

length of waveguide L , over a bandwidth $\Delta\omega$ is approximately

$$\Delta t = -\frac{\omega_c^2}{c^2\omega_0^2\beta_0}\Delta\omega L$$

where

ω_c waveguide angular cutoff frequency
 c speed of light in free space
 ω_0 band-center angular frequency

$$\beta_0 = \frac{\omega_0}{c} \sqrt{1 - \left(\frac{\omega_c}{\omega_0}\right)^2}$$

For a 2-in-diameter waveguide operating in the circular-electric mode (TE_{01}) and a center frequency of 50 GHz, and a 300-MHz bandwidth, $\Delta t = 3.82 \times 10^{-10}$ s/mi.

Thus the circuit described would equalize 25.8 mi of waveguide. A worst case analysis of the effects of the echo produced by the delay ripples indicates that this equalizer would produce 1 dB of degradation in signal-to-noise ratio performance for an amplitude-modulated PCM system [8]. The network may also be useful in pulse expansion

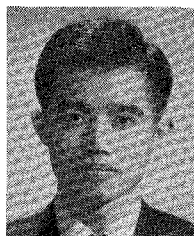
or compression applications. Note that for a "chirping" application, the input and output are taken at the N th filter with ports 1 and 2 of the zeroth filter terminated.

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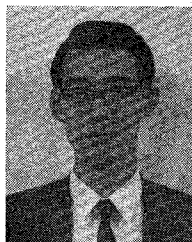


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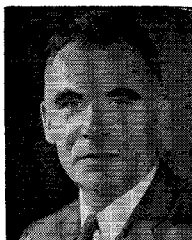
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