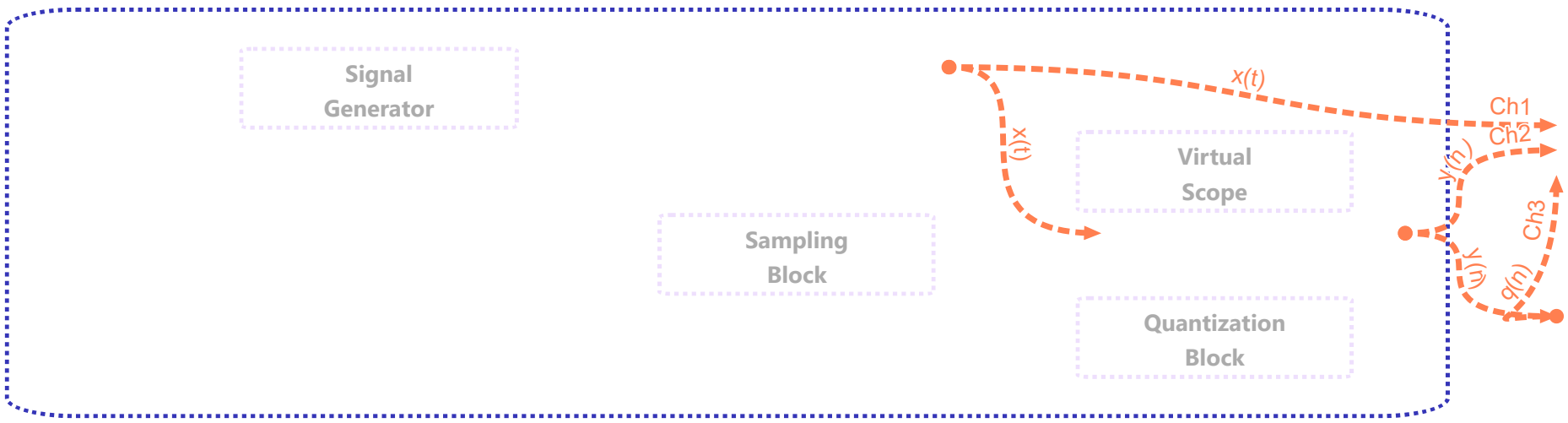
Virtual Labs
IIT Kharagpur

Study of Quantization of continuous-amplitude, discrete-time analog signals

Instructions

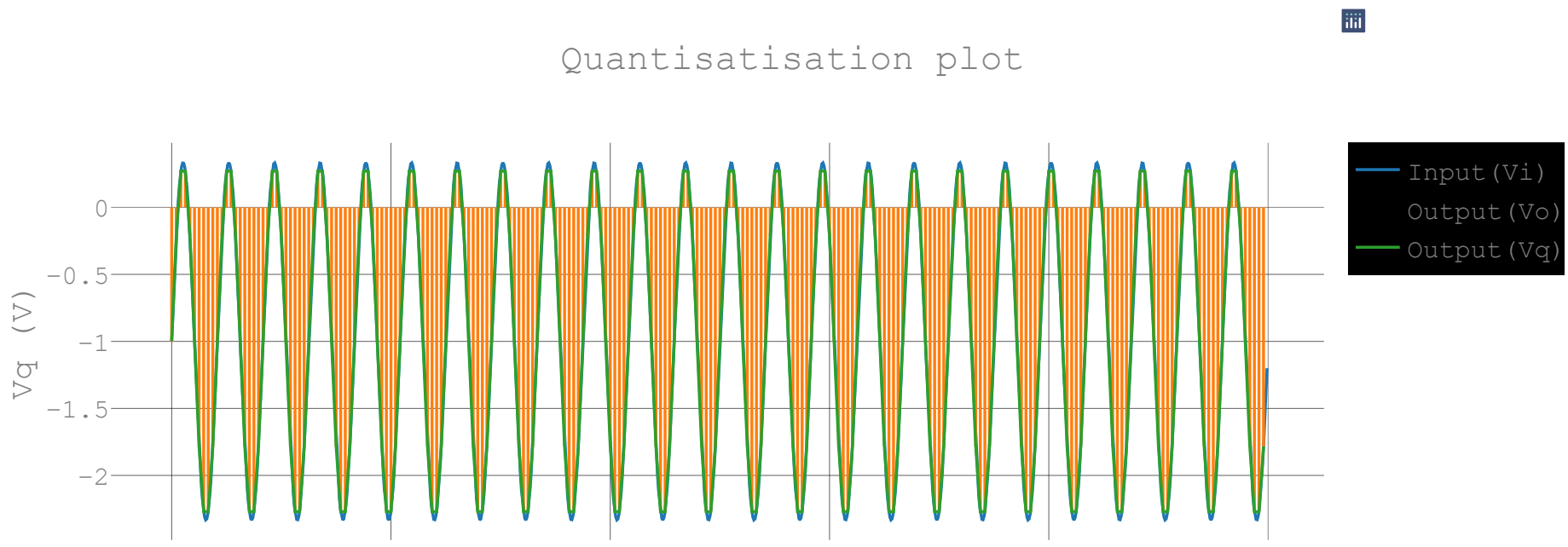
1. Observe the block diagram
2. Select the amplitide(A) of the input sine wave signal(x(t)).
3. Select the frequency of the signal(f_m) for the input signal(x(t)).
4. Select the sampling frequency of the signal(f_s).
5. Click on the "Channel 1" buttton to observe the input signal x(t) on graph
6. Click on the "Channel 2" to buttton observe the sampled output signal y(n) on graph
7. Click on the "Channel 3" to buttton observe the quantisation output signal y(n) on graph
8. Click on the "Dual" to observe the input signal and output signal on graph
9. Change the values of A, f_m, and f_s to observe the variation in the input and output signals.
10. Hover on the graph to observe the value of the x(t) and y(n) at that instatnt of time T.
11. Save the graph if you are done with your experiment.
12. **Note:**
    - **Make sure always input signal amplitude(A) >0 v**
    - **Make sure always input signal frequency(f_m and f_s) >0 Hz**
    - **To change the values just scroll by hovering on the knob.**
    - **Make sure that you kept equal time/div in the "Channel 1" and "Channel 2".**

Block Daigram



Power

Circuit ON



Time (s)

Function Generator Controls

V_i = 4 V

f_m = 4 kHz

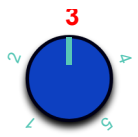
f_s = 10 kHz

n = 10 bits

Oscilloscope Controls

Channel 1 | Channel 2 | Channel 3 | Dual

Channel 1



V_{c1} = 3 V/div

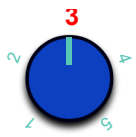
Time = 6 (ms)/div

Position

P_X = -1

P_Y = -1

Channel 2



V_{c2} = 3 V/div

Time = 6 (ms)/div

Position

P_X = -1

P_Y = -1