

Exercises Week 4

DSP

1. Compute the convolution of the signals $x_1[n] = \{\dots, 0, 1, 2, 3, 4, 0, \dots\}$ and $x_2[n] = \{\dots, 0, 2, 2, 3, 3, 0, \dots\}$ using the Z transform.
2. Find the Z transform of the following signals:

a.

$$x[n] = \left(\frac{1}{3}\right)^n u[n]$$

b.

$$x[n] = \begin{cases} \left(\frac{1}{3}\right)^n, & n \geq 0 \\ \left(\frac{1}{2}\right)^{-n}, & n < 0 \end{cases}$$

c.

$$x[n] = \left(\frac{1}{2}\right)^n \sin\left(\frac{\pi}{3}n\right)u[n]$$