Abstracts

Complex and Backward-Wave Modes in Inhomogeneously and Anisotropically Filled Waveguides

A rigorous analysis of lossless inhomogeneously and anisotropically filled waveguides of arbitrarily shaped cross section is presented. The mode propagation constants squared appear as eigenvalues of a real infinite-dimensional characteristic matrix, which is, in the general case, nonsymmetric. Complex conjugate pairs of eigenvalues are then possible, which give rise to complex modes. Modes at cutoff are shown to be either TE or TM with real cutoff frequencies. An investigation of the power flow shows that backward-wave modes may exist as well. Different orthogonality relations are derived from which the power coupling between complex modes is investigated.

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