Filter characteristics of linear systems, Distortion less transmission through a system

For a Distortion less transmission through a system, it is required that the output signal must have same shape as input signal although its amplitude may be different and may be delayed in time.

If x(t)is input signal,

$Y(t) = A\, x(t-t_0)$

Where t_0 is the time delay.

And $Y(w) = A\, e^{-jwto}\, X(w)$
Hence frequency response of the system is $H(w) = Y(w)/ X(w)$

Magnitude of $H(w)=A$

Angle of $H(w) = -wt_o$

Magnitude of H(w)=

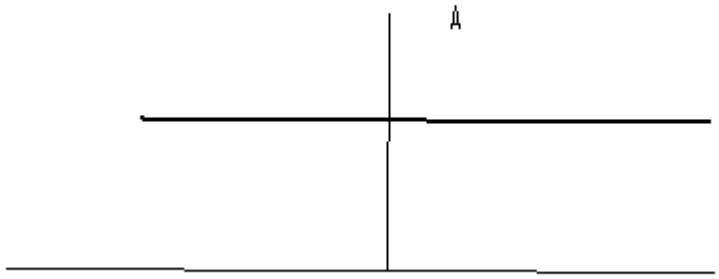

Figure 4.9

Angle of H(w)=

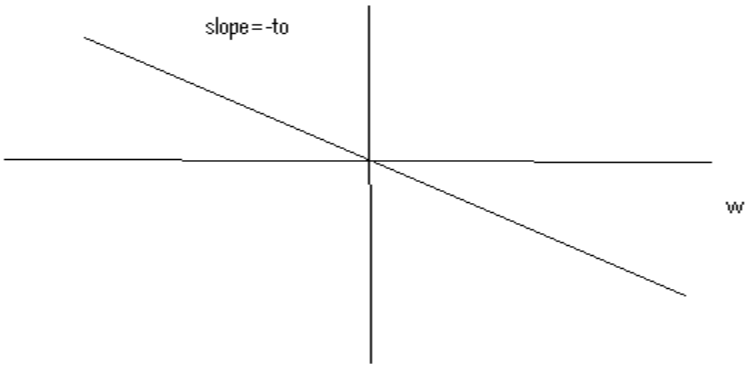

Figure 4.10