Microwave Abstracts

Based on technical merit and timeliness, microwave papers in journals published outside the United States have been selected and compiled below, many with annotations. Reprints of the papers may be obtainable by writing directly to the author or to the source quoted. The papers are in English unless noted otherwise.

—K. Tomiyasu, *Associate Editor for Abstracts*

Papers from Journals Published in the Scandinavian Countries

Compiled by M. M. Brady, Norwegian Defence Research Establishment, Kjeller, Norway. Ten journals from the four countries were scanned.

57

Millimeter Waves by P. E. Gudmandsen (Lab. of Electromagnetic Theory, Technical Univ. of Denmark, Copenhagen, Denmark); *Ingeniören*, vol. 73, pp. 410–418, July 1, 1964.

A review article which discusses some general applications and the outlook for Danish work. (In Danish.)

58

Properties of a Quantum Plasma in a Uniform Magnetic Field by J. J. Quinn (Reprint from Import and Export Dept., Almqvist and Wiksell, Stockholm, Sweden); *Arkiv för Fysik*, vol. 26, pp. 93–126, February 12, 1964.

The response of a system consisting of a large number of charged particles to some external disturbance is discussed and specialized to the plasma-magnetic field case. (In English.)

59

Piezoelectric Transducers for Microwaves by K. Blötekjær (Div. for Electronics, Norwegian Defence Research Establishment, Kjeller, Norway); *Electroteknisk Tidsskrift*, vol. 78, pp. 70–75, February 15, 1965.

General problems are discussed and means of increasing transducer efficiency are described. A transducer conversion loss of 13 dB at 1 GHz has been observed in preliminary experiments; with proper design of transducer this should be reduced to 3 dB. (In Norwegian.)

60

Use of Single Crystal Ferrites for Nonreciprocal Microwave Bandpass and Bandstop Filters by H. Skeie (Electronic Lab., Norwegian Institute of Technology, Trondheim, Norway); *Electroteknisk Tidsskrift*, vol. 78, pp. 145–148, March 25, 1965.

Polished samples of single crystal ferrites are used as the coupling elements in narrow band filters. A theoretical discussion is given. A 4-arm rectangular waveguide junction functioning as a 4-port circulator is described. (In Norwegian.)

61

Radio Astronomy and the Råö Observatory by O. Rydbeck (Chalmers Univ. of Technology, Gothenburg S., Sweden); *Teknisk Tidskrift*, vol. 95, pp. 205–207, March 3, 1965.

The Råö radio telescope is the most modern in Europe. The research programs are discussed. A complete description of the station is given in another article in the same journal: A. Rohdin, *Teknisk Tidskrift*, vol. 95, pp. 471–477, May 5, 1965. (In Swedish.)

62

On Attenuation and Electrical Length of a Plasma Loaded Helical Transmission Line by P. M. P. Jääskeläinen (Reprint from Acta Polytechnica Scandinavica Publishing Office, Stockholm, Sweden); *Acta Polytechnica Scandinavica*, No. Ph. 23, 53 pp., 1963.

(In English.)

63

A Study on the Dielectric Constant and Resistivity of Amorphous, Polycrystalline and Monocrystalline Selenium at 24 GHz by R. Lilja and T. Stubb (Reprint from Acta Polytechnica Scandinavica Publishing Office, Stockholm, Sweden); *Acta Polytechnica Scandinavica*, No. Ph. 28, 34 pp., 1964.

Microwave investigations of the complex dielectric constant of selenium are described along with the equipment required. (In English.)

64

The Dielectric Resonator, Design Methods and Applications by T. D. Iveland and T. Hansen (Electronic Lab., Norwegian Institute of Technology, Trondheim, Norway); *18th Conv. Radio Technology and Electroacoustics*, Geilo, Norway, p. 9, June 11–13, 1965. Preconvention summary.

Resonant conditions and coupling problems for dielectric resonators are discussed. A resonator in a parallelepiped form coupled to rectangular waveguides is discussed. A resonator for use in 10 GHz filters is discussed. (In Norwegian.)

65

Current Oscillations in CdS by J. Krokstad, H. Engan, and H. Skeie (Electronic Lab., Norwegian Institute of Technology, Trondheim, Norway); *18th Conv. Radio Technology and Electroacoustics*, Geilo, Norway, p. 13, June 11–13, 1965. Preconvention summary.

A qualitative analysis of current oscillations under constant applied voltage is given. Oscillations observed are of approximately 1 MHz. Experimental data are presented.

66

Circularly Polarized, Broadband Antennas for the Microwave Region by O. H. Longva (Div. for Electronics, Norwegian Defence Research Establishment, Kjeller, Norway); *18th Conv. Radio Technology and Electroacoustics*, Geilo, Norway, p. 21, June 11–13, 1965. Preconvention summary.

General broadband requirements are discussed and illustrated with the log spiral case and the log periodic case. The major work has been on log spiral antennas, while an omnidirectional log periodic antenna for 2.5–10 GHz is described. (In Norwegian.)

Papers from Journals Published in Japan

Compiled by Prof. H. Iwakata, Waseda University, Tokyo, Japan and his committee.[1]

67

Tunnel-Diode Detectors at Microwave Frequencies by T. Arizumi, T. Wada, and A. Maruyama (Dept. of Electronics, Faculty of Engineering, Nagoya University, Nagoya, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 395–401, March 1965.

Experimental results are given on the effect of the bias voltage and temperature upon the detection current of a tunnel diode at 2 Gc/s, 9 Gc/s, and 35 Gc/s. A tunnel diode is shown to be superior over a point contact diode in terms of linearity, sensitivity and temperature dependency. (In Japanese.)

68

Demodulation of PM-Modulated Laser Beam by Autocorrelation by S. Saito and T. Kimura (Inst. of Industrial Science, Univ. of Tokyo, Tokyo, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 418–423, March 1965.

An autocorrelation technique to demodulate the PM optical beam is proposed, and experimental results are mentioned. (In Japanese.)

[1] T. Iijima, T. Kasai, T. Nakahara, B. Oguchi, S. Okamura, T. Sekiguchi, K. Suetake, and A. Uchiyama.

69

Reflection Coefficient of TWT Attenuator by H. Nishihara, K. Ura, and M. Terada (Faculty of Engineering, Osaka Univ., Osaka, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 433–438, March 1965.

Useful design formula of reflection coefficient of TWT attenuator is derived. Experimental results are compared with theoretical calculations. (In Japanese.)

70

Effects of Rime on Microwave Passive Reflector Efficiency by S. Takeshita (Tohoku Electric Power Co., Ltd., Sendai, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 712–719, April 1965.

Theoretical analysis and experimental results. (In Japanese.)

71

A Study on Radiation Mechanism of Dielectric Rod Antenna and the New Types with High Gain by T. Sueta, S. Nishimura, and T. Makimoto (Faculty of Engineering Science, Osaka Univ., Toyonaka, Osaka, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 733–741, April 1965.

The radiation mechanism of dielectric rod antennas is theoretically analyzed. A new Dash-Hollow type dielectric rod antenna having a high gain directivity is developed. (In Japanese.)

72

Frequency Scanned Antenna Using Dielectric-Loaded Waveguide by S. Nishimura, T. Sueta, M. Kiyosue, and T. Makimoto (Faculty of Engineering Science, Osaka Univ., Toyonaka, Osaka, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 742–748, April 1965.

General principle and experimental results of the array type frequency scanned antenna using a waveguide filled with high permittivity dielectric material are discussed. A frequency-scanned interferometer type antenna is proposed, and its characteristics are analyzed. (In Japanese.)

73

An Application of Theory of Singular Integral Equations to the Analysis of Antennas by Y. Hayashi (College of Science and Engineering, Nihon Univ., Tokyo, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 749–757, April 1965.

Analysis of a circular cylinder with an arbitrary slot by means of the singular integral equation, and the approximate formula for special cases are derived. (In Japanese.)

74

Spurious Mode Effects on the Performance of Helix Type of Traveling Wave Amplifier by K. Ayaki (Nippon Electric Co., Ltd., Kawasaki, Kanagawa, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 892–898, May 1965.

Spurious effects on the performance of helix type traveling wave amplifier are theoretically eliminated. Methods to suppress the spurious mode are proposed. (In Japanese.)

75

VHF, UHF Lumped Element Y Circulator by Y. Konishi (Technical Research Labs., Japan Broadcasting Corp., Setagaya, Toyko, Japan); *J. Inst. Elect. Commun. Engrs. Japan*, vol. 48, pp. 899–908, May 1965.

Theoretical analysis and experimental results are given of a new lumped element Y circulator using a mesh element as the conductor of strip-line type circulator. (In Japanese.)

76

Automatically Computing Radar Rain Gauge (Article 1. Theory) by T. Okada and T. Saito (Shibaura Works, Oki Electric Ind. Co., Tokyo, Japan); *Oki Review*, vol. 32, pp. 55–62, April 1965.

A rain gauge is proposed with a radar and a computer to determine the rainfall at any point within its detection range. (In Japanese, English summary.)

77

The Guided Propagation of Electromagnetic Wave Beams between Two Parallel Plates by T. Nakahara (Sumitomo Electric Ind., Ltd., Osaka, Japan); *Sumitomo Electric Technical Review*, pp. 55–64, January 1965.

Guided beam propagation through iterative wing shaped phase transformers between two parallel metallic plates is proposed and analyzed. (In English,)

78

Transmission Modes in the Grooved Guide by T. Nakahara (Sumitomo Electric Ind., Ltd., Osaka, Japan); *Sumitomo Electric Technical Review*, pp. 65–71, January 1965.

The mode characteristics of the grooved guide are discussed. (In English.)

79

Diffractor as a Microwave Passive Repeater by M. Takada and M. Shinji (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Electrical Comm. Lab. Tech. J.*, vol. 14, pp. 405–463, March 1965.

Characteristics and design methods of a diffractor, which is devised to improve the propagation characteristics of a mountainous diffraction path, are described. (In Japanese.)

80

Dimensional Tolerance in Circular Waveguide in Transmission of the Circular Electric Wave by K. Noda, K. Yamaguchi, and N. Suzuki (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Electrical Comm. Lab. Tech. J.*, vol. 14, pp. 465–482, March 1965.

Attenuation constants of circular waveguides were measured and compared with theoretical values considering cross-section ellipticity and axial straightness of the waveguide. (In Japanese.)

81

A Historical Survey on the Development of the Various Radio Systems in Japan and Their Future Problems by I. Someya (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Electrical Comm. Lab. Tech. J.*, vol. 14, pp. 821–844, May 1965.

(In Japanese.)

82

Long-Term Properties of HF Path Loss and Multipath Distortion on Over-the-Horizon Radio Link Using Obstacle Gain Effect by Y. Okumura and M. Hara (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Rev. Electrical Comm. Lab.*, vol. 13, pp. 153–182, March/April 1965.

Report on the analytical results obtained from continuous measurements of received signal and multipath distortion on a 341.5 km obstacle gain path using 2000 Mc/s in the period from July 1962 through June 1963. (In English.)

83

Space Diversity Effects Measured on a Long Mountain Diffraction Path by Y. Okumura and S. Nakamura (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Rev. Electrical Comm. Lab.*, vol. 13, pp. 183–200, March/April 1965.

This paper describes the analytical results from measurements of space diversity reception on a 341.5 km over-the-horizon radio link using the mountain diffraction mode of propagation in the frequency regions of 800 Mc/s and 2000 Mc/s. (In English.)