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1. Logic levels:

In digital circuits, a logic level is one of a finite number of states that a digital signal can inhabit.

Types of logic levels:

2-level logic: In binary logic the two levels are logical high and logical low, which generally correspond to binary numbers 1 & 0 respectively. Signals with one of these two levels can be used in boolean algebra for digital circuit design or analysis.

Binary Signal Representations.

Logic level	Active-High	Active-low
logic high	1	0
logic low	0	1

3-level logic:
In three-state logic, an output device can be in one of the three possible states: 0, 1 & Z with the last meaning high impedance. This is not a logic level, but means that the output is not controlling the state of the connected circuit.

4. level logic :

4-level logic adds a fourth state, $|\alpha)$ → don't care, meaning the value of the signal is unimportant & undefined. It means that an input is undefined, or an output signal may be chosen for implementation convenience (K-Map, don't cares).

9-level logic :

IEEE 1164 defines 9 logic states for use in electronic design automation which includes strong and weakly driven signals, high impedance & unknown and uninitialised states.

Multi-level logic :

A multi-level cell stores data using multiple voltages.

3: Types of standard digital serial communications:-

Asynchronous Communications :

Asynchronous communications is the standard means of serial data communication for PC compatibles and PS/2 computers. Serial data communications implies that individual bits of a character are transmitted consecutively to a receiver and that assembles the bits back into a character.
Serial asynchronous communications is typically implemented with a Recommended Standard (RS).

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Synchronous Communication:

This type of communication is used for applications that require higher data rates & greater error checking procedures. Character synchronization and bit duration are handled differently than asynchronous communications. Bit duration in synchronous communications is not necessarily predefined at both the transmitting and receiving ends.

Electrical Interface Standards:

RS-232:

Probably the most widely used communication standard is RS-232. The most common implementation of RS-232 is on a standard 25 pin D sub connector, although the IBM PC computer. RS-232 is capable of operating at data rates upto 20 kbps/50ft.

RS-422:

This specification is defines the electrical characteristics of balanced voltage digital interface circuits.

RS-423:

this specification defines the electrical characteristics of unbalanced voltage digital interface ckts.

RS 449, RS 485, RS-530

Current Loop:

This specifcation is based on the absence or presence of currents, not voltage levels, over the communication line.

4. There are ~~major~~ five major types of ADCs in use today.

1. Succession Approximation (SAR) ADC:

It offers an ecellent balance of speed and resolution and handles a wide variety of signals with excellent fidelity.
They can be configured for both low-end A/D cards, where a signal ADC chip is shared by multiple channels (multiplexed A/D boards), or in configurations where each input channel has its own ADC for true simultaneous sampling.

2. Delta-sigma ($\Delta\Sigma$) ADC:

A newer design is Delta-Sigma ADC, which takes advantages of DSP technology in order to improve the amplitude axis resolution and reduce the high frequency quantization noise inherent in SAR designs.

3. Dual Slope A/D converters :-

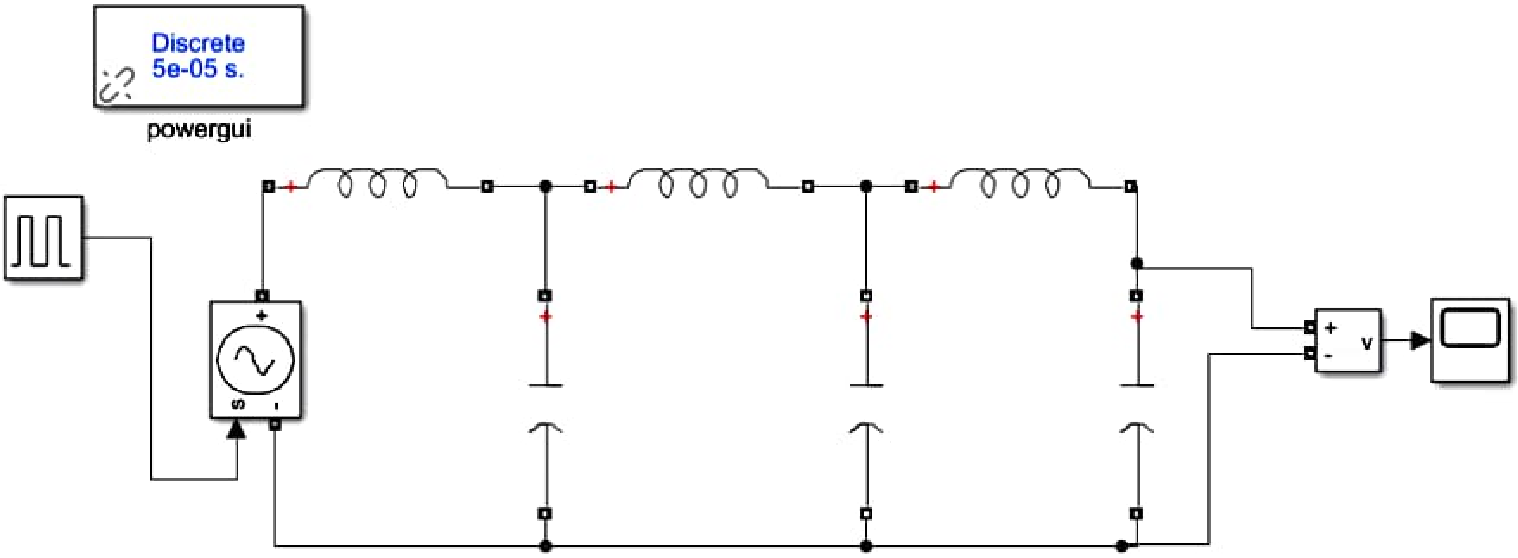
These are accurate but not terribly fast. The principal way they convert analog to digital values is by using an integrator. The voltage is input and allowed to "run up" for a period of time. Then a known voltage of the opposite polarity is applied and allowed to run back down to zero. When it reaches zero, the system calculates what the input voltage had been by comparing the run-up time with run-down time.

4. Pipelined ADC.

In this, the analog signal is not latched by all comparators at the same time, spreading out the energy required to convert the analog to a digital value. This has the high benefit of allowing higher resolutions to be achieved without high energy.

5. Flash ADC:

Flash ADCs are fast & operate virtually without latency, which is why they are the architecture of choice when the highest possible sample rates are needed. They convert analog to a digital signal by comparing it with known references. The more known references are used, the more accuracy is achieved.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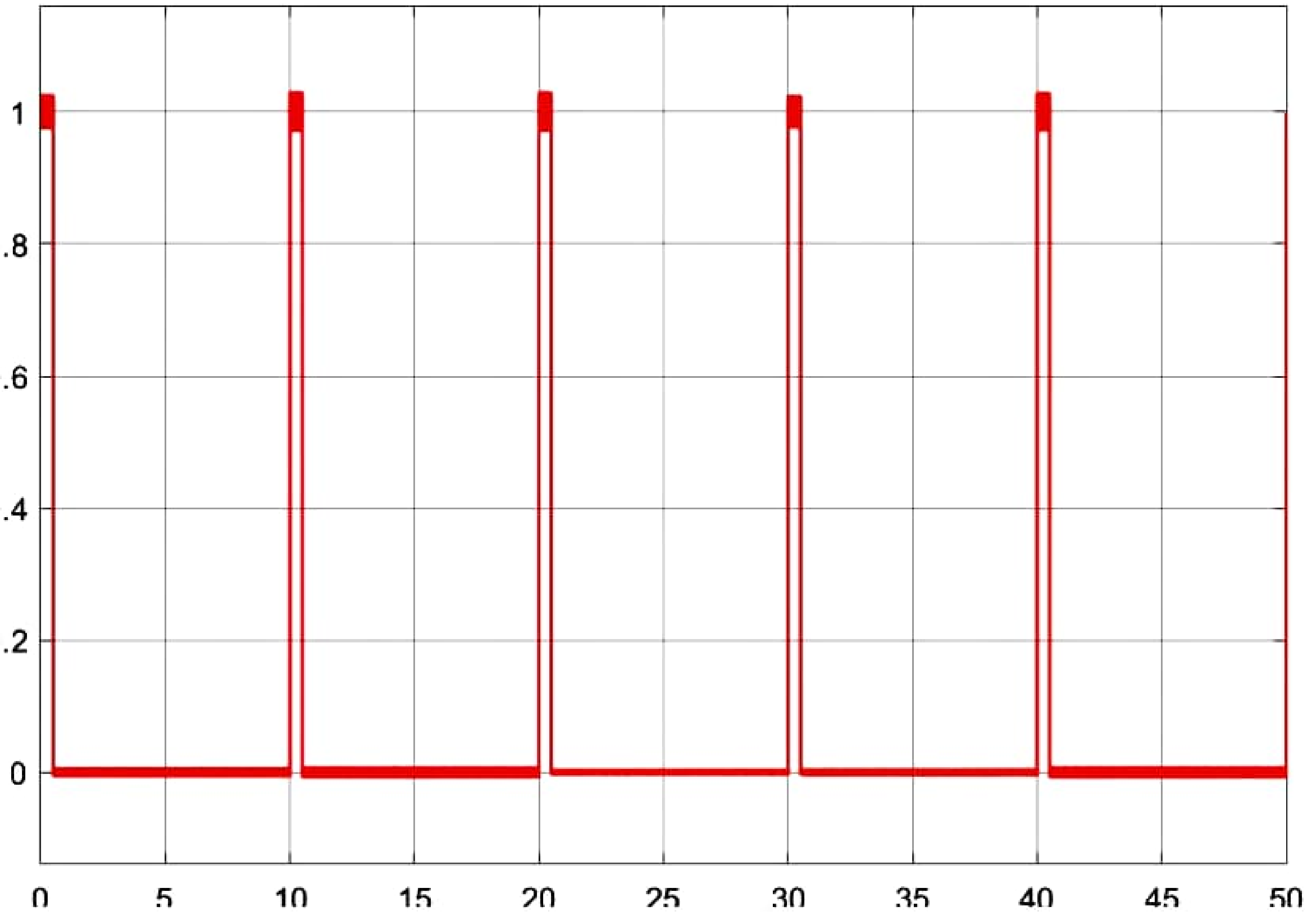
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