Waveguide Propagation Modes and Quadratic Eigenvalue Problems

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Abstract

This paper presents a direct approach to determine numerically the propagation modes in waveguides via a finite element method. Given a pulsation $\omega$, a quadratic eigenvalue problem is solved to obtain the propagation constant $\beta$. The main advantage of the new method lies in its generality: it allows the computation of $\beta$ from a given $\omega$, which is important to cope with the chromatic dispersion of optical materials, and it can take into account general anisotropic materials—a crucial advantage for the modeling of twisted microstructured optical fibres.

Topic: A2 Algorithms