ECE 113 HW 5

Lawrence Liu

November 15, 2022

Problem 1

(a)

We have that

$$\cos(2\pi\frac{1}{8}n) = \frac{1}{2}\left(e^{j\pi\frac{1}{4}n} + e^{-j\pi\frac{1}{4}n}\right)$$

Therefore we have that

$$\cos(2\pi\frac{1}{8}n) \to \boxed{\frac{N}{2}\left(\delta(k-1) + \delta(k-7)\right)}$$

(b)

$$y_1[n] \to \boxed{2j\sin(\frac{2\pi}{4}k)}$$

(c)

$$y_2[n] \to \boxed{2j + e^{j\frac{2\pi}{4}}}$$

Problem 2

$$y_3[n] \rightarrow \boxed{2j\sin(\frac{2\pi}{4}k)\left(2j + e^{j\frac{2\pi}{4}}\right)}$$

Problem 3