Abstracts

Forward and Backward Scattered Modes in Multimode Nonuniform Transitions

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Analyses previously published on the subject of mode conversion consider only the forward scattered modes. The present paper investigates both the forward and backward scattered modes at frequencies from cutoff to far away from cutoff in a multimode nonuniform waveguide. The four coupled telegraphist's equations with varying coefficients are transformed into the form of coupled Volterra integral equations of the second kind and these integral equations are solved by an iteration method. The solutions are valid for all frequencies from cutoff to far away from cutoff. For uniform waveguides the solutions correctly reduce to those of the original forward traveling launching mode. The solutions also show the characteristics of "propagation" in the tapered cutoff region of the waveguide. The accuracy of the series solution is discussed, and possible wide applications of the results to a variety of problems are mentioned.

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