propagates, the pattern of the transverse electric field moves along with it; actually the movement of the field patters is what we call a wave propagation. As the transverse electric field advances, it drags the charges inside the conductor with it, which leads to the axial current flow. Visualizing this physical picture saves researchers the trouble of interpreting mathematical expressions without a sense of direction, which may lead to wrong conclusions.

3. Chow *et al.* misunderstood and misquoted our paper regarding the assumption $\partial/\partial x = \partial/\partial y = 0$. They thought that we made this approximation for numerical calculations in our paper [2]. In [2], it is pointed out that this approximation was mentioned *only* to extract the physical meaning of $\nabla\Psi$. It was never used in the analysis nor in the simplified solution. Moreover, the assumption $\partial/\partial x = \partial/\partial y = 0$ is a special case, or represents a subcategory, of TEM waves. In general, TEM waves require the transverse divergence operator to be

$$\nabla_t = \partial/\partial x \boldsymbol{a}_x + \partial/\partial y \boldsymbol{a}_y = 0. \tag{16}$$

Thus TEM, or quasi TEM, waves allow variations in the x- and y-directions. A simple example of a TEM wave which is not a uniform plane wave is the fundamental mode of the microstrip line when the entire space is uniformly filled with the same dielectric material (e.g., when the substrate is removed to obtain an air-filled microstrip line). This structure supports a pure TEM-wave, while allowing both the electric and magnetic fields to vary in the transverse plane. Also the charge and current singularities are strongly pronounced despite the fact that this is a TEM-wave.

Finally, we would like to point out that the authors who utilized the incremental inductance approximation, including Wheeler himself, Pucel *et al.* and Mittra and Itoh, all of them acknowledged that this is just an approximation valid only under certain conditions. Therefore, when a researcher presents results that may not agree with the incremental inductance rule, nobody should automatically assume that the new results are wrong.

It is planned to execute a more accurate analysis based on the full wave solution presented in [2]. The accuracy of the numerical results presented in [2] will be checked against results of the more rigorous analysis.

In conclusion, we affirm that the axial current distributions in superconducting microstrip lines has a strong dependence on the charge density and the substrate's dielectric constant. Also, this strong dependence on the dielectric constant does not automatically lead to a measurable increase in the attenuation.

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Corrections to "A Study of the Nonorthogonal FDTD Method Versus the Conventional FDTD Technique for Computing Resonant Frequencies of Cylindrical Cavities

Paul H. Harms, Jin-Fa Lee, and Raj Mittra

A few corrections should be noted in our paper [1]. The reference numbers in Table I and II are incorrect, and a third reference should be added. Also, a mode shown for the results of the nonorthogonal FDTD analysis in Fig. 9 (b) was not included in Table II. This error results from the difficulty of identifying modes with the FDTD analysis, because only the frequency spectrum of the field is provided at a few points in the cavity. In comparing the FDTD results with data from the technical literature, it is difficult to match values mode-for-mode unless one knows what modes are

TABLE I
COMPARISON OF THE LOWER ORDER RESONANT FREQUENCIES FOR THE CYLINDRICAL CAVITY WITH A DIELECTRIC ROD FILLING (ϵ_r = 37.6, a = 1.00076 cm, b = 1.27 cm, L = 1.397 cm)

Mode	Ref. [13] (GHz)	FEM [12] (GHz)	Nonorthogonal FDTD (GHz)
TM010	—	1.50	1.47
TM110	—	2.44	2.38
HE111	2.49	2.50	2.48
TM011	3.38	3.38	3.38
HE211	3.40	3.38	3.38
HE121	3.81	3.83	3.79

TABLE II
COMPARISON OF THE LOWER ORDER RESONANT FREQUENCIES FOR THE CYLINDRICAL CAVITY WITH A DIELECTRIC DISK FILLING (ϵ_r = 35.74, a = 0.8636 cm, b = 1.295 cm, H = 0.762 cm, $L1$ = $L2$ = 0.381 cm)

Mode	Refs. [13], [15] (GHz)	FEM [12] (GHz)	Nonorthogonal FDTD (GHz)	% Difference (Ref. [13] & FDTD)
TE01	3.428	3.51	3.53	3.0%
HE11	4.224	4.27	3.90	7.7%
HE12	4.326	4.36	4.17	3.6%
TM01	4.551	4.54	4.53	0.5%

Manuscript received June 1.
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IEEE Log Number 9202909.

included for comparison. The percent difference in Table II, shown on the previous page, is computed with respect to data from [15] because experiments were used to validate the results. The largest discrepancy between the nonorthogonal FDTD results and the values from [15] is 7.7%. The mesh density of ten cells per wavelength at 3.1 GHz is not sufficient for computing this mode with precision; however, the other modes were computed within 3.6% of the data in [15].

We thank Dr. Mahadevan of the University of Illinois for bringing this matter to our attention.

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Correction to "Analysis of Multilayer Microstrip Lines by a Conformal Mapping Method"

Jiří Svačina

The above paper[1] contains one typographical error. Equation (7) should read as follows:

$$q_1 = \frac{1}{2} + \frac{0.9}{\pi \cdot \ln \frac{8h}{w}}. \qquad (7)$$

Manuscript received June 10, 1992.

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