Abstracts

The Origin of Spurious Modes in Numerical Solutions of Electromagnetic Field Eigenvalue Problems

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The appearance of unphysical "spurious solutions" in addition to the true physical modes of a resonator or waveguide is a problem which pertains to a variety of numerical methods for the electromagnetic field eigenvalue problem e.g. finite-elements, boundary-elements, finite-differences, point-matching and the spectral domain method. The common cause of the problem is shown to be a misconception of the discretization of a parameter dependent indefinite operator, in particular the application of the method of moments (MoM) and equivalent procedures to problems which they are not suited for. The method of least squares with intermediate projection (MLSIP) is described as one reliable approach for discretization of parameter dependent indefinite operators.

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