6 1848

$$H(e^{j\omega}) = \mathcal{F}(h_1(n) + h_2(n))$$

$$\mathcal{F}(h_1(n)) = \sum_{n=-\infty}^{+\infty} \left(\frac{1}{3}\right)^n u(n) e^{-j\omega n}$$

$$= \frac{1}{1 - \frac{1}{3}e^{-j\omega}}$$

$$H(e^{j\omega}) - \mathcal{F}(h_1(n)) = -1 + \frac{\frac{1}{3}}{e^{j\omega} - \frac{1}{3}} + \frac{-\frac{1}{2}}{e^{j\omega} - \frac{1}{4}} - \left(1 + \frac{\frac{1}{3}}{e^{j\omega} - \frac{1}{3}}\right)$$

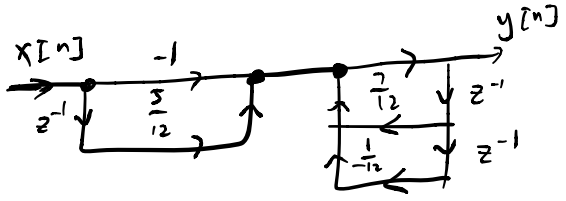
$$= -2 + \frac{-\frac{1}{2}}{e^{j\omega} - \frac{1}{4}}$$

so. $h_2(n) = -2\,\mathcal{F}^{-1}\left(\frac{\frac{-1}{4}}{e^{j\omega} - \frac{1}{4}} + 1\right)$

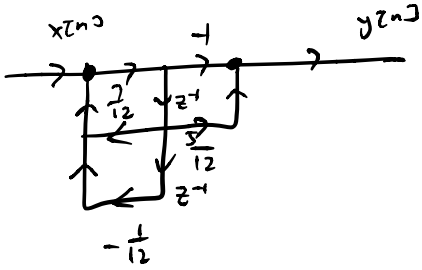
$$= -2\left(\frac{1}{4}\right)^n u(n)$$

② $$H(z) = \frac{-1 + \frac{5}{12}z^{-1}}{1 - \frac{7}{12}z^{-1} + \frac{1}{12}z^{-2}}$$

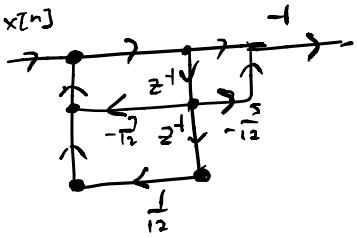
Direct Form I:



Direct Form II:



Cascade Form:



PARALLEL Form.