

Test 2 - No.3 - Retest

DSP

Exercises

1. Consider the system described by the following system function:

$$H(z) = \frac{1 - 2z^{-1}}{1 - 0.4z^{-1}}$$

- (2p) Indicate the poles and the zeros, and draw the pole-zero diagram (with the unit circle)
- (3p) Find the difference equation of the system

$$y[n] = \dots$$

2. A causal signal $x[n]$ has Z transform

$$X(z) = \frac{1}{(1 + 0.2z^{-1})(1 - 0.3z^{-1})}$$

- (4p) Find the signal $x[n]$

It is known that:

$$\begin{aligned} a^n \cdot u[n] &\xleftrightarrow{Z} \frac{1}{1 - a \cdot z^{-1}} = \frac{z}{z - a}, ROC : |z| > |a| \\ -a^n \cdot u[-n - 1] &\xleftrightarrow{Z} \frac{1}{1 - a \cdot z^{-1}} = \frac{z}{z - a}, ROC : |z| < |a| \end{aligned}$$