Abstracts

The Inductance Matrix of a Multiconductor Transmission Line in Multiple Magnetic Media (Short Papers)

J.R. Mautz, R.F. Harrington and C.G. Hsu. "The Inductance Matrix of a Multiconductor Transmission Line in Multiple Magnetic Media (Short Papers)." 1988 Transactions on Microwave Theory and Techniques 36.8 (Aug. 1988 [T-MTT]): 1293-1295.

Consider a multiconductor transmission line consisting of N/sub c/ conducting cylinders in inhomogeneous media consisting of N/sub d/ homogeneous regions with permeabilities μ/sub i/, and permittivities epsilon/sub i/. The inductance matrix [L] for the line is obtained by solving the magnetostatic problem of N/sub c/ conductors in N/sub d/ regions with permeabilities μ/sub i/. The capacitance matrix [C] for the line is obtained by solving the electrostatic problem of N/sub c/ conductors in N/sub d/ regions with permittivities epsilon/sub i/. It is shown that [L] = μ/sub 0/epsilon/sub 0/[C']/sup -1/, where [C'] is the capacitance matrix of an auxiliary electrostatic problem of N/sub c/ conductors in N/sub d/ regions with relative permittivities set equal to the reciprocals of the relative permeabllities of the magnetostatic problem, i.e., epsilon'/sub i//epsilon/sub 0/ = μ/sub 0//μ/sub i/.

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