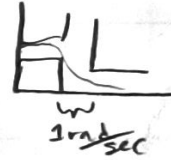


2.4-3 Find suitable width T so when applied to ideal LPF impulse resp.

$$h(t) = \frac{10}{\pi} \text{sinc}\left(\frac{10t}{\pi}\right) \quad \text{the transition}$$

band is approx. $1 \frac{\text{rad}}{\text{sec}}$



We know that the width of the transition band of a windowed filter is

approx. half the width of the main lobe (pg. 107)

ex: rect window $\rightarrow \frac{2\pi}{T} \frac{\text{rad}}{\text{sec}}$ transition band

triangle window $\rightarrow \frac{4\pi}{T} \frac{\text{rad}}{\text{sec}}$ transition band

using Table 2.1 on pg 110

a) Rectangular

$$\text{Main lobe width} = \frac{4\pi}{T}$$

$$\frac{2\pi}{T} = 1 \frac{\text{rad}}{\text{sec}} \Rightarrow \boxed{T = 2\pi}$$

b) Triangular

$$\text{MLW} = \frac{8\pi}{T}$$

$$\frac{4\pi}{T} = 1 \Rightarrow \boxed{T = 4\pi}$$

c) Hann window

$$\text{MLW} = \frac{8\pi}{T}$$

$$\frac{4\pi}{T} = 1 \Rightarrow \boxed{T = 4\pi}$$

d) Hamming window

$$\text{MLW} = \frac{8\pi}{T}$$

$$\frac{4\pi}{T} = 1 \Rightarrow \boxed{T = 4\pi}$$

e) Blackman

$$\text{MLW} = \frac{12\pi}{T}$$

$$\frac{6\pi}{T} = 1 \Rightarrow \boxed{T = 6\pi}$$