$h_{notch}[n] = \delta(n) - 2\cos(\omega n)\,\delta[n-1] + \delta[n-2]$

- Which frequency/frequencies have $H_{notch}(e^{j\omega}) = 0$?

  * $\delta[n-n_0] \xrightarrow{\text{FT}} e^{-j\omega n_0}$, $\delta[n] \xrightarrow{\text{FT}} 1$

$$H_{notch}(e^{j\omega}) = 1 - 2\cos(\omega n)\,e^{-j\omega} + e^{-j2\omega}$$

$$= e^{-j\omega}\left(e^{j\omega} - 2\cos(\omega n) + e^{-j\omega}\right)$$

$$= e^{-j\omega}\left(2\cos(\omega) - 2\cos(\omega n)\right)$$

$$= 2e^{-j\omega}\left(\cos(\omega) - \cos(\omega n)\right)$$

If $\boxed{\omega = \pm \omega n}$ $H(e^{j\omega}) = 0$