Abstracts

An Apparent Anomaly in the Group and Energy Velocty in a Dielectrically Loaded Slow-Wave Structure

G.B. Walker and C.G. Englefield. "An Apparent Anomaly in the Group and Energy Velocty in a Dielectrically Loaded Slow-Wave Structure." 1962 Transactions on Microwave Theory and Techniques 10.1 (Jan. 1962 [T-MTT]): 30-33.

This paper is concerned with group and energy velocity in a cylindrical guide periodically loaded with dielectric disks. For a TM wave a confluence may be obtained between the first and second pass band of such a structure by arranging that the characteristic impedances of the air and dielectric regions are equal when the phase change per section is pi. It was at first thought that, since the impedances are equal, there would be no reflections from the interfaces. Assuming only forward waves, however, the equivalence of group and energy velocity is violated. The detailed analysis presented here shows that, mathematically, infinitely many solutions for the field pattern at the matched pi mode are possible but that only one of these has physical significance. For this one pattern the group and energy velocities are equal.

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