Abstracts

An Alternative Theory of Optical Waveguides with Radial Inhomogeneities

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The field equations are solved for an inhomogeneous dielectric cylinder with azimuthal symmetry. The solutions are shown to satisfy particular orthogonality relations and allow derivation of simple, generally valid expressions for dispersion relation, power flow, energy density, and group delay. A method for numerical solution of the equations, the modified staircase method, is proposed. It is shown that it leads to expressions similar to those of the Wentzel-Kramer-Brillouin (WKB) method, but, unlike the latter, is valid for the lowest order guided modes. The method has been tested in a computer program.

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