Abstracts

On the Scalar Approximation in Fiber Optics (Short Papers)

C.-C. Su. "On the Scalar Approximation in Fiber Optics (Short Papers)." 1988 Transactions on Microwave Theory and Techniques 36.6 (Jun. 1988 [T-MTT]): 1100-1103.

It is widely accepted that the scalar approximation is valid when the gradient of the pemittivity distribution /spl nabla/ epsilon/epsilon is small enough. Such a condition is rather demanding, however, since it precludes a rapidly varying permittivity distribution, which is usually the case in a practical optical fiber, due to some kind of fluctuation in a fabrication process. In this investigation, we derive the scalar approximation from the electric field integral equation. From the result it is seen that the applicability of the scalar approximation does not depend on the roughness in the permittivity distribution so long as the permittivity in the core is close to that in the cladding.

❑ Return to main document.