Abstracts

Influence of Wall Losses on Energy Flow Center Velocity of Pulses in Waveguides

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A rectangular carrier pulse is studied under the assumption of the propagation of a pure basic mode in a circular waveguide with low wall losses. An analytical expression of the electromagnetic field of an output pulse and an analytical expression of, the velocity with which the temporal center of gravity of the axial component of the Poynting vector of a pulse is traveling in a waveguide were derived for a not very high ratio of the input-pulse carrier frequency to the cutoff frequency of the given mode. A dependence is found of the above velocity on the wall losses, on the distance from the source, and on the duration time of the input pulse. The relation is found between the above velocity and the instantaneous phase velocity in the above center of gravity. The results obtained can be of importance in nanosecond pulse technique or for long-distance transfer of the pulses.

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