EE22BTECH11049 - Shivansh Kirar

Question EC 31 2023

The signal to noise ratio (SNR) of an ADC with full scale sinusoidal input is given to be 61.96 dB. The resolution of ADC is

Solution:

$$\text{Resolution (in bits)} = \frac{\text{SNR (dB)} - 1.76 \text{ dB}}{6.02 \text{ dB}} \tag{1}$$

In this formula:

- SNR is the signal-to-noise ratio in dB, which is given as 61.96 dB in your case.
- 1.76 dB is a constant that accounts for quantization noise.
- 6.02 dB is the noise bandwidth factor for a sinusoidal input.

Plug in the values:

$$\text{Resolution (in bits)} = \frac{61.96 \text{ dB} - 1.76 \text{ dB}}{6.02 \text{ dB}} \tag{2}$$

$$\text{Resolution (in bits)} = 10 \text{ bits} \tag{3}$$

So, the resolution of ADC is 10 bits.