Abstracts

Rectangular modes and dyadic Green's functions in a rectangular chirowaveguide. II. Results

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"Rectangular modes and dyadic Green's functions in a rectangular chirowaveguide. II. Results." 1999 Transactions on Microwave Theory and Techniques 47.1 (Jan. 1999 [T-MTT]): 74-81.

For pt. I see ibid., vol. 47, no. 1, p. 67-73 (1999). A general expression of spectral-domain dyadic Green's function (DGF) in a rectangular chirowaveguide has been represented in Part I of this paper. As an application of the theory developed, this paper represents an analytic solution of electromagnetic (EM) wave propagation in the rectangular chirowaveguide. Firstly, the results of EM fields in closed form are obtained by using the DGF decomposition method, which is essentially a combination of the wavefield decomposition method followed by eigenfunction expansion of DGF. Secondly, the novel features of the analytically derived dispersion relations are analyzed and the effects of chirality on the novel features of the dispersion relations and propagation constant are discussed. Distributions of magnetic and electric fields of different order of modes are derived analytically and are then represented in vector field plots and contour plots. Also, the effects of chirality responsible for both plots are discussed. Finally, comparisons between part of the current results and those available in the literature are made. It is observed that this analysis encompasses all the published novel features for a rectangular chirowaveguide, in addition to some newly observed features. The analysis in this part of the paper confirms the applicability of the theoretical analysis given in Part I.

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