# Abstracts

## Solution of the Finite Length Septum Problem with Application to Periodic Mode Suppressors

A square waveguide with periodic septums is considered with a view towards determining the parameters of a structure which suppresses three of four possible propagating modes. The analysis is presented in two parts, the first of which is concerned with the isolated septum. Using available techniques, semi-infinite scattering matrices are determined for the semi-infinite septum for arbitrary $TE_{N0}$, $TE_{N1}$, and $TM_{N1}$ incident modes. These are used to derive Fredholm matrix equations which yield the field everywhere near the finite length septum. The leading terms of the inverted equations are the far-field transmission and reflection coefficients. The solutions are evaluated for several frequencies, and fifth degree polynomials are fitted for the computation of $S_{11}$ and $S_{12}$. The analysis for the $TE_{10}$ mode is applicable to an arbitrary height waveguide and may be used without modification for the "finite length" septum in conventional waveguide.  The second part is concerned with the periodic waveguide and assumes that the septums are far apart. A contour chart is introduced to visualize the performance of the periodic structure. The chart is especially useful when more than one propagating mode is involved and simplifies the design problem so that the parameters of practical structures may be obtained with little effort.

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