Abstracts

Rigorous Analysis of Multiple Coupled Rib Waveguides

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The general problem of multiple coupled rib wave-guides, where energy may be leaked from one guide to the other via the substrate and radiation mode, is of great practical and theoretical importance. Rigorous results including substrate and air modes coupling are hard to find for the general case of coupling of two or more different guides, due to the considerable complexity arising. In this contribution, we develop the analysis in terms of a cascade of the transverse steps, utilizing a variational solution with a single trial function and making explicit use of edge singularities at the dielectric corners in order to produce an effective and rigorous solution. Multiple coupled rib guides are then reduced to a cascade of interacting step discontinuities in the transverse direction, Where comparison is possible the numerical results obtained by the method are seen to be as accurate as those obtained by the FEM/FDM methods, but with a fraction of the computer time and memory involved.

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