Abstracts

Polarization Insensitive Phase Shifter for Use in Phased Array Antennas

M.C. Mohr and S.R. Monaghan. "Polarization Insensitive Phase Shifter for Use in Phased Array Antennas." 1967 G-MTT International Microwave Symposium Program and Digest 67.1 (1967 [MWSYM]): 91-94.

Theory of Operation - The theory of operation of a non-reciprocal circularly polarized (CP) phase shifter has been described in a paper by the authors, and the PIP device is simply a modification. The CP phaser can be converted into a PIP device through the modification indicated in Figure 1. A second ferrite rod is placed in tandem with respect to the first, and a coil is wrapped around the second rod in the opposite direction so that the internal magnetization of the second rod opposes that of the first. Since the magnetic fields are reversed for the two rods, the phase-current characteristics for each rod are mirror images. For a given positive value of coil current (I/sub o/) and right-handed circular polarization input, rod No. 2 delivers a phase delay of phi/sub 2/, and rod No. 1 delivers a phase advance of phi/sub 1/. The total reciprocal phase shift through the device is, therefore, a phase delay of phi = |phi/sub 2/| - |phi/sub 1/|. If left-handed circular polarization were applied to the phase shifter instead of right-handed, the first rod would give a phase delay, and the second would give a phase advance for the same direction of coil current. In other words, the roles of the two rods would be reversed, but the phase shift through the device would still be a phase delay of phi.

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