Generalized Plane Wave Horn Theory

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(Received October 5, 1945)

By the use of dimensionless variables and simplifying transformations Webster's plane wave horn equation is recast into a form permitting separation of the effects of horn contour and frequency. A generalized expression for the admittance also displays this separation. Further interrelations among the variables are developed which permit the formal synthesis of a horn from a given conductance or susceptance function. The conditions for realizability of the horn thus synthesized are discussed. Several applications of the results are presented, including a comparison with Freehafer's exact theory for the hyperbolic horn.