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A **data acquisition system** is a system that records information about the world. The data is stored in digital form on the computer.

VIDEO 14.1. DIGITIZATION CONCEPTS



DR. JONATHAN VALVANO: In this video, we will

demonstrate the fundamental concepts of sampling.

Here is a slide plot similar to the one you will use in lab.

The analog signal is shown in the plot as the blue signal.

And the data points are sampled as plotted by the red signal.

Help

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An analog to digital converter (ADC) converts an analog signal into digital form, shown in Figure 14.1. An embedded system uses the ADC to collect information about the external world (data acquisition system.) The input signal is usually an analog voltage, and the output is a binary number. The ADC precision is the number of distinguishable ADC inputs (e.g., 4096 alternatives, 12 bits). The ADC **range** is the maximum and minimum ADC input (e.g., 0 to +3.3V). The ADC **resolution** is the smallest distinguishable change in input (e.g., 3.3V/4096, which is about 0.81 mV). The resolution is the change in input that causes the digital output to change by 1.

$$\text{Range(volts)} = \text{Precision(alternatives)} \cdot \text{Resolution(volts)}$$

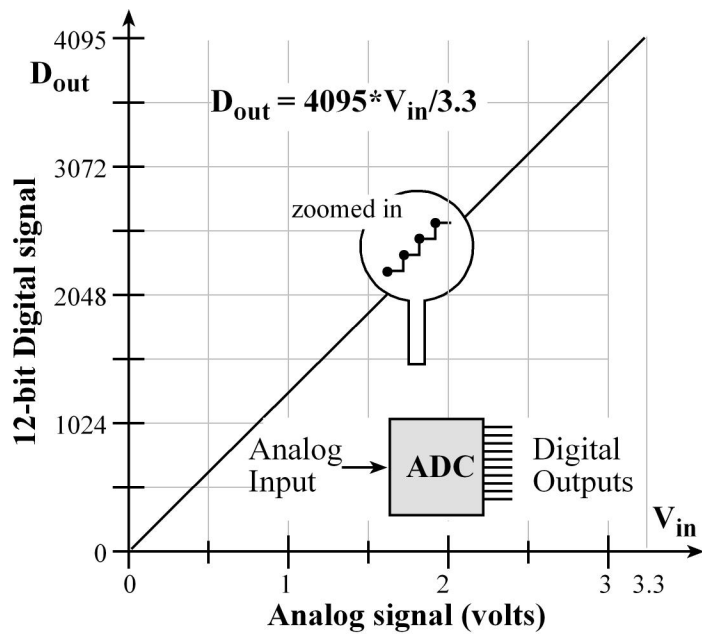


Figure 14.1. A 12-bit ADC converts 0 to 3.3V on its input into a digital number from 0 to 4095.



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