Abstracts

Analysis of the Arbitrarily Shaped Waveguide by Polynomial Approximation

R.M. Bulley. "Analysis of the Arbitrarily Shaped Waveguide by Polynomial Approximation." 1970 Transactions on Microwave Theory and Techniques 18.12 (Dec. 1970 [T-MTT] (1970 Symposium Issue)): 1022-1028.

Theory is described for a computer program EHPOL which produces polynomial approximations to eigenfunctions of the Helmholtz equation in the interior of an arbitrarily shaped plane region. TWO types of boundary conditions are considered: homogeneous Neumann and Dirichlet. Neumann boundaries pose much fewer difficulties than do Dirichlet so considerable attention has been given to the construction of polynomial subspaces that satisfy the Dirichlet constraint. EHPOL evaluates the modes by the Rayleigh-Ritz method and employs efficient algorithms both for the setting up of the matrix eigenproblem and for its solution. For convex guides the program is fast, economical in store space, and produces solutions of remarkable accuracy. An analysis of the computing time for EHPOL is given. Eigenvalue accuracy is demonstrated by tables of exact and computed eigenvalues for E- and H-modes in circular waveguide. Full advantage may be taken of regions with symmetry axes. A FORTRAN listing and a description of the program is available.

❑ Return to main document.