Abstracts

Electromagnetic Theory of the Loosely Braided Coaxial Cable: Part I

J.R. Wait. "Electromagnetic Theory of the Loosely Braided Coaxial Cable: Part I." 1976 Transactions on Microwave Theory and Techniques 24.9 (Sep. 1976 [T-MTT]): 547-553.

A solution to Maxwell's equations subject to boundary conditions on counterwound helical wires is achieved. The helices are contained in a cylindrical surface that is concentric to a perfectly conducting center conductor of circular cross section. The permittivity of the annular region may be different from that of the external region. The excitation is taken to be symmetrical about the cable which leads to a considerable simplification of the formulation. The key step is to recognize that the assumed form of the current on the thin helical wires is a spatial harmonic expansion that leads to a doubly infinite expansion, in such harmonics, for the resultant fields. The inherent complication of the problem results from the intercoupling between the spatial harmonics of the helix currents. Various generalizations of the theory are also indicated.

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