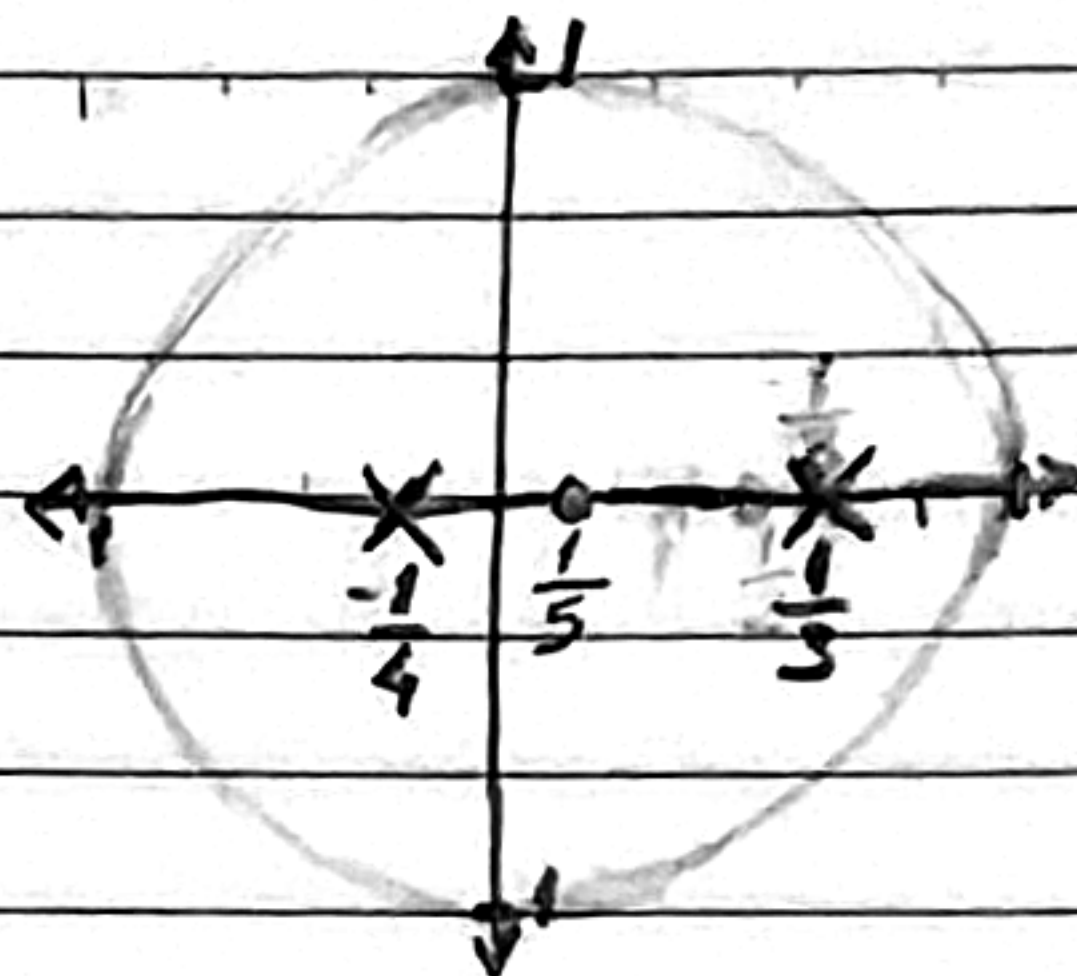


4. poles:  $-\frac{1}{4}, \frac{1}{3}$

zero:  $\frac{1}{5}$



$$H(z) = \frac{z - 0.2}{\left(\frac{z+1}{4}\right)\left(\frac{z-1}{3}\right)}$$

$$H(z) = \frac{z - 0.2}{z^2 - \frac{1}{3}z + \frac{1}{4}z - \frac{1}{12}}$$

$$H(z) = \frac{z - 0.2}{z^2 - \frac{1}{12}z - \frac{1}{12}}$$

$$H(z) = \frac{z^1 - 0.2z^{-2}}{1 - \frac{1}{12}z^{-1} - \frac{1}{12}z^{-2}}$$

$$\frac{Y(z)}{X(z)} = H(z)$$

$$\frac{Y(z)}{X(z)} = \frac{z^1 - 0.2z^{-2}}{1 - \frac{1}{12}z^{-1} - \frac{1}{12}z^{-2}}$$

$$Y(z) \left(1 - \frac{1}{12}z^{-1} - \frac{1}{12}z^{-2}\right) = X(z) (z^1 - 0.2z^{-2})$$

$$Y(z) - \frac{1}{12}Y(z)z^{-1} - \frac{1}{12}Y(z)z^{-2} = X(z)z^1 - 0.2X(z)z^{-2}$$

$$y[n] - \frac{1}{12}y[n-1] - \frac{1}{12}y[n-2] = x[n] - 0.2x[n-2]$$

$$y[n] = x[n] - 0.2x[n-2] + \frac{1}{12}y[n-1] + \frac{1}{12}y[n-2]$$

Answer: Yes, it's a stable and casual transfer function, cause the poles numbers are inside of the unit circle in the  $z$  plane.