WELCOME

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SIRAJGONJ POLYTECHNIC INSTITUTE,

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CONTROL SYSTEMS AND ROBOTICS

AIMS :

- **After completing the subject, students will be able to:**
- **1. Illustrate the principle of control system theory.**
- **2. State controllers using different techniques.**
- **3. Interpret Artificial Intelligent (AI)**
- **4. Explain fundamentals of Robotics**
- **5. Integrate controls systems with robotics platforms to achieve desired**
- **performance.**
- **6. Elucidate sensors, actuators, feedback control system and practical application**
- **in industrial automation.**

SHORT DESCRIPTION :

- Introduction to Control System.
-

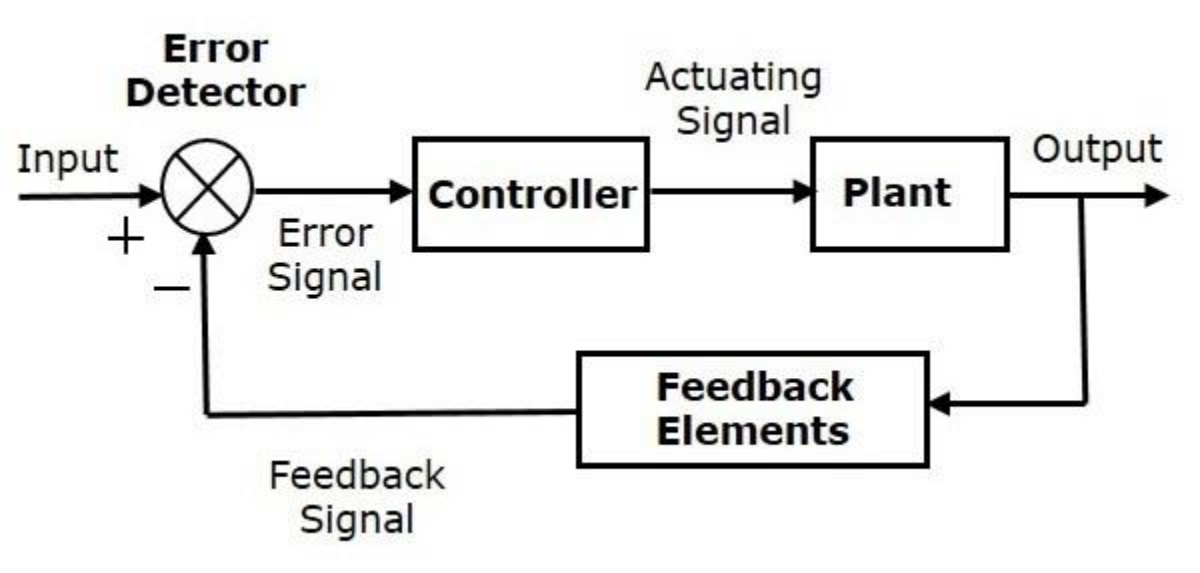
Chapter-01

- **Introduction to Control System**

Control System?

A control system is a set of devices or processes that regulate or manage the behavior of other devices or systems to achieve a desired outcome

Control System ?



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Chapter-01

- **Introduction to Control System**

the Importance and applications of control systems

Control systems are crucial for regulating and managing various processes across diverse fields, ensuring efficiency, precision, and safety. They are essential for maintaining desired behaviors in systems, improving quality, and optimizing resource utilization. Applications range from simple temperature regulation in a room to complex flight control in aircraft.

the Importance and applications of control systems

.Control systems are found in abundance in all sectors of industry such as:
*quality control of manufactured products
*Automatic assembly line
*Machine tool control
*Space technology and weapon systems
*Computer control
*Power Systems
*Robotics
*MicroElectroMechanicalSystems(MEMS)
*Nano technology
*Smart transportation systems
*Ship stabilization systems
*Intelligent Systems
*Temparature control systems
*Steering control of automobiles
*Missile launching systems
*Voltage stabilizer systems
*Idle speed control of automobiles
*Industrial sewing machine
*Sun tracking control of solar collectors

the Importance and applications of control systems

https://www.youtube.com/watch?v=jd59pA-iCZg

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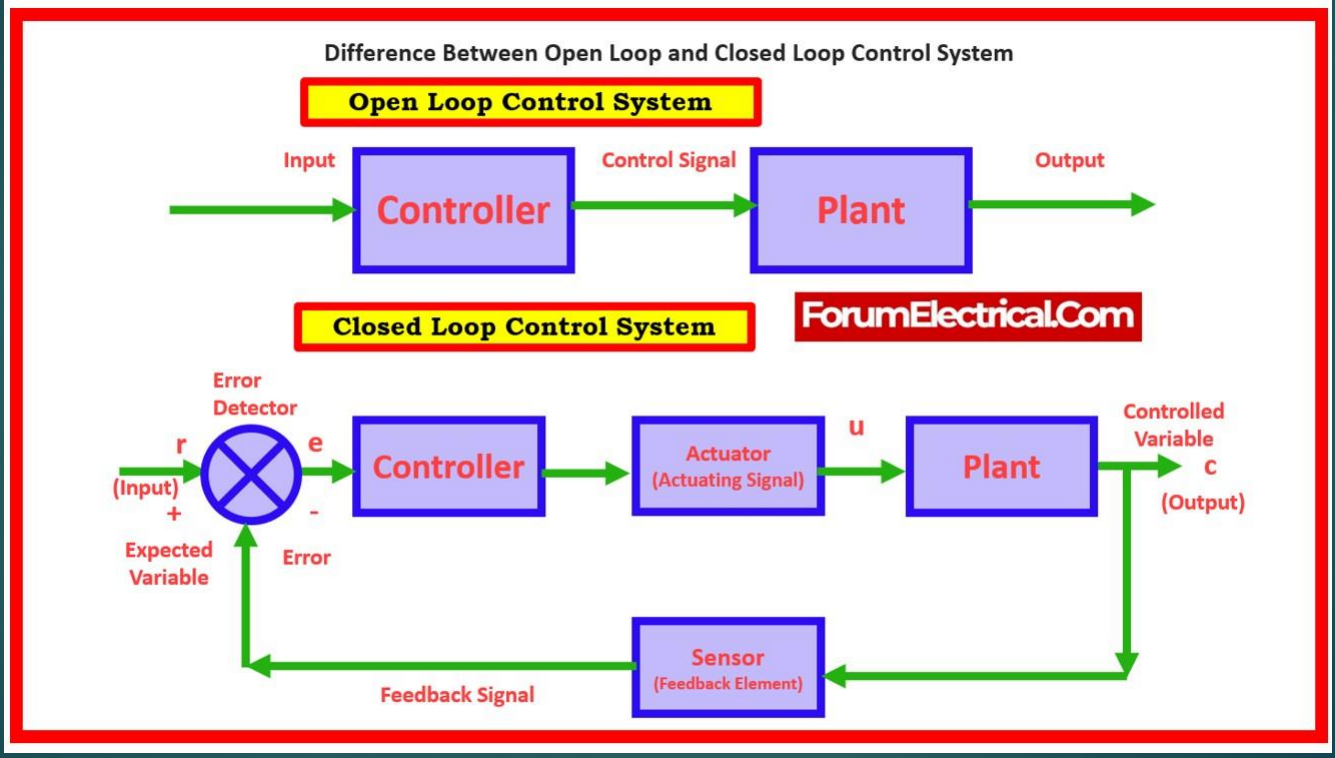
Control systems are crucial for regulating and managing various processes across diverse fields, ensuring efficiency, precision, and safety. They are essential for maintaining desired behaviors in systems, improving quality, and optimizing resource utilization. Applications range from simple temperature regulation in a room to complex flight control in aircraft.

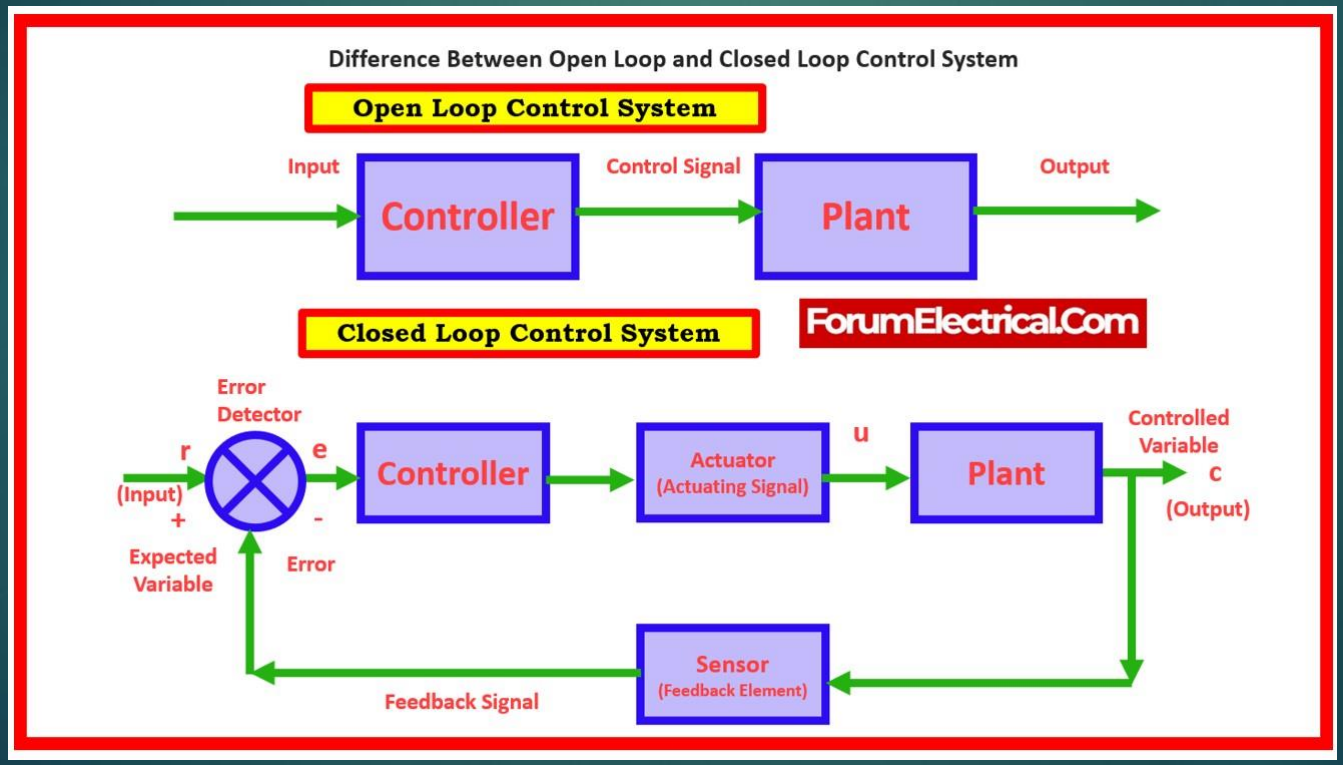
Open-loop control system

An open-loop control system, also known as a non-feedback system, operates without monitoring or adjusting its output, relying solely on a predetermined input to achieve the desired result.



Closed-loop control system

A closed-loop control system, also known as a feedback control system, uses feedback to automatically regulate a system, maintaining a desired state or output without constant human intervention. It continuously monitors the output, compares it to a reference input, and makes adjustments to the input to minimize any deviation.



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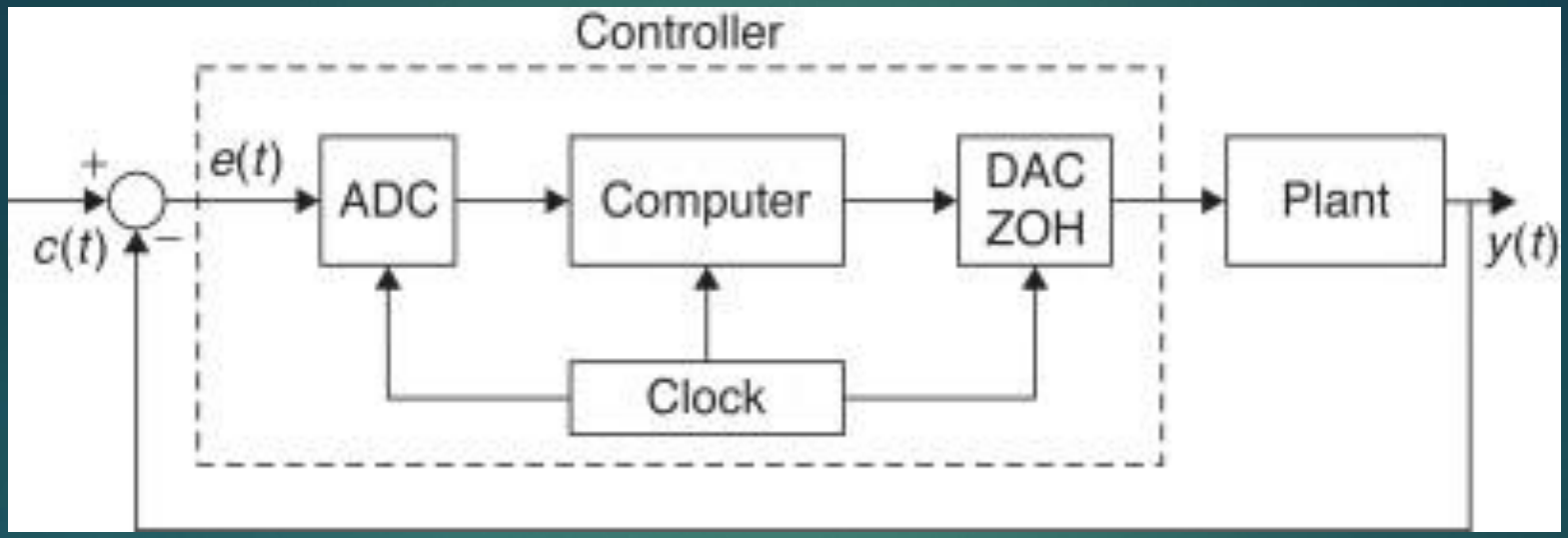
Chapter-02

- **Digital Control System**

Digital Control System?

A digital control system uses a digital computer (like a microcontroller or a PC) to act as the controller, processing and controlling a physical system. It typically involves converting continuous analog signals from sensors into discrete digital values, then processing those digital values to generate control signals, which are then converted back into analog to actuate the system.

Block Diagram of Digital Control System



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Chapter-03

- **Different type of Controller**

Describe Feedback controller.

A feedback controller is a system that adjusts the input of a process based on the difference between a desired setpoint and the actual output, aiming to maintain the output close to the setpoint. It uses negative feedback, where the difference (or error) between the desired output and the actual output is used to correct the input in the opposite direction of the error.

Describe Feedback controller.

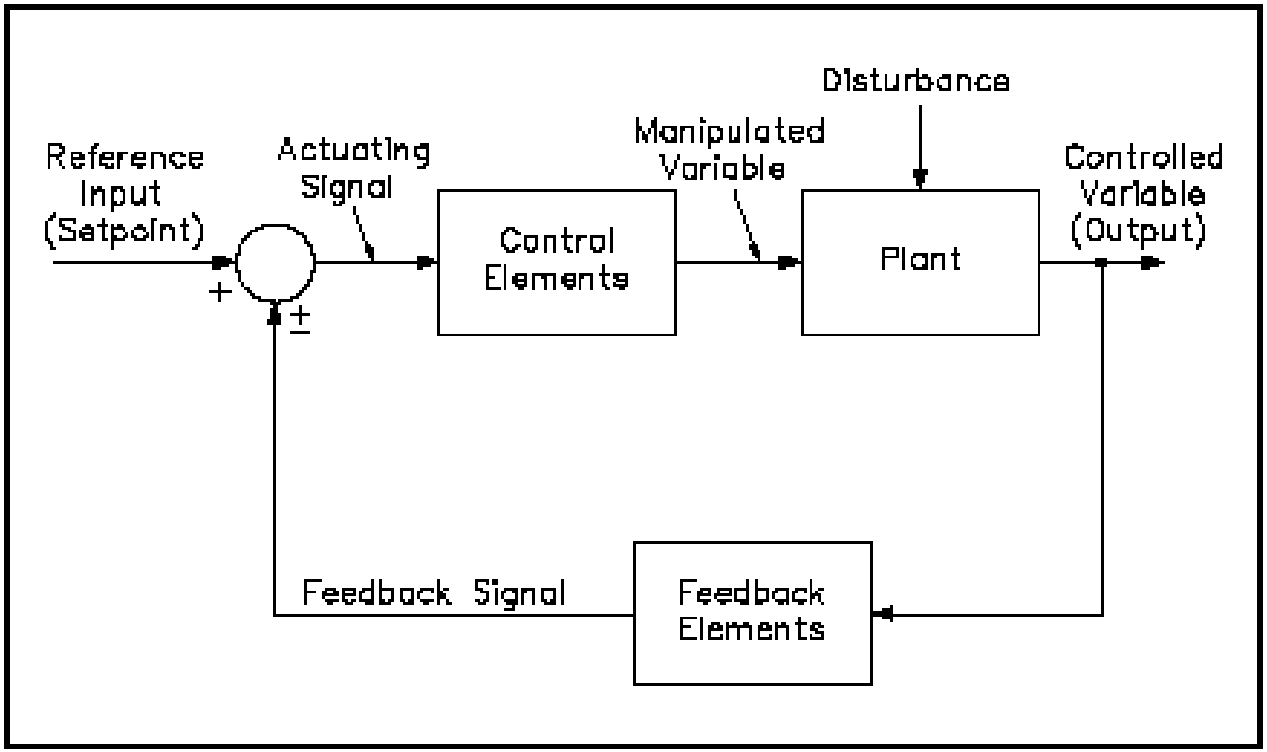

Figure 8 Feedback Control System Block Diagram

Describe Feedback controller.

- https://www.youtube.com/watch?v=GZDPMTBCbYA

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Chapter-03

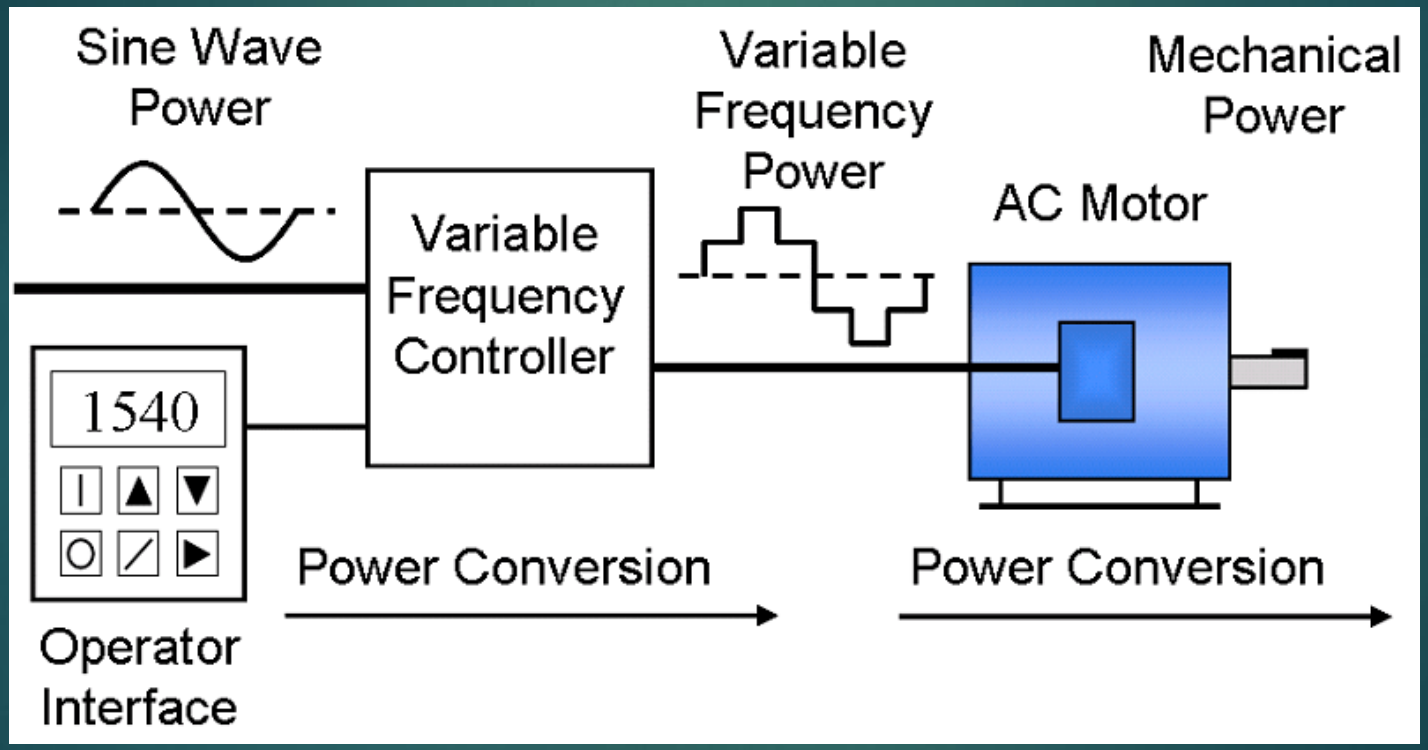
- **Different type of Controller**

Illustrate variable frequency drive (VFD) controller.

A variable frequency drive (VFD) is a type of motor controller that drives an electric motor by varying the frequency and voltage of its power supply. The VFD also has the capacity to control ramp-up and ramp-down of the motor during start or stop, respectively.

Illustrate variable frequency drive (VFD) controller.

Illustrate variable frequency drive (VFD) controller.



Illustrate variable frequency drive (VFD) controller.

- https://www.youtube.com/watch?v=g7jFGOn6xfU

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