Abstracts

Rectangular Waveguides with Impedance Walls

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The propagation of guided waves in a rectangular geometry having impedance boundary conditions is investigated. An impedance compatibility relation is derived that must be satisfied in order that a separable modal solution exists for a given impedance configuration. Several new rectangular waveguides are developed; among them are 1) a tall rectangular waveguide operating in a dominant H/sub 10/ mode with no H/sub 0N/ modes; 2) a rectangular waveguide with two parallel anisotropic impedance surfaces; 3) a rectangular waveguide with two parallel walls having isotropic impedance surfaces, the other two walls being anisotropic; 4) a rectangular waveguide supporting only E modes; and 5) rectangular coaxial systems containing impedance surfaces. The modal structure of rectangular waveguides with impedance boundary conditions offers advantages over the conventional waveguide. The potential of oversizing for low-loss and high-power applications is enhanced because of the additional modal control provided by the impedance surfaces. Other applications are suggested.

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