Abstracts

LSE- and LSM-Mode Sheet Impedances of Thin Conductors (Short Papers)

S. Amari and J. Bornemann. "LSE- and LSM-Mode Sheet Impedances of Thin Conductors (Short Papers)." 1996 Transactions on Microwave Theory and Techniques 44.6 (Jun. 1996 [T-MTT]): 967-970.

The sheet resistance of very thin conductors is commonly taken as R = 1/sigma t. We show that the sheet impedance, defined as the ratio of the tangential electric field at the surface of the conductor to the conduction current per unit length in the conductor, depends on the field distribution. The LSE (TE-to-y) and LSM (TM-to-y) modes used in the spectral domain immittance approach have sheet impedance which are distinct for vanishingly small or large values of the wavenumber gamma in the medium surrounding a thin conductor. In the limit gamma --> O and t/delta 1 <<Z/sup LSE//sub sh/ approaches R =1/sigma while Z/sup LSM/sub sh/ --> 2 1/sigma t. In the limit gamma --> O and t/delta << 1, Z/sup LSE//sub sh/ approaches R = 2/sigma t and Z/sup LSE//sub sh/ approaches R = 1/sigma t. When t/delta >> 1, the sheet impedance approaches the surface impedance Z/sub s/= (1 + j) /sigma delta and is independent of the field distribution.

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