Exercises Week 4

DSP

1. Compute the convolution of the signals $x_1[n] = \{..., 0, 1, 2, 3, 4, 0, ...\}$ and $x_2[n] = \{..., 0, 2, 2, 3, 3, 0, ...\}$

   a. using the Z transform

   b. as a product of polynomials

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