

# Report of Advances in Microwave Theory and Techniques in Japan—1958\*

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A number of papers were presented in the fields of microwave art from companies and universities. In this article, short abstracts of some selected papers will be mentioned.

Shimizu presented a method of describing the electromagnetic  $TE_{01}$  field within a curved waveguide of a constant but arbitrary section. He expressed Maxwell's equations converted into telegraphic equations and the bend problem which may be solved by using the techniques of coupled transmission lines.

Y. Shimizu, "Transmission of circular  $TE_{01}$  wave in curved circular waveguides," *J. Inst. Elect. Commun. Engrs. of Japan*, vol. 41, no. 1, pp. 29–35; 1958.

Oguchi and Kato discussed the characteristics of the  $TE_{01}$ ,  $TM_{11}$ , and  $TE_{1m}$  mode waves in a curved circular waveguide taking their mutual couplings into account.

B. Oguchi and M. Kato, "The effects of the circular  $TE_{1m}$  waves on the propagation of the circular  $TE_{01}$  wave in curved waveguide," *ibid.*, vol. 41, no. 1, pp. 35–42, 1958.

Kumagaya discussed problems concerning the reflection and mode conversions of the  $TE_{01}$  mode produced at a position where the diameter of a multimode circular waveguide varied discontinuously.

S. Kumagaya and N. Kumagaya, "Discontinuity in the cylindrical waveguide," *ibid.*, vol. 41, no. 5, pp. 556–559; 1958.

Kumagaya and two coworkers discussed theoretically the electromagnetic waves in a circular waveguide to which is added a circular ferrite ring.

S. Kumagaya and N. Kumagaya, and K. Takeuchi, "Ferrite loaded nonreciprocal cylindrical waveguide for circular electrical wave," *ibid.*, vol. 41, no. 10, pp. 965–971; 1958.

Noda published a paper concerning characteristics of a delay compensator which is composed of a magic  $T$  and of a resonant circuit. He discussed several delay

characteristics and loss performances for a trial set experimentally and theoretically.

K. Noda, "Microwave delay compensator," *ibid.*, vol. 41, no. 3, pp. 221–228; 1958.

Fukumitsu presented a paper concerning measuring procedures for long and symmetrical networks by the  $S$ -curve method.

T. Fukumitsu "Measuring procedure for long and symmetrical network by  $S$ -curve," *ibid.*, vol. 41, no. 12, pp. 1221–1225; 1958.

He discussed the four terminal circuit constant by the  $S$ -curve method which is formally applied only to a lossless circuit and can be extended to a lossy symmetric circuit.

Asano and two coworkers presented a paper concerning a coaxial directional coupler which is made for very wide band of 400–7000 mc.

T. Asano, J. Morishoma, and R. Koike, "Conical directional coupler," *ibid.*, vol. 41, no. 6, pp. 626–632; 1958.

Saito presented two papers on the electron beam, especially on the space charge wave on the electron beam.

S. Saito, "New method of measuring the noise parameters of the electron beam by using selective beam coupler," *ibid.*, vol. 41, no. 6, pp. 605–610; 1958.

S. Saito, "Parametric amplification of space charge waves on a thin electron beam," *ibid.*, no. 11, pp. 1113–1120; 1958.

In the former paper, the author treated the minimum noise figure of TWT which has been a problem of great interest for some years past. He tried the measurement of beam noise by using a selective beam coupler devised by him, along an electron beam and succeeded in measuring correlation coefficient between current and velocity noises. In the latter paper, he dealt with a theory of a one-dimensional beam-type parametric amplifier with the very thin beam. He gave basic equations and applied the analysis to two cases, namely inverted and noninverted, and presented an approximate equivalent circuit comprising lumped inductances and lumped voltage-dependent capacitances.

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