

Since it is easily differentiated, this equation is simply solved iteratively by the rapidly convergent Newton's method. A suitable initial trial solution is one lying in the range

$$\omega_o \left(1 - \frac{C_{eq}}{C_o l}\right) < \omega_r < \omega_o \quad (2)$$

where

$$\omega_o = \pi c/2l;$$

C_o capacitance per unit length of the coaxial line.

RESULTS

In an attempt to provide some basis for comparison with Williamson's results, this method has been used to compute the resonant frequency of his cavity no. 4 which has dimensions (in millimeters) $h = 28.019$, $g = 7.999$, $a = 5.999$, $b = 29.988$. By simple linear interpolation in [2, table VI], we deduce that for this case $C_{eq} = 0.4426$ pF, giving a resonant frequency of 2.387 GHz. This is in error from Williamson's value of 2.216 GHz by about 7.5 percent. In the circumstances this is rather good as this cavity is so squat that it violates the suggested criterion for valid application of this method by more than a factor of 2, and there should be significant distortion of the gap field by the presence of the shorting plate.

REFERENCES

- [1] A. G. Williamson, "The resonant frequency and tuning characteristics of a narrow-gap reentrant cylindrical cavity," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-24, pp. 182-187, Apr. 1976.
- [2] H. E. Green, "The numerical solution of some important transmission line problems," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-13, pp. 676-692, Sept. 1965.
- [3] —, "Correction to the numerical solution of some important transmission line problems," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-23, p. 455, May 1975.

Evaluation of MTT TRANSACTIONS (1976)

M. E. HINES

Editor's Note: Marion Hines was one of three individuals asked by the IEEE Publications Board to review recent volumes of the MTT TRANSACTIONS and to provide an objective evaluation. Printed below is his evaluation in its entirety.

I have been asked by you, on behalf of the IEEE, to review recent volumes of the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES to evaluate them objectively, and to prepare a report on this subject for the IEEE. This letter constitutes that report. This is a personal document which is subjective to a large degree, no matter how objective I try to be. In the following, I will discuss a number of topics on this subject which occur to me, and make a number of suggestions for improvement of the TRANSACTIONS.

I. GENERAL QUALITY OF PAPERS

I am impressed by the average high technical level of the published papers in the TRANSACTIONS. Within the framework

of IEEE and S-MTT policy, the traditions of the MTT Society, and the limitations imposed by the unavoidable fallibility of volunteer reviewers, the MTT TRANSACTIONS have maintained high standards. I feel that we have had outstanding service and good management by our editors and that nothing said here should be construed as criticism of their performance in this demanding and somewhat thankless task.

II. SOME PHILOSOPHICAL COMMENTS

In my opinion, the primary function of the MTT TRANSACTIONS is the communication of microwave *engineering* information among the membership so that new and *useful* knowledge is made available to the profession as a whole. I have stressed the words engineering and useful. We are an engineering society, devoted to applications of science and technology. The chief criticisms of the MTT TRANSACTIONS which I have heard in recent years and my own chief criticism is that much of the published theoretical material is written with obscure jargon and unfamiliar mathematical symbolism so that for a majority of the membership it is difficult to read and understand. There also appears to be a singular lack of usefulness in much of what is published. Often there is insufficient effort to explain the results and to present the data in graphs, tables, or other directly interpretable form. These are serious charges and the problems they present do not seem to have simple answers.

We have a tradition in the MTT of taking our theoretical work seriously. We believe that good microwave engineering requires a sound theoretical foundation, and that we prefer to *design* our microwave components and systems with theory and precise computations. I have no desire to change this tradition. I believe, however, that no worthwhile theoretical paper need be so obscure that its purpose, its basic method of approach, and the meaning and general character of the results cannot be understood by a majority of the subscribers to the TRANSACTIONS. Likewise, no experimental paper need be so meager or disorganized in its information content that other experienced workers in the same field with similar availability of components and technology cannot duplicate the results from the data presented.

I have an impression that many of our contributors of theoretical work are directing their work to an elite group of specialists and seem to believe that mathematical "elegance" is the chief virtue of a good paper. In this context, elegance seems to require a minimization of explanatory English text, no repetition of previously published material (even when necessary to understand the paper), elimination of all unnecessary steps in the development, the use of specialized jargon familiar only to the specialists, use of mathematical symbolism requiring the minimum amount of space for equations, and expression of the results in the most compact equations possible. Graphs of key data may be eliminated as unnecessary. This kind of "elegant" paper is, as a result, directly useful only for that limited group of specialists. It must be recognized that the IEEE and S-MTT encourages some of this by editorial policies regarding shortness, and the the "page charge" policy.

In recent years, the digital computer has become an indispensable tool for microwave engineers who use theory to design their devices and systems. A large number of our member engineers are now adept at writing their own programs and make much use of time-shared computer services. Many of these engineers have developed libraries of software for their personal use and for use by others in their own organizations. A number of software service companies have developed and offer the use of

programs which are widely adaptable to a variety of problems. There are, in some cases, commercial difficulties associated with public release of program listings because of the competitive nature of our industry. Nevertheless, the trend to computer-aided design is continuing and will, no doubt, become the most indispensable technique in the profession. In reading the TRANSACTIONS, one does not get this impression. I, for one, would like to see more emphasis on the adaptation of our theoretical design papers to machine computation. In some cases, publication of a program listing might occur in the TRANSACTIONS. This problem needs further study, and I have no more concrete suggestions to make at this time.

Another problem is sometimes evident with papers which are predominantly experimental. For commercial or other reasons, the device of interest may be inadequately described, perhaps to avoid giving useful information to competitors. The gist of such papers is "Gee-whiz, look at these wonderful results I achieved. It's too bad that I can't tell you how I did it."

III. SPECIFIC SUGGESTIONS

1) I think we should attempt to change the editorial policies of the MTT TRANSACTIONS regarding the content of papers which are acceptable. Particular needs for change are as follows.

a) Engineering usefulness should be the primary criterion for acceptance. This may be broadly interpreted. It will require the exercise of judgment on the part of the editors and reviewers and it is not easy to enforce. We wish to avoid purely mathematical exercises, but, encourage both experimental and theoretical papers which present new methods and/or new results which will affect the practice of microwave engineering.

b) The significant results of each paper should be pointed out, and made as clear as possible by the use of graphs, tables, dimensioned drawings, or other appropriate means.

c) In experimental papers, the critical parameters of the device should be adequately described to permit duplication of the experiment by one "skilled in the art."

d) The abstract should be designed to tell each reader whether or not the paper will be useful to him. This should include a summary description of the problem, what was done, and what is the engineering meaning of the paper.

To help make changes come about, I suggest that our publication policies be thoroughly reviewed and hopefully revised, perhaps drastically. A new policy statement should be prepared and published in the TRANSACTIONS. Furthermore, it should be separately printed as a monograph for free distribution to anyone planning to write a paper, and its availability should be referred to in each issue under a heading "Information for Authors" on the "masthead" page inside the front cover, or inside the back cover as in the ED TRANSACTIONS. This policy statement should describe the various criteria for acceptance and might also include information about IEEE standards for terminology, typing, mathematical symbolism, etc.

2) I object to the present policy of returning, without review, any paper longer than 20 typewritten pages and 18 illustrations. (Actually, this has not been strictly enforced.)

3) I see no point in separating "applications oriented" and "theoretical" papers into separate issues. This results in publication delays, and little else that I can see. (In my opinion all

papers should be applications oriented even when their content is entirely theoretical.)

4) A paper is a paper, whether "long" or "short." I see no point in segregating papers on the basis of length, which seems to imply a difference in value or importance. A good paper may be quite short, a poor paper may be very long.

I suggest that many of the papers now called "short" might be classified as "engineering notes" instead and segregated in the same manner as "short papers" are now. I believe that there is value in publishing short simple contributions which describe new and useful techniques in the practice of microwave engineering. These may be experimental or theoretical or mixed. More contributions of this sort should be encouraged.

5) Letters are an important part of the TRANSACTIONS. A technical contribution should be published as a letter if speed is important because of the newsworthiness of the subject matter. Of course, this implies that correspondence should be handled speedily in the editorial process. More letters should be encouraged by the editors.

6) Budgetary matters have become a dominant consideration in our publications policy. We need more money to be able to publish more of the kinds of papers that microwave engineers need and want. I understand that we are now accumulating a backlog of "accepted" but unpublished papers. I also hear that our printing is done abroad to save money, but this results in 1-2 months extra delay in distribution. This is a deplorable situation. If we can increase the clarity and usefulness of the papers we present, we might increase the membership in S-MTT and the number of subscribers. I presume that would help. In addition, I recommend that the TRANSACTIONS seek and accept advertising much as was done in the old IEEE and IRE Proceedings of the early 1960's and before. Advertising is often newsworthy and is avidly read by many practicing engineers. It will, in my opinion, help to increase our readership, as well as provide additional revenue. Advertising matter should be separated from editorial matter to permit deletion and compact binding and to avoid the confusion of mixed material on a single page.

Correction to "Different Representations of Dyadic Green's Functions for a Rectangular Cavity"

PAWEL ROZENFELD

In the above paper,¹ I noticed two small errors. The first one is the lack of the tilde over term $\nabla' \times \bar{G}_e(\bar{R}'/\bar{R})$ in the surface integral of (20) (p. 599). The second one is the lack of the prime over I_0 in the expression for B_2 in the left column, fifth line from the bottom on p. 601.

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¹ C. T. Tai and P. Rozenfeld, *IEEE Trans. Microwave Theory Tech.*, vol. MTT-24, pp. 597-601, Sept. 1976.