Lower and Upper Bound Calculations on the Capacitance of Multiconductor Printed Transmission Line Using the Spectral-Domain Approach and Variational Method

A unified spectral-domain method is developed for accurate evaluation of the parameters of single and coupled microstripline-type structures containing a number of additional conducting strips with induced and/or zero potentials, located on several interfaces of dielectric layers. The Green's function technique in the spectral domain and the superposition principle for solutions of simple Dirichlet's problems are applied for the first step of the analysis in which a set of algebraic equations is to be derived. Extreme values of two variational functional are found for estimation of the upper and lower bounds on the line capacitance. Specific computations, carried out for new coupled coplanar lines with additional tuning conductive septums, illustrate the validity and efficiency of the presented method. It has been shown that equalization of the even- and odd-mode phase velocities can be achieved in this structure.

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