Abstracts

Propagation in Twisted Square Waveguide

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The problem of propagation of TE modes in twisted rectangular waveguides has been solved except for the case where one of the propagating modes becomes degenerate. The purpose of this paper is to show how to obtain a solution for degenerate modes in a twisted rectangular waveguide, with emphasis on the particular case of the square waveguide, for which the lowest order mode is degerate. It is shown that the propagation constant for the twisted square waveguide can be expressed as an asymptotic series, the first term being the propagation constant for a straight square waveguide and the first order correction term being of order 1/ L where L is the distance in which the guide makes one full rotation. The propagation constant for a nondegenerate mode in a twisted rectangular waveguide, on the other hand, can be expressed in a similar manner except that the first-order correction term is of order 1/ L/sup2/. Some comments are offered on the nature of the transition when the propagating mode is almost degenerate.

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