(1) $X(z) = \dfrac{1+z^{-1}}{1+\frac{1}{5}z^{-1}}$, $|z| > \frac{1}{5}$

$X(z) = \dfrac{1}{1+\frac{1}{5}z^{-1}} + \dfrac{z^{-1}}{1+\frac{1}{5}z^{-1}}$, $|z|>1/5$ → sağ taraflı

$x[n] = \left(-\frac{1}{5}\right)^n u[n] + \left(-\frac{1}{5}\right)^{n-1} u[n-1]$

$n \geq 2$ için

$h[n] = \left(-\frac{1}{5}\right)^n + \left(-\frac{1}{5}\right)^{n-1}$

$h[3] = \left(-\frac{1}{5}\right)^3 + \left(-\frac{1}{5}\right)^2$

(2) $y[n] = y[n-1] + \frac{3}{4}y[n-2] + 2x[n] - \frac{2}{3}x[n-1]$

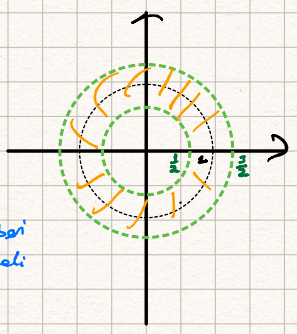
Kararlı sistemin impuls cevabı $h[n]$.

$Y(z)\left[1 - z^{-1} - \frac{3}{4}z^{-2}\right] = X(z)\left[2 - \frac{2}{3}z^{-1}\right]$

$x[n] \rightarrow [h[n]] \rightarrow y[n]$

$H(z) = \dfrac{Y(z)}{X(z)} = \dfrac{2 - 2/3\,z^{-1}}{1 - z^{-1} - \frac{3}{4}z^{-2}} = \dfrac{2 - 2/3\,z^{-1}}{\left(1-\frac{3}{2}z^{-1}\right)\left(1+\frac{1}{2}z^{-1}\right)}$

$H(z) = \dfrac{A}{1-\frac{3}{2}z^{-1}} + \dfrac{B}{1+\frac{1}{2}z^{-1}}$ $\quad A = 7/6$ $\quad B = 5/6$



$|z| < 1/2$, $\quad \frac{1}{2} < |z| < \frac{3}{2}$ → kararlı olduğu için birim çemberi içermeli

$h[n] = -\frac{7}{6}\left(\frac{3}{2}\right)^n u[-n-1] + \frac{5}{6}\left(-\frac{1}{2}\right)^n u[n]$

Bu kısım sol taraflı -1'den $-\infty$'a kadar diğer alır. → $n \geq 1$ için bu kısım "0" olacaktır.

$n \geq 1$

$h[n] = \frac{5}{6}\left(-\frac{1}{2}\right)^n$

③ $x[n] = (0,5)^{n+1} \cdot u[n+2]$

$X(z)$ olmak üzere, $X(1)$'i hesaplayınız.

$$x[n] = \left(\frac{1}{2}\right)^{n+1} u[n+2] = \left(\frac{1}{2}\right)^{-1} \cdot \left(\frac{1}{2}\right)^{n+2} \cdot u[n+2]$$

$$\left(\frac{1}{2}\right)^n u[n] \xrightarrow{z} \frac{1}{1-\frac{1}{2}z^{-1}}, \quad |z| > 1/2$$

$$\left(\frac{1}{2}\right)^{n+2} u[n+2] \xrightarrow{z} \frac{z^{-2}}{1-\frac{1}{2}z^{-1}}, \quad |z| > 1/2$$

$$x[n] = \left(\frac{1}{2}\right)^{-1} \left(\frac{1}{2}\right)^{n+2} u[n+2] \xrightarrow{z} X(z) = \left(\frac{1}{2}\right)^{-1} \cdot \frac{z^{-2}}{\left(1-\frac{1}{2}z^{-1}\right)}, \quad |z| > 1/2$$