Analysis of Wave Propagation in Anisotropic Film Waveguides with Bent Optical Axes

M. Geshiro, Y. Kaihara and S. Sawa. "Analysis of Wave Propagation in Anisotropic Film Waveguides with Bent Optical Axes." 1984 Transactions on Microwave Theory and Techniques 32.4 (Apr. 1984 [T-MTT]): 339-339.

We present an analytical method for studying the wave propagation in anisotropic planar optical waveguides where the oblique angle between the optical axis and the propagation axis changes arbitrarily in the film surface along the propagation length. The analysis is based on the coupled-mode theory, where the coupling between a guided mode and radiation modes is regarded to be of major importance. We apply a hypothetical boundary method to quantize the continuum of radiation modes, and replace the continuously changing oblique angle by a step approximation. It is shown that these approximations do not degrade the computational accuracy. To exemplify the wave-propagation properties, we deal with a waveguide consisting of LiNbO/sub 3/ and let the oblique angle change linearly along the propagation length. It is found that the incident guided TE mode leaks its power primarily in a very narrow region centered on the critical oblique angle, and that TE radiation modes play an important role in the power conversion, even though they carry far less power than the TM radiation modes.

❑ Return to main document.