

Application of Rayleigh-Ritz Method to Dielectric Steps in Waveguides*

Collin and Vaillancourt¹ write that in a previous paper of mine²: "the coupling of the LSE modes by the step when a LSM mode is incident is neglected."

This remark is true, only in reference to the approximate numerical results obtained in my paper, but does not apply to the varia-

tional expressions. All derivations and results about the four-terminal network equivalent to the discontinuity, are perfectly general and include Hy as well as Ey modes. The summations in all the expressions in my paper extend to both types of modes.

The particular trial field chosen for the numerical computation of the admittance is such that the contribution of the Hy modes is zero. It is with this thought in mind that I asked the reader, at the beginning of the paper, to ignore the Hy modes. I did not mean to say that they are not excited. In fact, if another trial field is inserted into the expressions given for the admittances in my paper, they will yield contributions from the Hy modes.

It is actually very easy to show that Hy modes are excited at the discontinuity, simply by matching all the fields at that plane.

In my thesis at the Polytechnic Institute of Brooklyn, I discussed both types of modes. My intention in the paper, was to reduce its length to a minimum by not including the Hy mode functions.

This opportunity to point out the generality of the theory and the limitations of the numerical results, I owe to Dr. Collin who, before the publication of his paper, called my attention to the possibility of misinterpreting the statement in mine.

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* Received by the PGMMT, June 21, 1957.

¹ R. E. Collin and R. Vaillancourt, IRE TRANS., vol. MTT-5, pp. 177-184; July, 1957.

² C. M. Angulo, "Discontinuities in a rectangular waveguide partially filled with dielectric," IRE TRANS., vol. MTT-5, pp. 68-74; January, 1957.

Contributors

Wesley P. Ayres (M'56) was born on September 26, 1924, at Los Angeles, Calif. He served as an electronic technician aboard a destroyer during World War II. He returned to college in 1948 and received the B.S. degree in physics from Fresno State College in 1951. He then entered Stanford University where he received the M.S. degree in 1953, and the Ph.D. degree in physics in 1954. In 1954, he joined the Electronic Defense Laboratory of Sylvania Electric Products, Inc., Mountain View, Calif., where he engaged in ferrite research at microwave frequencies. In 1956, Dr. Ayres helped to found Microwave Engineering Laboratories, Inc., Palo Alto, Calif., where he is presently doing research on microwave components.

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Kenneth R. Bushore was born in San Diego, Calif., on April 27, 1915. After graduating from the Navy's Radio Materiel Schools at Chicago, Ill., Del Monte, Calif., and Treasure Island, Calif., he served as an electronic technician with the Pacific fleet during World War II.

In 1949, Mr. Bushore was employed by the Navy Electronics Laboratory, San Diego, Calif., where he engaged in microwave research and development as a member of the Microwave Components Group of the Radar Branch from 1950 until early 1957. He is currently a member of a newly organized group at N.E.L. which is investigating optical system applications for radar use.

Robert S. Elliott (A'51-SM'53) was born in Brooklyn, N. Y., on March 9, 1921. He was a Pulitzer Scholar at Columbia University, New York, N. Y., where he received the A.B. degree in 1942 and the B.S. degree in 1943.

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at the University of Illinois, where his duties included undergraduate and graduate teaching and research in antennas and microwave tubes. While at Illinois he received the M.S. degree in 1947, and the Ph.D. degree in 1952.

Summer employment in the antenna groups at Sperry Gyroscope Co. in 1949, and North American Aviation, in 1950, supplemented his Illinois employment. Upon leaving Illinois in 1952, Dr. Elliott served one year of active duty in the U. S. Navy and then joined the technical staff of the Hughes Aircraft Company, where he was in charge of the antenna research section of the Microwave Laboratory. At Hughes, Dr. Elliott specialized in surface wave antennas and uhf arrays. He is presently technical director and vice-president of the RANTEC Corporation.

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Lowell E. Norton was born on August 12, 1909, in Arlington, Minn. He received the B.S. degree in electrical engineering in 1932,

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Peter A. Rizzi (S'50-A'54-M'57) was born in Providence, R. I., on December 10, 1930. He received the B.S. degree with high honors

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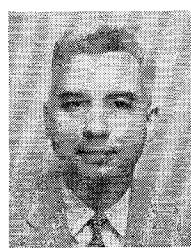
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Lucien G. Virgile was born in New York, N. Y., on January 11, 1925. He received the Bachelor degree in aeronautical engineering

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Florian Shnurer was born on May 29, 1929, in Blakely, Pa. He entered Union College in 1946 and received the B.S.E.E. degree in 1950. In 1952, he received the M.S. degree from Northwestern University, Evanston, Ill., for which he did research in coated conductor antennas. He is a candidate for a Ph.D. from the same university.

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