Abstracts

Input impedance of a coaxial-line fed probe in a thick coaxial-line waveguide

Edward Kai-Ning Yung, Ze Ming Xie and Ru Shan Chen. "Input impedance of a coaxial-line fed probe in a thick coaxial-line waveguide." 2000 Transactions on Microwave Theory and Techniques 48.10 (Oct. 2000 [T-MTT]): 1707-1711.

The Green's functions for determining the electromagnetic fields inside a semiinfinite coaxial line due to a radially directed, infinitesimally thin, and short-current element have been derived. In addition to the TEM mode, TE and TM modes are also considered. Based on the Green's functions, a closed-form formula for determining the input impedance of a probe in a coaxial line terminated at an arbitrary load has been derived. Good agreement is observed between the theoretical results and experimental measurements over a wide frequency band for several configurations of interest. At low frequencies where the TEM mode is dominating, there is practically no difference between the results obtained by the rigorous analysis and those by a simple formula derived from the transmission-line theory. However, at frequencies where TE and TM modes are no longer insignificant, there is a noticeable discrepancy between the results obtained by the rigorous and not-so-rigorous methods.

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