

KNOWLEDGE PROBE 3: ADC Specifications Data Conversion Part 2

Learning Objectives

1. Explain the primary specifications of ADCs.
 2. Name three common applications for ADCs.
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1. What is the dynamic range of a 10-bit ADC?
 - a. 26 dB
 - b. 30 dB
 - c. 45 dB
 - d. 60 dB
 2. What composes noise?
 - a. External signals injected by capacitive or inductive coupling
 - b. Clock
 - c. Power supply ripple
 - d. All of the above
 3. The quantization process produces noise.
 - a. True
 - b. False
 4. Signal-to-noise ratio (SNR) is the
 - a. Ratio between the RMS signal level and the highest amplitude signal expressed in dB
 - b. Ratio of the RMS value of the input analog signal and the RMS noise voltage expressed in dB
 - c. Ratio of the RMS value of the output analog signal and the RMS noise voltage expressed in dB
 - d. Ratio of the signal amplitude and the amplitude of all the noise and distortion expressed in dB
 5. Quantization noise is the result of the analog sample value being different from the incremental values available in the ADC.
 - a. True
 - b. False
 6. An analog input has a value of 4 volts while the noise value is 22 mV. The SNR is:
 - a. 22.6 dB
 - b. 36.7 dB
 - c. 45.2 dB
 - d. 53.8 dB



7. SINAD is the
 - a. Ratio of the RMS value of the input analog signal and the RMS noise voltage
 - b. Ratio of the RMS value of the output analog signal and the RMS noise voltage
 - c. Ratio of the signal amplitude and the amplitude of all the noise and distortion
 - d. Ratio between the RMS signal level and the highest amplitude signal expressed in dB

8. ENOB is a specification that indicates
 - a. An undesired signal that is not present in the input and whose source is sometimes not known
 - b. That if the noise and harmonics are too large, they reduce the resolution
 - c. The ratio of the RMS value of the input analog signal and the RMS noise voltage expressed in dB
 - d. The ratio of the signal amplitude and the amplitude of all the noise and distortion

9. What is the ENOB of a 10-bit ADC if the SINAD is 55 dB?
 - a. 7.3
 - b. 8.8
 - c. 9.3
 - d. 10

10. A spur is
 - a. A dominant harmonic
 - b. An unknown spurious voltage
 - c. Noise
 - d. Quantization noise

11. The SFDR shows the relationship between the signal amplitude and the
 - a. Amplitude of the largest spurious signal
 - b. Quantization noise
 - c. Total noise
 - d. ENOB