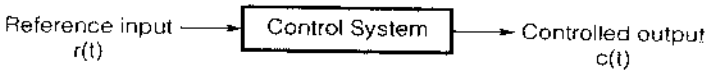
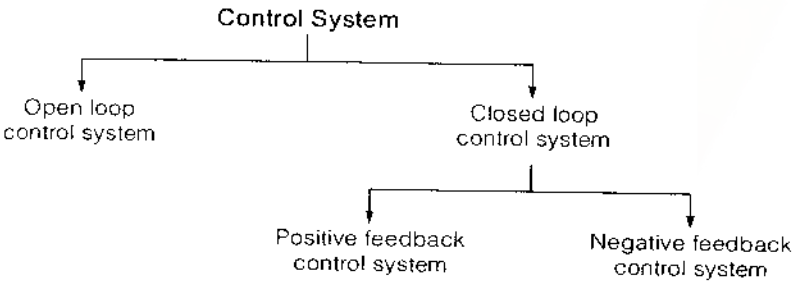
Introduction

A control system is a combination of elements arranged in a planned manner wherein each element causes an effect to produce a desired output.

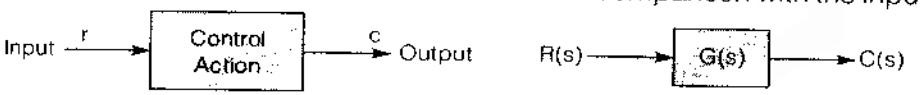


Classification of Control System



Open Loop Control System

It is a conditional control system, formulated under the basic condition that, the system is not subjected to any type of the disturbances. Control characteristics of such systems are independent of output of the system. The output is neither measured nor feedback for comparison with the input.

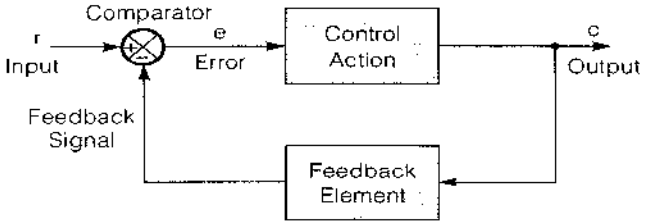


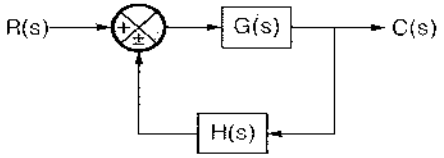
Note:

- Performance analysis is not applicable to open loop system because they are highly stable system.
- Faithfulness of an open loop control system depends upon the accuracy of input calibration.

Closed Loop Control System

Control characteristics of the system depends upon the output of the system. It is also termed as feedback control system. The control action is actuated by an error signal 'e', which is the difference between input signal and output signal. The purpose of feedback is to reduce the error between the reference input and the system output.





Effect of Negative Feedback

1. Effect of parameter variation reduces.
2. The gain of system reduces by a factor (1 + GH).
3. The bandwidth of the system increases.
4. Effect of internal disturbance reduces.

Note:

- Except oscillators, in positive feedback, we have always unstable systems.
- Closed loop system is complex and costly.

Comparison of Open Loop and Closed Loop Control System

Open Loop System	Close Loop System
1. So long as the calibration is good, as open-loop system will be accurate	1. Due to feedback, the close-loop system is more accurate
2. Organization is simple and easy to construct	2. Complicated and difficult
3. Generally stable in operation	3. Stability depends on system components
4. If non-linearity is present, system operation degenerates	4. Comparatively, the performance is better than open-loop system if non-linearity is present