ECE351: Signals and Systems I - Fall 2023 - Dr. Thinh Nguyen
Homework 5
Due 11/01/2023

1. Determine the DTFTs of the following signals:

   (a) $x[n] = \left(\frac{3}{4}\right)^n u[n-4]$

   (b) $x[n] = a^{|n|} \quad |a| < 1$

   (c) $x[n] = 2\delta[4-2n]$

   (d) $x[n] = \delta[n+4] + \delta[n+2] + \delta[n-2] - \delta[n-4]$

   (e) $x[n] = \begin{cases} \frac{1}{2} + \frac{1}{2}\cos(\frac{\pi}{N}n), & |n| \leq N \\ 0, & \text{otherwise} \end{cases}$

2. Determine the inverse DTFTs of the following frequency representations:

   (a) $X(e^{j\Omega}) = \cos(2\Omega) + j\sin(2\Omega)$

   (b) $X(e^{j\Omega}) = \sin(\Omega) + \cos(\frac{\Omega}{2})$

   (c) $|X(e^{j\Omega})| = \begin{cases} 1, & \frac{\pi}{4} \leq |\Omega| \leq \frac{3\pi}{4} \\ 0, & \text{otherwise} \end{cases}$

   $argX(e^{j\Omega}) = -4\Omega$