Abstracts

An Approximation for the Characteristic Impedance of Shielded-Slab Line

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It is shown how the parametric expressions for t/b and w/b of shielded-slab line, given by means of elliptic integrals in terms of two independent real parameters a and k, can be inverted. First q' = exp (-pi K/K') is expressed as an odd power series in exp (-pi v/(b - t)) whose coefficients are irrational functions of t/b. Here, w is the width of the slab, t is its thickness, and b is the spacing between the infinite parallel plates. Then k is expressed in terms of q' by a well-known formula, and an expression is derived which gives a in terms of q' and w/(b - t). When the series expressions for a and k are substituted in the formulas which yield the total capacitance C/sub 0/, of the shielded-slab line, it is found that the fringing capacitance C/sub f0/=C/sub 0//4 - w/(b - t), is given by an even power series in exp (-pi w/(b - t)), at least to the eighth power. These coefficients, which are irrational functions of t/b, are given explicitly. Finally, comparisons are made with exact values of Z/sub 0/.

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