An inverse eigenvalue problem of the theory of optical waveguides

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Abstract

© 2014 IEEE. We present a new method for calculation of permittivities of dielectric materials using optical fiber's propagation constants measurements. Our numerical algorithm is based on approximate solution of a nonlinear nonselfadjoint inverse eigenvalue problem for a system of weakly singular integral equations. We prove that it is enough to measure propagation constants of fundamental eigenmode only at two frequencies for reconstruction of dielectric constants of core and cladding of a waveguide.