Abstracts

Investigation of integration paths in the spectral-domain analysis of leaky modes on printed circuit lines

F. Mesa and D.R. Jackson. "Investigation of integration paths in the spectral-domain analysis of leaky modes on printed circuit lines." 2002 Transactions on Microwave Theory and Techniques 50.10 (Oct. 2002 [T-MTT]): 2267-2275.

The different integration paths that may arise in the spectral-domain analysis of leaky modes on open printed-circuit transmission lines such as microstrip are investigated. There are an infinite number of paths in the complex plane that may be used to construct leaky-mode solutions. Not all of the paths are valid mathematically. Among the mathematically valid ones, a certain subset correspond to paths that yield "physically valid" solutions. When tracking leaky-wave solutions as frequency changes, it is found that the propagation constants of the leaky modes may go through nonphysical "growing" regions where the attenuation constant is negative. These nonphysical regions may appear between physically valid frequency regions, implying that the leaky modes should be tracked in all frequency regions, including the nonphysical growing ones, in order to obtain the complete frequency dispersion behavior of the leaky mode. The migration of the leaky modes into these nonphysical growing regions gives rise to unconventional integration paths never seen before. Such paths must be used if the dispersion behavior of the leaky modes is to be plotted for all frequencies.

❑ Return to main document.