

ASSIGNMENT-1

- 1) Plot the following on MATLAB
 - a) A sinusoid of 1kHz
 - b) Add 1kHz, 3kHz, 5kHz & 7kHz
 - c) Vary the amplitude of each frequency component and comment on the composite waveform
- 2) Explain why 'e' raised to a real number is a rising or decaying function by e raised to imaginary number is a sinusoid
- 3) Build a system with transfer function

$$H(s) = \frac{2\pi \cdot 10k}{s + 2\pi \cdot 10k}$$

- a) Simulate the TF in MATLAB
- b) Plot magnitude & phase plot
- c) Give a sinusoidal input of 1k, 5k, 10k, 15k, 20k & 25kHz. Observe and comment on o/p magnitude and phase

d) Give a square wave i/p with sq wave freq of 10 kHz and comment on the o/p

4) Consider a function

$$y = 2x + \frac{1}{4}x^2 + \frac{1}{16}x^3$$

If $x = 1 \cdot \sin(2\pi \cdot 1 \cdot t)$

Simulate on MATLAB what is the value of y . Take FFT of o/p and comment on what you observe

Do the same exercise for

$$y = 2x + \frac{1}{8}x^2 + \frac{1}{32}x^3$$

5) Design a second order low pass RC filter to have a cutoff freq of 10 kHz. Plot Bode Plot for the same