Abstracts

Study of the dispersion characteristics of planar chiral lines

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This paper analyzes the dispersion characteristics of the fundamental modes of some basic chiral planar transmission lines: microstrip, slot-line, coplanar waveguide (CPW), and a coupled microstrip line, including the possible frequency dependence of the chiral parameters. The dispersion characteristics are computed after finding the zeros of the determinantal equation resulting from the application of the Galerkin method in the spectral domain. Because of the biisotropic nature of the substrate, a 4/spl times/4 matrix differential equation has been solved to obtain the spectral dyadic Green's function (SDGF). This function is explicitly obtained in terms of a closed-form 4/spl times/4 transition matrix that relates the transverse electromagnetic fields at the upper and lower interface of the chiral substrate. This fact is key to developing fast computer codes since it avoids numerical matrix exponentiations. The numerical results have shown that the chiral nature of the substrate basically adds an additional parameter to control the propagation characteristics of the analyzed lines and, in general, makes the lines more dispersive, showing even resonant-like behavior.

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