Letters

Comment on "Transmission Line Identities for a Class of Interconnected Coupled-Line Sections with Application to Adjustable Microstrip and Stripline Tuners"

ROBERT G. ROGERS

Some years ago I considered a class of tuners the author discussed in the above paper,[1] and all but the two forms of Fig. 6 were discarded as being unsuitable to practical tuning methods.

The author states incorrectly that it is necessary to combine two or more of the circuits he shows in order to make a practical tuner. The forms of Fig. 6, as they stand, will match any two impedances whose real parts have the same sign [1]. The circuit of Fig. 6(b) has been used in a very successful transistor oscillator [2]. A paper on this oscillator was published in 1977 [3].

References

[1] R. G. Rogers, "Microwave impedence-matching networks," U.S. Patent 3 745 488, July 10, 1973.

[2] ——, "Double-mode tuned microwave oscillator," U.S. Patent, 3 699 475, Oct. 17, 1972.

[3] ——, "A dual mode tuning circuit for microwave transistor oscillators," *IEEE Trans. Microwave Theory Tech*, vol. MTT-25, pp. 120–127, Feb. 1977.

Reply[2] by Adel A. M. Saleh[3]

In spite of what I thought was a careful search of the literature before writing my paper in question, I obviously missed Mr. Rogers' work where he considered the tuner of Fig. 6(b). For that, I apologize to him, and indeed to the reader, and can only promise to be more careful next time.

Each of the tuners in Fig. 6, as it stands, can indeed match any impedance only if the position (ϕ) of the bridging wire and the overall length (ψ) of the stubs are both adjustable. Adjusting the latter is quite impractical in a microstrip medium, and is somewhat awkward in a stripline medium (especially at higher microwave frequencies). In fact, if one is allowed to vary the length of a shorted stub in these media, one might as well use an adjustable double-stub tuner! Thus, the overall lengths of the various stubs and lines should be left fixed. It then follows, as I stated in my paper, that at least two of the tuning elements of Figs. 4, 5, and 6 are needed to match an arbitrary impedance.

Finally, I disagree with Mr. Rogers' unsubstantiated statement that, of all the tuning elements presented in my paper, the two given in Fig. 6 are the only practical ones. To be sure, these two are attractive for some applications, especially where the proximity of the input and output ports of the tuner is desirable. However, the circuit layout, the range and the frequency response of the impedance to be matched, and the requirement to either ground or to maintain a dc bias voltage on the line may make other tuners more suitable for other applications. For example, I found that the yin-yang tuner (Fig. 9) and the ganged-stubs tuner (Fig. 10), which each consists of a cascade of two sections of the tuning element of Fig. 5(a), are quite convenient in matching the input and output ports of an FET amplifier on a microstrip.

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[1] A. A. M Saleh, *IEEE Trans. Microwave Theory Tech*, vol MTT-28, pp. 725–732, July 1980.
[2] Manuscript received February 9, 1981
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Correction to "High-Accuracy Numerical Data on Propagation Characteristics of α-Power Graded-Core Fibers"

KIMIYUKI OYAMADA AND TAKANORI OKOSHI

In the above paper,[1] the following typographical errors occurred:

(1) The last two lines in page 1113 should read "...WKB method [1], power-series expansion method [2], Rayleigh..."

(2) The minus signs in the numerators of equation (9a) and (9b) should be deleted.

(3) In equation (21), the upper integral limit in the numerator should be ∞ rather than t.

(4) In equation (22), $i+j+\alpha+2m+2$ and $i+j+2m+2$ should be bracketed as $(i+j+\alpha+2m+2)$ and $(i+j+2m+2)$, respectively.

Manuscript received February 9, 1981
The authors are with the Department of Electronic Engineering, The Faculty of Engineering, University of Tokyo, Bunkyo-ku, Tokyo, Japan.
[1] K. Oyamada and T. Okoshi, *IEEE Trans Microwave Theory Tech.*, vol MTT-28, pp. 1113–1118, Oct 1980.