Comments and Corrections

Comments on "Wideband Coupled-Line Microstrip Filters With High-Impedance Short-Circuited Stubs"

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***Index Terms*—Coupled lines, wide-band pass filter .**

In the above paper [1], authors analyze the realization of coupled-line filters by means of the Π equivalent circuit of a short-circuited coupler. Therefore, a a wide-band bandpass filter composed of several quarter-wavelength coupled-line sections connected in cascade is designed and values for the Π equivalent network are calculated. Then, an alternative to implement a high-impedance short-circuited stub (Fig. 1(a)) using a pair of coupled lines with three short circuits (Fig. 1(b)) is proposed. Nevertheless, the equation [1, (2)] used to calculate the equivalent characteristic impedance Z_c of the proposed alternative seems to be incorrect.

The admittance matrix of a lossless two-port short-circuited coupled lines, as drawn in Fig. 2, can be expressed as [2]

$$[Y] = \frac{1}{j2Z_{oe}Z_{oo}} \begin{bmatrix} (Z_{oe}+Z_{oo})\cot\theta & (Z_{oe}-Z_{oo})\csc\theta \\ (Z_{oe}-Z_{oo})\csc\theta & (Z_{oe}+Z_{oo})\cot\theta \end{bmatrix}. \quad (1)$$

Now, from (1), if the output port is short-circuited to ground, it is straightforward to calculate the input impedance of the resultant one-port (Fig. 1(b)) as

$$Z_{\text{in}} = jZ_c \tan\theta \quad (2)$$

where

$$Z_c = \frac{2Z_{oe}}{\frac{Z_{oe}}{Z_{oo}}+1} \quad (3)$$

and $Z_{oe} \geq Z_{oo}$.

Therefore, the equivalent characteristic impedance Z_c (3) of the coupled lines with three short circuits is different to the given in [1]. Furthermore, attending to (3), this element seems to be not appropriate to synthesize high-impedance short-circuited stubs. When the coupling level is negligible, $Z_c \approx Z_{oe} \approx Z_{oo}$, and for any other value of coupling, the higher the coupling factor, the lower the value of Z_c.

Table I shows the new values of Z_c calculated by using the even- and odd-mode impedances found in ([1, Table II]). As seen, there is a great difference between the characteristic impedances computed by means of (3) and [1, (2)]. In addition, it is demonstrated that for $Z_c^{[1]} = 700\,\Omega$ the frequency response of the filter using the proposed circuit is the same as the original one because the actual synthesized characteristic impedance is $Z_c = 175.8\ \Omega$, very similar to the desired theoretical value of 176.05 Ω in [1].

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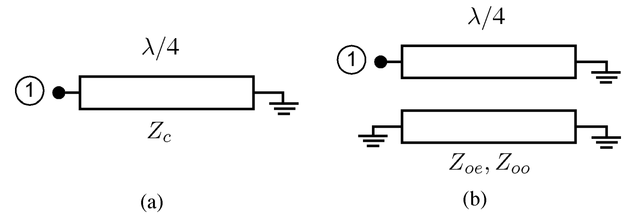

Fig. 1. Single short-circuited stub (a) and proposed equivalent circuit (b).

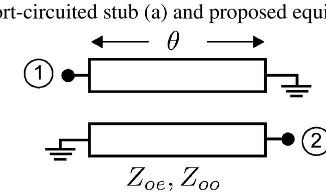

Fig. 2. Short-circuited coupled lines.

TABLE I
CHARACTERISTIC IMPEDANCE Z_c FOR SEVERAL VALUES OF EVEN AND ODD MODE IMPEDANCES. $Z_c^{[1]}$ STANDS FOR THE VALUES GIVEN IN [1]

Z_{oe} (Ω)	67.09	83.86	105.67	134.18	234.8
Z_{oo} (Ω)	40.15	50.19	63.24	80.30	140.5
$Z_c^{[1]}$ (Ω)	200	250	315	400	700
Z_c (Ω)	50.23	62.80	79.12	100.47	175.80

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Reply to 'Comments on "A Modified Gysel Power Divider of Arbitrary Power Ratio and Real Terminated Impedances"'

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Dr. Park points out that the structure in the authors' paper [1] can be derived as a special case of the unequal dual-band Gysel power divider proposed in [2]. Actually, this conclusion is not correct if the shorted-circuit z_v stub in [2] is not eliminated initially.

First, if the frequency ratio f_2/f_1 is equal to 3, the desired electrical length θ_1 at the first frequency f_1 will equal to $\pi/4$. In [2, eq. (46)], according to the results in [2]. However, the given electrical length θ_1

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