

## Tutorial 4: ADC Metrics

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### 1.1. ADC Metrics

#### Question 1

$$1) N = 2^M \Rightarrow 10 \times 1024 = 2^M \Rightarrow M = \log_2((10 \times 1024)/10) = 10 \text{ bits.}$$

$$2) Q = \frac{V_{PSR}}{N} = \frac{2.55}{2^8} = 9.96 \text{ mV/step}$$

#### Question 2

$$1) V(\text{FSR}) = 25 - 5 = 20$$

$$\text{LSB} = \frac{V_{ref}}{2^n} = \frac{2.55}{2^3} = 0.31875 \text{ V}$$

$$\text{Error} = (\text{LSB} \times V_{ref}) / 2^n = 0.31875 \times 2.55 / 2^3 = 0.1016$$

$$2) \text{SFDR} = 10 \log_{10}(PS / \text{PREF}) = 10 \log_{10}(25/5) = -6.9897$$