

EE110B Lab 1

- 1) Use Matlab to plot the following sequences and discuss their periodicity. Choose a proper range of n and a proper pattern for the plots. (For example, the sample of the sequence $x[n]$ at time n can be represented by a vertical line at time n .)
 - a) $\cos(2\pi\frac{7}{3}n)$ and $\cos(2\pi\frac{1}{3}n)$. Note that it can be shown that $\cos(2\pi f_d n) = \cos(2\pi(f_d \pm m)n)$ with m being any integer.
 - b) $\cos(2\pi\frac{1}{3}n)\cos(2\pi\frac{4}{5}n)$. Is its period equal to 3×5 ?
 - c) $\cos(2\pi\frac{1}{3}n) + \cos(2\pi\frac{4}{5}n)$. Is its period also equal to 3×5 ?
 - d) $\cos^2(2\pi\frac{1}{3}n)$. What is its period?
 - e) $\cos^3(2\pi\frac{1}{3}n)$. What is its period?
 - f) $\cos(2\pi\frac{2}{7}n^2)$. Is its frequency changing with time? Is its period equal to the constant 7? Why?
 - g) $0.9^n \cos(2\pi\frac{2}{7}n)u[n]$. What is its value if $n = \infty$? Why?
 - h) $1.1^n \cos(2\pi\frac{2}{7}n)u[n]$. What is its value if $n = \infty$? Why?
- 2) Plot the values of the following complex discrete-time signals on 2-D complex plots:
 - a) $e^{j2\pi\frac{4}{9}n+j\pi/4}$. How many distinct points are there on the unit circle? Why?
 - b) $e^{j2\pi\frac{4}{9}n^2+j\pi/4}$. How many distinct points are there on the unit circle? Why?
 - c) $e^{j2\pi\frac{12}{9}n+j\pi/4}$. How many distinct points are there on the unit circle? Why?
 - d) $e^{j\frac{4}{9}n+j\pi/4}$. How many distinct points are there on the unit circle? Why?