Abstracts

Sommerfeld Pre- and Postcursors in the Context of Waveguide Transients

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For propagation in lossless waveguide, the rigorous impulse response function is given. It is shown that its instantaneous frequency is that which has reached the output at that time by propagating at the group velocity. For a square envelope pulse with a carrier frequency omega above the cutoff frequency omega/sub c/, the propagation of the envelope and of the phase are essentially described by the group and phase velocity, respectively. In addition, however, the bulk of the pulse is preceded by the so-called Sommerfeld precursors having an increasing amplitude and a frequency which decreases from a high value to omega. Similarly the bulk of the pulse k followed by the Sommerfeld postcursors in which both amplitude and frequency decrease, the latter from omega to omega/sub c/. The analytic results are illustrated by computed examples of waveguide transients.

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