Abstracts

Transient Electromagnetic Guided Wave Propagation in Moving Media

H. Berger and J.W.E. Griemsmann. "Transient Electromagnetic Guided Wave Propagation in Moving Media." 1968 Transactions on Microwave Theory and Techniques 16.10 (Oct. 1968 [T-MTT]): 842-849.

An analytical study of the influence of moving media on the propagation of transient electromagnetic modal waves in dispersive waveguides is presented. The response to impulsive excitation is determined in exact closed form and used to demonstrate that the nature of the pulse distortion differs in each of the three cases, 1) 0 < u < c /spl equiv/ (/spl epsi/μ)/sup -½/, 2) v = c, and 3) c < v < c/sub 0/ /spl equiv/ (/spl epsi//sub 0/μ/sub 0/)/sup -½ (v = speed of the medium). An expression is derived from which the pulse waveform generated by an input of arbitrary form can be readily determined when 0 < v < c if the transient response to a similar input is known for v = 0. An untabulated Laplace transform pair is derived and used to determine the unusual pulse distortion in case 3) which shows a markedly discontinuous change from the pulse distortion in case 2). The theory illuminates a singular circumstance in which the Lorentz transformation is consistent with the "speed of light" differing from one inertial reference frame to another.

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