Indian Institute of Technology Hyderabad

Electrical Engineering
Indian Institute of Technology Hyd
Analog Electronics

January 16, 2024

Deadline: XXXX 2023 | *Assignment # 1* | Maximum Marks: TBD

Instructions:
1. Use MATLAB software.

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1. (i). Generate a square wavefrom (approximate) using sinusoildal waveforms with different frequencies. (start from 5 kHz)

   (ii). Pass this square wavefrom with an amplifier with a gain A(ω) and the following frequency response
   - (upto 10 kHz A(ω) = 1)
   - (From 10 kHz to 50 kHz A(ω) = 5)
   - (From 50 kHz to 200 kHz A(ω) = 2)
   - (From 200 kHz to 1 MHz A(ω) = 1)
   - (From 1 MHz to 2 MHz A(ω) = 0.3)
   - (From 2 MHz and above A(ω) = 0)

   (iii). Pass the square waveform generated in (1) with an ideal low-pass filter with cut-off frequenecy = 8 kHz. Get the output waveform.

2. A nonlinear device is with following input/output characteristics:

$$I_{out} = \beta {V_{in}}^2 \tag{1}$$

   Consider β = 10mA/V^2, and V_{in} = 1V. Find out DC operating point corrospondingly. Find out the range of incremental change in V_{in} for that the device still considered as a linear one with less than (i) 1%, (ii) 5% non-linearilty.

Student's roll number: Ended here