**Hysteresis :**

Hysteresis is the dependence of the output of a system not only on its current input, but also on its history of past inputs. The dependence arises because the history affects the value of an internal state. To predict its future outputs, either its internal state or its history must be known. If a given input alternately increases and decreases, a typical mark of hysteresis is that the output forms a loop as in the figure.

Such loops may occur purely because of a dynamic lag between input and output. This effect disappears as the input changes more slowly. This effect meets the description of hysteresis given above, but is often referred to as rate-dependenthysteresis to distinguish it from hysteresis with a more durable memory effect.

Hysteresis occurs in ferromagnetic materials and ferroelectric materials, as well as in the deformation of some materials (such as rubber bands and shape-memory alloys) in response to a varying force. In natural systems hysteresis is often associated with irreversible thermodynamic change. Many artificial systems are designed to have hysteresis: for example, in thermostats and Schmitt triggers, hysteresis is used to avoid unwanted rapid switching. Hysteresis has been identified in many other fields, including economics and biology.

**Hysteresis in Electronic circuits:**

Some amount of hysteresis is intentionally added to an electronic circuit to prevent unwanted rapid switching. This and similar techniques are used to compensate for contact bounce in switches, or noise in an electrical signal. A Schmitt trigger is a simple electronic circuit that exhibits this property. A latching relay uses a solenoid to actuate a ratcheting mechanism that keeps the relay closed even if power to the relay is terminated.

Hysteresis is essential to the workings of some memristors (circuit components which "remember" changes in the current passing through them by changing their resistance).

Hysteresis can be used when connecting arrays of elements such as nanoelectronics, electrochrome cells and memory effect devices using passive matrix addressing. Shortcuts are made between adjacent components and the hysteresis helps to keep the components in a particular state while the other components change states. Thus, all rows can be addressed at the same time instead of individually.

In the field of audio electronics, a noise gate often implements hysteresis intentionally to prevent the gate from "chattering" when signals close to its threshold are applied.

References:

http://en.wikipedia.org/wiki/Hysteresis