

The key step in the method used is the placement of additional image line sources and reduction of right-hand side of (3) to a periodic function. One of the factors in this representation, viz., $T_1(x, y)$ in (11), $T_2(x, y)$ in (17), $T(x, y)$ in (25), $U(x, y)$ in (30), and $W(x, y)$ in (32), is the potential function which satisfies the boundary conditions. Thus, this part of the procedure can be used in evaluation of potential functions in similar cases. This technique could also be used for finding Green's functions for triangular planar circuits with all short circuit boundaries [8]. A similar procedure can be used for finding Green's function for solution of Poisson's equation also.

REFERENCES

- [1] T. Okoshi and T. Miyoshi, "The planar circuit—An approach to microwave integrated circuitry," *IEEE Trans. Microwave Theory Tech.*, vol.

- MTT-20, pp. 245–252, Apr. 1972.
 [2] P. Silvester, "Finite element analysis of planar microwave networks," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-21, pp. 104–108, Feb. 1973.
 [3] T. Okoshi, Y. Uehara, and T. Takeuchi, "The segmentation method—An approach to the analysis of microwave planar circuits," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-24, pp. 662–668, Oct. 1976.
 [4] J. Helszajn and D. S. James, "Planar triangular resonators with magnetic walls," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-26, pp. 95–100, Feb. 1978.
 [5] J. Helszajn, D. S. James, and W. T. Nisbet, "Circulators using planar triangular resonators," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-27, pp. 188–193, Feb. 1979.
 [6] P. M. Morse and H. Feshbach, *Methods of Theoretical Physics*. New York: McGraw-Hill, 1953, ch. 7, p. 812.
 [7] Schelkunoff, *Electromagnetic Waves*. New York: Van Nostrand, 1943, p. 393.
 [8] T. Okoshi and S. Kitazawa, "Computer analysis of short-boundary planar circuits," *IEEE Trans. Microwave Theory Tech.*, vol. MTT-23, pp. 299–306, Mar. 1975.

Letters

Addendum to "Closed-Form Expressions for the Current or Charge Distribution on Parallel Strips or Microstrip"

EDWARD F. KUESTER AND DAVID C. CHANG

It has been called to the authors' attention that (28) in the above paper¹ is too crudely approximated. The correct expression should read

$$C_m \cong \epsilon_r \frac{2l}{t} + \frac{2}{\pi} \left[\ln \left(\frac{2l}{t\sqrt{a_\epsilon}} \right) + 2(\epsilon_r + 1) \ln 2 \right].$$

Manuscript received June 12, 1980; revised June 13, 1980.

The authors are with the Electromagnetics Laboratory, University of Colorado, Boulder, CO 80309.

¹E. F. Kuester and D. C. Chang, *IEEE Trans. Microwave Theory Tech.*, vol. 28, pp. 254–259, March 1980.

Also, two further references on the subject have been discovered. Rochelle [1] gives an expression for C_p using only a constant trial function for $\rho(y)$. The error in the resulting formula can be as large as 5 percent, considerably larger than that obtainable from (14) of the subject paper. Shchapoval [2] has presented a variety of expressions valid for different ranges of l/t and ϵ_r for the capacitance as well as $\rho(y)$ of microstrip. In particular, he has obtained the limiting form of (20) of the paper in the case where $\epsilon_r \gg 1$.

REFERENCES

- [1] J. M. Rochelle, "Approximations for the symmetrical parallel-strip transmission line," *IEEE Trans. Microwave Theory Tech.*, vol. 23, pp. 712–714, 1975.
 [2] E. A. Shchapoval, "Capacitance, inductance and effective relative permittivity of microstrip line," *Electron. Lett.*, vol. 11, pp. 225–226, 1975 (in Russian).