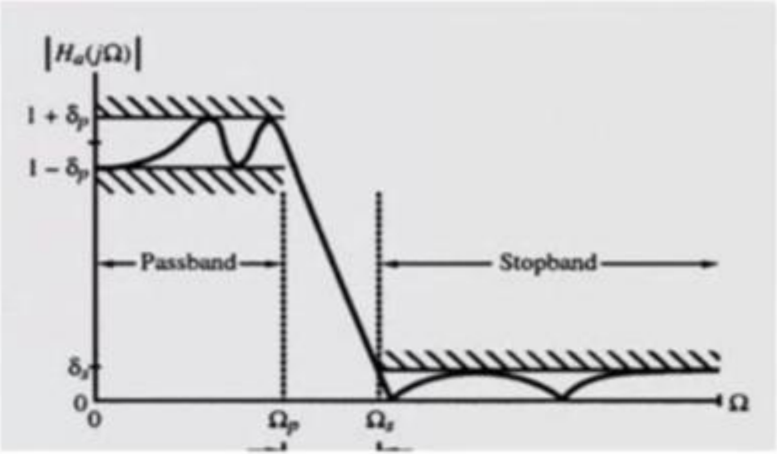
Magnitude response

$$Magnitude = \begin{cases} 1-\delta_p \leq |H(j\Omega)| \leq 1 & \text{for } 0 \leq \Omega \leq \Omega_p \\ 0 \leq |H(j\Omega)| \leq \delta_s & \text{for } |\Omega| \geq \Omega_s \end{cases}$$



(NORMALIZED) PROTO TYPE LOW PASS ANALOG FILTER

(ANALOG TO ANALOG TRANSFORMATION)

DESIGN FILTER OF REQUIRED TYPE AND ANY REQUIRED FREQUENCY

ALALOG TO DIGITAL TRANSFORMATION

BILINEAR TRANSFORMATION

MATCHED Z-T

IMPULSE INVARIANCE TRANSFORMATION

- $H(\Omega)$ cannot have an infinitely sharp cutoff from passband to stopband, that is $H(\Omega)$ cannot drop from unity to zero abruptly.
- It is not necessary to insist that the magnitude be constant in the entire passband of the filter. A small amount of ripple in the passband is usually tolerable.
- The filter response may not be zero in the stopband, it may have small nonzero value or ripple.
- The transition of the frequency response from passband to stopband defines transition band.
- The passband is usually called bandwidth of the filter.
- The width of transition band is $\Omega_s - \Omega_p$ where Ω_p defines passband edge frequency and Ω_s defines stopband edge frequency.
- The magnitude of passband ripple is varies between the limits $1 \pm \delta_p$ where δ_p is the ripple in the passband
- The ripple in the stopand of the filter is denoted as δ_p

Ω_p= Passband edge frequency in rad/second Ω_s= Stopband edge frequency in rad/second

ω_p= Passband edge frequency in rad/sample ω_s= Stopband edge frequency in rad/sample