Overseas Abstracts

PAPERS FROM JOURNALS PUBLISHED IN JAPAN

Compiled by Prof. T. Okoshi, Department of Electronic Engineering, University of Tokyo, Prof. Okoshi points out that where articles in Trans. IECEJ, in Japanese, are referenced, these may be available in English translation, with several months' delay, in Electronics and Communications in Japan.

1
Lumped-Element Approach to Microwave Integrated Circuits, by H. Katoh (Central Research Laboratory, Nippon Electric Co. Ltd., Kawasaki-shi, 211 Japan); *Trans. IECEJ,* vol. 56-B, pp. 213–220, June 1973.

The frequency characteristics of the reactance values and Q factors of spiral inductors and thin-film capacitors are discussed. Upon that basis, a lumped-element MIC approach using silica substrate and RF-sputtered silica thin film is proposed as the most practical approach in the present state of the art. A 1-2-GHz transistor amplifier designed and manufactured by the above method is described. The measured characteristics show good agreement with the computer prediction.

2
Measurement of High-Dielectric-Constant and Low-Loss Dielectrics in 50 GHz Band Using Ghost-Mode Technique, by M. Kawamura and E. Sasamori (Faculty of Engineering, Tokyo Institute of Technology, Meguro-ku, Tokyo, 152 Japan); *Trans. IECEJ,* vol. 56-B, pp. 229–236, June 1973.

The measurement as described in the title is usually difficult because the wall loss of the measuring circuit masks the dielectric loss. The author applied the "ghost-mode technique" proposed by Jaynes (*Proc. IRE,* Feb. 1958) to the measurement at 50 MHz to overcome this difficulty.

3
Wave-Theory Analysis of Resonant Modes in an Astigmatic Open Resonator, by N. Yamauchi (Department of Electrical Engineering, Nagoya Institute of Technology, Nagoya-shi, 466 Japan); *Trans. IECEJ,* vol. 56-B, pp. 244–251, June 1973.

A new formulation of the resonant modes based upon the elliptic coordinates is presented. Analyses of two types of practical optical resonators are described.

4
Diffraction of Two-Dimensional Gaussian Beam by a Perfectly Conducting Half-Plane, by S. Nemoto and T. Makimoto (Faculty of Engineering Science, Osaka University, Toyonaka-shi, 560 Japan); *Trans. IECEJ,* vol. 56-B, pp. 258–265, June 1973.

A theoretical analysis is presented. The electric field of the incident wave is assumed parallel to the edge of the infinite half plane.

5
Mode Conversion in a Slightly Offset TE_{01}-Mode Semicircular Waveguide, by K. Hashimoto (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 269–270, June 1973.

The semicircular waveguide is used in millimeter-wave branching filters and mode filters. The theoretical analysis of the mode conversion due to the offset at the junction is presented.

6
Band-Splitting Filters and Channel-Dropping Filters for Millimeter Waves [1], by S. Shimada (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *J. IECEJ,* vol. 56, pp. 809–817, June 1973.

A review paper describing the present state of the art is given. Applications to the supermultiplex communication systems are discussed.

7
Band-Splitting Filters and Channel-Dropping Filters for Millimeter Waves [II], by S. Shimada (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *J. IECEJ,* vol. 56, pp. 942–954, June 1973.

The second part of the review paper is given here.

8
Reflection Characteristics of a Ring-Type Filter, by K. Yamada and I. Ohtomo (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 314–315, July 1973.

The ring-type filter is the most promising channel-branching filter in future millimeter wave communication systems. This paper proposes a method of adjusting its frequency characteristics.

9
Fast-Sweep Measurement of Unloaded Quality Factor, by A. Takaoka and K. Ura (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 323–324, July 1973.

The fast-sweep measurement is used in measuring very high Q factors such as those obtained with superconducting cavity resonators. It was originally proposed by Schmitt and Zimmer for measuring loaded Q; this paper describes its application to the unloaded-Q measurement.

10
A Method for Analysing the Characteristics of Some Lumped Elements in Microwave Integrated Circuits, by T. Itoh (University of Illinois, Illinois, U.S.A.); *Trans. IECEJ,* vol. 56-B, pp. 339–344, Aug. 1973.

The capacitance of rectangular strips and disks in microstrip-type (asymmetrical) microwave integrated circuit is computed numerically. The computation features the conversion of the integral equation describing the problem into its spectral plane, and the use of Galerkin's method in the computation. The results are compared with the experiment.

11
The Conditions for 0-dB Coupling between Two Waves with Different Phase Constants, by K. Iwasaki and S. Kurazono (Faculty of Engineering, Osaka University, Suita-shi, 565 Japan); *Trans. IECEJ,* vol. 56-B, pp. 358–365, Aug. 1973.

It is shown theoretically that the 0-dB coupling (transfer of entire energy) may take place between two transmission lines having different phase constants if two or more sections with different coupling coefficients are cascaded.

12
Spurious-Mode-Suppressed Millimeter Wavelength Band-Pass Filter Using Circular TE_{011}-Mode Resonators, By M. Ando (Central Research Laboratories, Nippon Electric Co., Ltd., Kawasaki-shi, 211 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 372–373, Aug. 1973.

The use of TE_{011}-mode cylindrical resonators in millimeter-wave filters is desirable because low insertion loss is expected. However, the presence of spurious modes (especially TE_{311}) limits its usefulness. A construction for suppressing the TE_{311}-mode is proposed and experimented.

13
Determination of Circuit Parameters of a Tri-plate Planar Circuit, by T. Miyoshi (Faculty of Engineering, Kobe University, Kobe-shi, 657 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 373–374, Aug. 1973.

Circuit parameters of planar circuitry are discussed. The validity of the discussion is proved by its application to a wide stripline.

14

A Hermetically Sealed 20 GHz-Band IC Mixer, by T. Araki and M. Hirayama (Musashino Electrical Communication Laboratory, N.T.T., Musashino-shi, 180 Japan), N. Fujine and T. Kajimura (Semiconductor Devision, Nippon Electric Co. Ltd., Kawasaki-shi, 211 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 417–418, Sept. 1973.

A report of the development is presented. Conversion loss below 5.5 dB and input VSWR below 1.3 dB have been obtained for entire 18–21-GHz band with a hermetically sealed structure.

15

A Theoretical Analysis of a New BGS-Wave Guide, by M. Koshiba, M. Hikita, T. Tanifuji, and N. Suzuki (Faculty of Engineering, Hokkaido University, Sapporo-shi, 060 Japan); *Trans. IECEJ*, vol. 56-B, pp. 455–461, Nov. 1973.

The BGS wave is an elastic surface wave in piezoelectric materials found by Bleustein, Gulyaev, and Shimizu. It has less energy concentration at the surface than the Rayleigh wave. This paper shows that when a conducting layer is made in the material the energy can be concentrated near the surface. Such a structure may be used as a nondispertive delay line.

16

Multi-Point Method for the Precise Measurement of Reflection Coefficient and Scattering Matrix, by S. Ohkawa and H. Yamamoto (Faculty of Engineering, Chiba University, Chiba-shi, 280 Japan); *Trans. IECEJ*, vol. 56-B, pp. 462–469, Nov. 1973.

In the reflection–coefficient measurement using a slotted section, the accuracy of the measurement is poorer for the modulus than for the argument. This paper proposes a new method for improving the modulus accuracy. The voltage is measured at many points and obtained data are processed mathematically.

17

Variable Equalizer for High-Capacity Microwave Radio Relay, by H. Shiki (Microwave and Satellite Communications Division, Nippon Electric Co., Ltd., Yokohama-shi, 226 Japan); *Trans. IECEJ*, vol. 56-B, pp. 478–485, Nov. 1973.

The amplitude distortion characteristics of three types of the phase equalizers for use in multiplex radio relay systems are compared. It is shown that the rat-race circuitry loaded with a parallel resonance circuit is the best choice.

18

Characteristics of Bi-Laterally Injection-Locked Oscillators, by Y. Ida, K. Hayashi, and S. Hashimoto (Faculty of Engineering, Kanazawa University, Kanazawa-shi, 920 Japan); *Trans. IECEJ*, vol. 56-B, pp. 486–491, Nov. 1973.

In an actual injection-locked oscillator, a more or less backward injection is present due to the incompleteness of the isolator placed between the injecting and injected oscillators. This paper gives a theoretical analysis taking into account the backward injection.

19

Waveguide Resonant-Iris Bandpass Filters, by M. Yokoyama, N. S. Chang, and Y. Matsuo (The Institute of Scientific and Industrial

Research, Osaka University, Suita-shi, 565 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 509–510, Nov. 1973.

Theoretical and experimental treatment of multistage quarter-wavelength waveguide filters using many resonant irises is presented. Typical characteristics of a 7-stage filter are as follows: the center frequency is 4 GHz, bandwidth is 1.5 GHz, and insertion loss is 1 dB.

20

Resonant Frequency of a Slot Resonator in Planar Circuit Mounted in Waveguide, Y. Konishi and K. Uenakada (NHK Technical Research Laboratories, Setagaya-ku, Tokyo, 157 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 511–512, Nov. 1973.

A theoretical analysis of the resonance frequency of the circuit described in the title, which is considered promising in microwave TV-broadcast receivers, is presented. The results are compared with the experiment.

21

On the Experimental Discussions of Magnetizing Methods for Microstrip Lumped Element Circulators, by I. Ikushima and M. Maeda (Hitachi Central Research Laboratory, Kokubunji-shi, 185 Japan); *Trans. IECEJ* (Corresp.), vol. 56-B, pp. 512–514, Nov. 1973.

It is shown that by adding a radial magnetic field component to the circulator, the widebandness is improved. For example a 20-dB isolation bandwidth was increased from 0.15 GHz to 0.5 GHz.

22

Millimeter-Wave Wideband Michelson Interferometer-Type Band-Splitting Filter, by N. Suzuki (Yokosuka Electrical Communication Laboratory, N.T.T., Yokosuka-shi, 238-03 Japan); *Trans. IECEJ*, vol. 56-B, pp. 519–526, Dec. 1973.

This paper proposes a new design approach toward a super-wideband bandsplitting filter for use in millimeter wave communication systems. Typical characteristics obtained experimentally are as follows: splitting (cutoff) frequency is 76.15 GHz, and insertion loss below 1.5 dB for entire 40–120-GHz band.

23

Dispersion Relation of a Circular Waveguide Filled with an Anisotropic Plasma, by K. Uchida and K. Aoki (Faculty of Engineering, Kyushu University, Fukuoka-shi, 812 Japan); *Trans. IECEJ*, vol. 56-B, pp. 535–542, Dec. 1973.

Results of a numerical analysis of the characteristic equation are presented. The nature of various propagation modes are discussed.

24

Effects of the Fin Thickness and the Slot Pitch on Propagation Characteristics in the Corrugated Circular Waveguide, by F. Takeda and T. Hashimoto (Kamakura Works, Mitsubishi Electric Corporation, Kamakura-shi, 247 Japan); *Trans. IECEJ*, vol. 56-B, pp. 543–550. Dec. 1973.

The analysis of a corrugated circular waveguide will furnish design data for the corrugated cone antenna which features wide-bandness. This paper describes a theory taking into account the fin thickness. The theory shows good agreement with the experiments.