Abstracts

Efficient numerical analysis of arbitrary single-mode optical fibers using Pade approximants

V. Fiumara, V. Galdi, V. Pierro and I.M. Pinto. "Efficient numerical analysis of arbitrary single-mode optical fibers using Pade approximants." 1998 Microwave and Guided Wave Letters 8.9 (Sep. 1998 [MGWL]): 305-307.

We propose a new, fast, and accurate numerical technique for analyzing single-mode optical fibers with arbitrary (transverse) refractive index profile. The method is based upon a Pade (rational) approximation of the spectral domain Green's function of the fiber, obtained by solving a hierarchy of static problems. The sought eigenfrequency and modal field are accordingly estimated by computing, respectively, the dominant pole and the related residual of the rational approximant. Numerical simulations and comparison with known analytical results indicate that the proposed method is highly accurate, reliable, and computationally affordable.

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