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Q1. What are Hybrid Systems? Give an Example?

Ans). A hybrid system is **a dynamical system that exhibits both continuous and discrete dynamic behaviour** – a system that can both flow (described by a differential equation) and jump (described by a state machine or automaton).

A familiar simple example of a practical hybrid control system is **the heating and cooling system of a typical home**. The furnace and air-conditioner, along with the heat flow characteristics of the home, form a continuous-time system, which is to be controlled.

Q2. What are feedback Controllers? What are the types of feedback Controls?

Ans). A feedback controller **measures the output of a process and then manipulates the input as needed to drive the process variable toward the desired setpoint**.

There are two main types of feedback control namely: **Negative Feedback and Positive Feedback**.
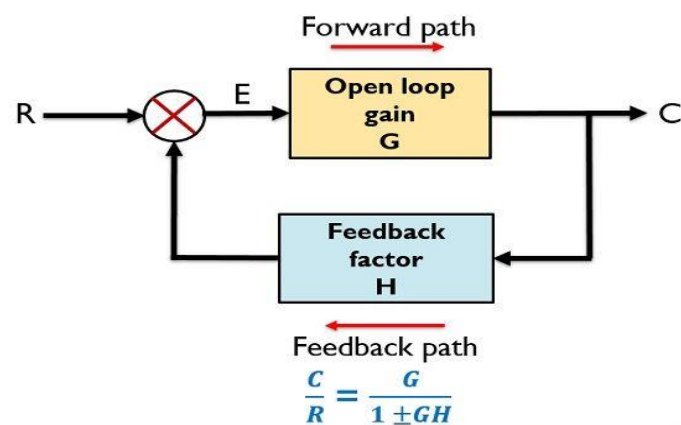
The simplest feedback controller is an on/off controller. It is commonly used for temperature control for home heating and air conditioning systems.

Q3). What are open-loop controllers?

Ans). In an open-loop controller, also called a non-feedback controller, the control action from the controller is independent of the "process output", which is the process variable that is being controlled.

Open Loop Control System

Electronics Coach
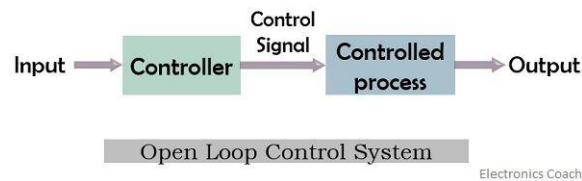
Q4). What is a Zeno Behaviour in Hybrid Systems?

Ans). Zeno behaviour is a phenomenon in hybrid systems that is of special interest, it exists when an infinite number of discrete transitions occur in a finite time interval. Zeno behaviour has seemed to be impervious to analysis.

Q5). Give difference Between Open-loop Controllers and Feedback Controllers?

Ans).

Open Loop Controllers	Feedback Controllers
1). The control system in which input or controlling action does not depend on the output is called an Open-loop control system.	1). The control system in which input or controlling action depends on the output is called a Feedback Controllers.
2). The construction of an open-loop control system is very simple.	2). The construction of an open-loop control system is very complex.
3). This system does not consist of a feedback loop.	3). This system consists of a feedback loop to control the state or previous output of the dynamic system.
4). The output does not change the action of the control system.	4). The output changes the action of the control system.
5). The cost of this system is low.	5). The cost of this system is high.
6). Optimization is not possible in this system.	6). Optimization is possible in this system.