Signals & Systems Assignment No. 11

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17MCME13

March 28, 2019

Q1) Write a report on the curves obtained by plotting the graph of w^{-nk} for different values of n and k?$(n, k \in [0, N))$

$$w = e^{\iota \frac{2\pi}{N}}, \text{ where N} = 16$$

A) a) For n = 1 and 15 the graphs are almost similar to the sinusoidal wave.
b) As, n increases from 1 the distance between the y-coordinate is also increasing.
c) The distance becomes constant for values of 8, 9.
d) Then onwards it starts decresing and becomes almost zero.
e) The ratio of y/x in $x \pm \iota y$ is always positive for all values of n
f) Except for n = 8, it is negative.
g) The magnitude of the ratio is in the order of 10^{14}(roughly).
h) The plot of θ(phase) and k is also giving a periodic curve.
i) Most of the graph‘s have sharp edges, only a few have a smooth curve.
j) The frequency of the curves monotonically increases and then it decreses.