Abstracts

Time-domain optical response of an electrooptic modulator using FDTD (Dec. 2001 [T-MTT])

M.M. Tomeh, S. Goasguen and S.M. El-Ghazaly. "Time-domain optical response of an electrooptic modulator using FDTD (Dec. 2001 [T-MTT])." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2276-2281.

A time-domain analysis of an LiNbO/sub 3/ electrooptic modulator using the finite-difference time-domain (FDTD) technique is performed. This allows for the calculation of optical modulation and the time-domain optical response of an electrooptic modulator. The electromagnetic fields computed by FDTD are coupled to standard electrooptic relations that characterize electrooptic interactions inside the embedded Ti diffused LiNbO/sub 3/ optical waveguides. The electric field-dependent change in the index of refraction inside these optical waveguides and resulting minute phase shifts imparted to optical signals propagating along the device are determined in time, allowing for the simulation of optical intensity modulation. This novel approach to LiNbO/sub 3/ electrooptic modulators using a coupled FDTD technique allows for previously unattainable investigations into device operating bandwidth and data transmission speed.

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