Abstracts

A method for investigating a class of inhomogeneous stripline circulators

Broad-band stripline circulators are studied by means of a mixed numerical technique which employs both boundary integral and segmentation methods; this technique allows the analysis of planar circuits where the substrate is constituted by several regions with arbitrary shapes and different electrical properties. It is known that tracking circulators require matching structures because they present a low-gyrator impedance (real and almost constant in an octave frequency band). The matching structures (generally tapers or multisection's transmission line transformers) must be realized on a reciprocal substrate. The overall device (circular disk on ferrite substrate and matching structure on dielectric substrate) constitutes a planar circuit with an inhomogeneous medium. The method of study presented here allows the determination of the overall impedance matrix of the planar circuit constituted by the nonreciprocal disk with sections of striplines connected to each port; in this way, the discontinuities between reciprocal and nonreciprocal medium are included in characterization of the overall device. Moreover the accuracy of the representation is increased, In fact, the coupling ports of the overall device may be located at a suitable distance from the disk boundary where higher-order modes excited by the discontinuities have been sufficiently attenuated and only the TEM mode is present on the striplines (which is the only one considered in the design of the matching structures).

❏ Return to main document.