Abstracts

High-Order Triangular Finite Elements for Electromagnetic Waves in Anisotropic Media

Specialized functional are introduced for traveling and circulating electromagnetic waves in planar and axisymmetric two-dimensional geometries, without recourse to complex arithmetic. The singularities in the functional for axisymmetric geometries are eliminated by a transformation of the field components. The transformed fields are approximated by high-order interpolation polynomials over triangular regions in the x-y and r-z coordinate planes. A matrix expression assembled from constant element matrices and geometric factors relating to triangle shape, size, and position is obtained which is the discretized equivalent of the original functional. The necessary element matrices have been computed to sixth-order polynomial approximation. The procedure for assembling a global problem is stated. Finally, a matrix equation is generated by minimizing the discretized functional.

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