Abstracts

Analysis of Integrated-Optics Near 3 dB Coupler and Mach-Zehnder Interferometric Modulator Using Four-Port Scattering Matrix

R.H. Rediker and F.J. Leonbeger. "Analysis of Integrated-Optics Near 3 dB Coupler and Mach-Zehnder Interferometric Modulator Using Four-Port Scattering Matrix." 1982 Transactions on Microwave Theory and Techniques 30.10 (Oct. 1982 [T-MTT] (Special Issue on Optical Guided Wave Technology)): 1801-1804.

The scattering matrix formalism for a lossless four-port device is used to describe the interferometric performance of the integrated optics near 3dB coupler and, consequently, the Mach-Zehnder interferometric modulator as a function of coupler and/or power imbalance. For the case of a coupler consisting of three single-mode dielectric guides forming a Y junction, a fourth port is incorporated which takes W the power radiated out of the guided-wave system in the vicinity of the junction. The interferometric properties of the coupler are shown to be relatively insensitive to fabrication and/or design errors of a magnitude which would make the use of this junction in the reverse direction as a 3 dB divider very marginal. A coupler with an extinction ratio as an interferometer better than -26 dB corresponds to a power divider which couples 22 percent more power into one arm than the other. It is also shown that the near 3 dB coupler used as the output of an interferometric modulator is similarly insensitive to the inequality of the powers in the two arms.

❑ Return to main document.