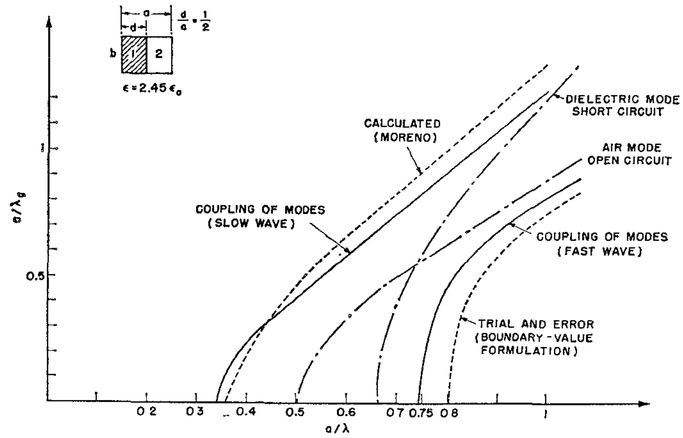

Fig. 4—Propagation in rectangular waveguide half-filled with dielectric material.

where

$$\Gamma_1^2 = p_1^2 - k_1^2 = \left[\frac{\pi}{d}\right]^2 - \left[\frac{\epsilon_1}{\epsilon_0}\right]k_0^2$$

$$k_0^2 = \omega^2\mu_0\epsilon_0,$$

$$\Gamma_2^2 = p_2^2 - k_0^2 = \left[\frac{\pi}{2d}\right]^2 - k_0^2$$

$$K = \frac{\pi}{d\sqrt{d(a-d)}} = \frac{4\pi}{a^2}.$$

A few algebraic transformations lead to

$$\left(\frac{a}{\lambda_g}\right)^2 = -\frac{1}{8}\left\{\left[5 - 13.8\left[\frac{a}{\lambda}\right]^2\right] \pm \sqrt{\left[3 - 5.8\left[\frac{a}{\lambda}\right]^2\right]^2 + 6.5}\right\}.$$

If we solve for the cut-off wavelength, we find that $a/\lambda_c = 0.34$ or $a/\lambda_c = 0.74$. Here we see that we obtain two solutions for $\lambda_g(\lambda)$ as a result of the coupling between the modes in the two subwaveguides. One is a slow wave, and the other a fast wave.

The results of our calculation are plotted in Fig. 4 and compared with the results of an exact computation based on the boundary-value formulation.[6]

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[6] Moreno, *op. cit.*, p. 192.

CORRECTION

R. C. Johnson, author of "Design of Linear Double Tapers in Rectangular Waveguides," which appeared on pp. 374–378 of the July 1959 issue of these TRANSACTIONS has brought the following corrections to the attention of the Editor.

The first line under (2) should read "where γ_m is the propagation constant in the mth segment."

The expression for b above (7) should be

$$b = b(x) = b_0 + \frac{b_1 - b_0}{L}x.$$

The integral in (14) can be evaluated in closed form; therefore, instead of determining l through the use of (15), it is preferable to use

$$= \frac{L}{2(a_1 - a_0)}\left[\frac{2a_1}{\lambda_{g1}} - \frac{2a_0}{\lambda_{g0}} + \arctan\frac{2a_0}{\lambda_{g0}} - \arctan\frac{2a_1}{\lambda_{g1}}\right],$$

where

$$\lambda_{g0} = \frac{\lambda}{\sqrt{1 - (\lambda/2a_0)^2}}$$

$$\lambda_{g1} = \frac{\lambda}{\sqrt{1 - (\lambda/2a_1)^2}}.$$

The imaginary operator was left out of the exponent term of (19); it should be

$$\Gamma = \frac{i}{8\pi L/\lambda_g}\left[\frac{b_1 - b_0}{b_1}\exp\left(-i4\pi L/\lambda_g\right) - \frac{b_1 - b_0}{b_0}\right]. \quad (19)$$

The close parenthesis symbol was left out of the cosine term in (20); it should be

$$|\Gamma| = \frac{1}{8\pi L/\lambda_g}\left|1 - \frac{b_0}{b_1}\right|\left[1 + \left(\frac{b_1}{b_0}\right)^2 - 2\left(\frac{b_1}{b_0}\right)\cos\left(4\pi L/\lambda_g\right)\right]^{1/2}. \quad (20)$$