, Ltd., Sakura-shi, 285 Japan); *Trans. IECEJ*, vol. 57-B, pp. 391–398, June 1974.

A new type of circular TE_{0n}-mode refection filter has been devised. The essential part of this filter is a conductor tube slightly deformed from the ordinary circular cross section toward a polygonal (having p corners) cross section. Thus, TE_{0n}-mode energy is converted to TE_{p1}-mode energy which is easily absorbed in a helical waveguide. This new filter features low insertion loss for the TE_{01} mode.

29

4 GHz 4-port Latching Circulator Switch, by M. Nakamura (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03, Japan) and H. Kurabayashi (Mitsubishi Electric Co., Ltd., Kamakura-shi, 247 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 404–405, June 1974.

The development of a new type of 4-port latching circulator switch to be used in IF amplifiers in a communication satellite for remote switching is described. The developed switch showed isolation above 40 dB and insertion loss below 1.0 dB in a 200-MHz bandwidth.

30

Inference of Current Distribution on Microstrip Line by Liquid Crystal Display of Temperature, by E. Kiuchi, E. Yamashita, K. Atsuki, and Y. Kobayashi (University of Electro-Communications, Chofu-shi, 182 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 405–407, June 1974.

A resistive film terminating a microstrip line is painted with a liquid crystal material (Vari-Light Co. Model 101) to measure the field distribution around the microstrip.

31

A Method for Constructing Circular TE_{01}-Mode Exciter, by K. Iwasaki and K. Itakura (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 408–409, June 1974.

A new type of millimeter-wave mode transducer is described; it is based upon the principle of 0-dB coupling between lines having different phase velocities proposed previously by the same authors.

32

Quadrature Phase Cross Polarization Caused by a Force Applied to a Lens for Optical Beam Transmission, by K. Matsumura (Faculty of Engineering, Utsunomiya University, Utsunomiya-shi, 321-31 Japan), T. Matsumoto (Nippon Electric Co., Ltd., Kawasaki-shi, 211 Japan), and Y. Mushiake (Faculty of Engineering, Tohoku University, Sendai-shi, 980 Japan); *Trans. IECEJ*, vol. 57-C, pp. 173–178, June 1974.

When an external force is applied to a lens in an optical transmission system carrying a linearly polarized beam, a quadrature component is generated due to the anisotropy in the lens caused by the external force. This effect is investigated both experimentally and theoretically.

33

Injection Locking of Two Oscillators in Mutual Synchronism, by I. Ohta (Department of Electronics, Himeji Institute of Technology, Himejishi, 671-22 Japan) and K. Fukui (Faculty of Engineering, Okayama University, Okayama-shi, 700 Japan); *Trans. IECEJ*, vol. 57-B, pp. 433–440, July 1974.

The injection-locking characteristics and the noise phenomena are investigated both theoretically and experimentally. It is shown that the C/N ratio for the FM noise is improved by 3 dB as compared with the original oscillator.

34

Second-Order Analysis of Inductive Triple-Post Obstacles in a Waveguide, by M. Hashimoto (Mitsubishi Electric Co., Amagasaki-shi, 661 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 464–465, July 1974.

The triple-post obstacle is used in microwave waveguide filters. An exact analysis giving the equivalent circuit parameters is described.

35

Pico-Second Pulse Generation with Nonlinear Ladder Network, by W. Yamada, and S. Mori (Faculty of Engineering, Keio University, Yokohama-shi, 223 Japan), and E. Teraiwa (Yamatake Honeywell Co., Ltd., Tokyo, 144 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 465–466, July 1974.

A ladder-type network including nonlinear capacitances (varactor diodes) is used to generate 300-ps pulses from a 200-MHz 5-V sinusoidal input.

36

Parallel Coupled Microstrip Bandpass Filter with Arbitrary Angle, by Y. Konishi and Y. Utsumi (NHK Technical Research Labs., Tokyo, 157 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 467–469, July 1974.

To make a highly selective microstrip bandpass filter in a limited area, a new method of loosely coupling two microstrip resonators (parallel, distributed coupling) is proposed and tested experimentally.

37

Coupled-Mode-Type TE_{02}-Mode Filter Using Helix Waveguide, by T. Fujino, S. Kurazono, and N. Kumagai (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 469–471, July 1974.

Theoretical analysis and experiment of the mode filter consisting of a circular waveguide and a helix mounted coaxially in the waveguide are described.

38

A Design for a Waveguide Gunn Effect Oscillator, by R. F. Dannecker and M. W. Gunn (Electrical Engineering Department, University of Queensland, Brisbane, Qld., Australia); *Proc. IREE Australia*, vol. 35, pp. 210–212, July 1974.

The design of an X-band Gunn oscillator suitable for the replace-

ment of a klystron oscillator is described. The practical details are given of suitable methods of amplitude and frequency modulation. The measured performance is in good agreement with the theoretical analysis used.

39

A Coupled Mode Theory of Dielectric Optical Waveguides Based on Variational Principle, by S. Sawa (Faculty of Engineering, Ehime University, Matsuyama-shi, 790 Japan); *Trans. IECEJ*, vol. 57-C, pp. 241–247, Aug. 1974.

A variational formulation and its solution of the coupling phenomena between several dielectric optical waveguides is presented.

40

On the Measurement of the Tensor Permeability and Permittivity of Ferrite with Application of the Multi-Point Method in the Microwave Range, by S. Ohkawa, A. Ito, and H. Yamamoto (Faculty of Engineering, Chiba University, Chiba-shi, 280 Japan); *Trans. IECEJ*, vol. 57-B, pp. 525–532, Sept. 1974.

A new method of measuring simultaneously the permeability and permittivity of ferrite is proposed. Experiment is described and the errors and their correction are discussed.

41

Dynamic Characterization of Band-Reflection-Type Cavity Stabilized Gunn Oscillator, by K. Kohiyama and K. Momma (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ*, vol. 57-B, pp. 557–564, Sept. 1974.

A theoretical analysis of the cavity-stabilized Gunn oscillator proposed previously by the same authors (see 9 of these abstracts) is presented. The theory shows good agreement with experiment.

42

High Frequency-Stability, High Power TRAPATT Oscillator, by S. Furukawa (Research Laboratory of Precision Machinery and Electronics, Tokyo Institute of Technology, Tokyo, 152 Japan); *Trans. IECEJ*, vol. 57-B, pp. 581–588, Sept. 1974.

It is proposed that the use of high-impedance triggering circuit in a series-type IMPATT oscillator is advantageous in obtaining high frequency-stability, high power and high efficiency. A frequency-stability better than ordinary oscillators by a factor of 10^{-2}, efficiency of 27 percent, and output power of 43 W (pulse) have been obtained at 1.5 GHz.

43

An Analysis of Strip-Line by Conformal Mapping, by H. Iwakura, Y. Kami, and T. Arakawa (University of Electro-Communications, Chofu-shi, 182 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 590–592, Sept. 1974.

A new, precise analytical approach is proposed, and computation is performed for some examples. Results are compared with other analyses which have appeared in the literature.

44

A Broadband Balun Using Stripline, by K. Matsumoto and D. Ogusu (Faculty of Engineering, Shizuoka University, Hamamatsu-shi, 432 Japan), and M. Terajima (Kawasaki Heavy Industries, Co., Ltd. Kagamihara-shi, 504 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 594–595, Sept. 1974.

A new super-wide-band strip balun is proposed, and results of experiment are described. Insertion loss below 1 dB over the entire 100–800-MHz band is obtained.

45

Refractive Index Distribution and Group Delay Characteristics in Multimode Dielectric Optical Waveguides, by Y. Suematsu and K. Furuya (Department of Electronics Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan); *Trans. IECEJ*, vol. 57-C, pp. 289–296, Sept. 1974.

The relation between the refractive index distribution and group delay characteristics in slab-type multimode dielectric optical waveguide is discussed. Some specific refractive index profiles have been found, with which relatively small group delay is generated.

46

Dielectric Thin-Film Branching Waveguide, H. Yajima (Electrotechnical Laboratory, Tanashi-shi, 188 Japan); *Trans. IECEJ*, vol. 57-C, pp. 297–303, Sept. 1974.

Theory and experiment of a new dielectric thin-film optical branching coupler are described. Their applications to the mode converter, traveling-wave resonator, and optical switching device are discussed.

47

Characteristics of Cutoff Modes in a Symmetrical Five-Layer Slab Optical Waveguide with Low Index Intermediate Layers, by S. Kawakami and S. Nishida (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan); *Trans. IECEJ*, vol. 57-C, pp. 304–311, Sept. 1974.

Analysis of a new low-dispersion dielectric optical waveguide proposed previously by the same authors is presented. It is called the "W-shaped" waveguide because of its refractive index profile. The mechanism of the attenuation of cutoff modes is discussed.

48

Transmission Experiments of Frequency Modulated Color Video Signals Through Optical Fiber, by T. Tanaka *et al.*, (Central Research Laboratory, Hitachi Ltd., Kokubunjo-shi, 185 Japan); *Trans. IECEJ* (Corresp.), vol. 57-C, pp. 327–328, Sept. 1974.

Transmission experiment via a multimode, core-clad-type optical fiber (loss: 35 dB/km) using a GaAlAs laser oscillator is described.

49

Analysis of Higher Order Modes in Single, Coupled and Asymmetrical Striplines, by Y. Fujiki, T. Kitazawa, M. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan), and Y. Hayashi (Kitami Institute of Technology, Kitami-shi, 090 Japan); *Trans. IECEJ*, vol. 57-B, pp. 633–639, Oct. 1974.

An exact theoretical analysis of striplines placed in a rectangular shield is presented. It features the use of network-model representation of the fields and hence versatility in applying to various types of striplines.

50

***S* Parameters of Millimeter-Wave Diode Mixer,** by N. Tokoyo and N. Ihara (Fujitsu Laboratories Limited, Kawasaki-shi, 211 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 644–646, Oct. 1974.

Circuit parameters of a mixer are usually given as *Y* parameters. However, in some applications *S* parameters are preferable. This paper escdribes the direct measurement of the *S* parameters.

51

Dielectric Multi-Layer Film Optical Circuit with Arbitrarily Prescribed Hybrid Characteristics, by S. Kawakami, M. Shida, and S. Nishida (Research Institute of Electrical Communication, Tohoku University, Sendai-shi, 980 Japan); *Trans. IECEJ*, vol. 57-C, pp. 375–382, Oct. 1974.

The design theory and experiment of a multilayer dielectric directional coupler are described; it makes use of the difference in the reflection and transmission characteristics of the multilayer film between the *p*-polarized and *s*-polarized waves.

52

Noise Analysis of Bilaterally Injection-Locked Oscillators, by K. Hayashi and Y. Ida (Faculty of Technology, Kanazawa University, Kanazawa-shi, 920 Japan); *Trans. IECEJ*, vol. 57-B, pp. 657–664, Nov. 1974.

In the noise analyses of an injection-locked oscillator, an infinite

isolation from the locked to the locking oscillator has been assumed. On the other hand, in the analysis of mutually locking oscillators, they are reciprocally coupled. This paper presents a generalized theory including the above cases as its extreme cases.

53

Mode-Dependent Radiation Losses of Dielectric Waveguides with External-Higher-Index Layers, by K. Furuya and Y. Suematsu (Faculty of Engineering, Tokyo Institute of Technology, Tokyo, 152 Japan); *Trans. IECEJ*, vol. 57-C, pp. 411–418, Nov. 1974.

The radiation loss from a low-dispersion dielectric optical waveguide proposed previously by the same authors (see **45** of these abstracts), which features the addition of a high-refractive-index external layer, is analyzed.

54

Optimum Design of Digital Diode-Loaded-Line Phase Shifters, by T. Yahara, Y. Kadowaki, and K. Shirahata (Central Research Laboratory, Mitsubishi Electric Corp, Amagasaki-shi, 660 Japan); *Trans. IECEJ*, vol. 57-B, pp. 711–718, Dec. 1974.

The relation between the circuit parameters and characteristics of 11.25°, 22.5°, and 45° loaded-line-type phase shifters is considered. The optimum design is discussed.

55

A Computer Analysis of Frequency Multiplier Using Low-Q Diode, by S. Okamura and Lin Min Sheng (Faculty of Engineering, University of Tokyo, Tokyo, 113 Japan); *Trans. IECEJ*, vol. 57-B, pp. 719–725, Dec. 1974.

At shorter millimeter-wave frequencies, the Q factor of diodes used in the frequency multipliers becomes low. This fact requires new type of approximation in the analysis. A computer analysis is described; the results are compared with experiments.

56

8-Figure Locus of mm-Wave diode Mixer, by N. Tokoyo and N. Ihara (Fujitsu Labs. Ltd., Kawasaki-shi, 211 Japan); *Trans. IECEJ* (Corresp.), vol. 57-B, pp. 752–753, Dec. 1974.

It is shown both theoretically and experimentally that the IF impedance follows a "letter-8-shaped" locus on the Smith chart when the shorting position in the signal and image circuit is moved. The use of this locus for the measurement of circuit parameters is suggested.