UNIT-I

CONTROL SYSTEM MODELING.

Basic elements of Control System.

* System: It is an arrangement of physical components related in such a manner to form an entire unit.
* Command Input: It is the excitation applied to a control system from an external source. It is the input signal to the system but does not depende on the output of the system.
* Output: It is actual response obtained from a control system.
* Reference input: It is the actual signal i/p to the control system.
* Actuating signal (or) error signal: Diff b/w reference i/p and feedback signal.
* plant: It is a process / machine that is to be controlled.
* Feedback: Feeding back the output quantity to compare with the reference input.
* Control element: Component required to generate the appropriate control signal applied to the plant.

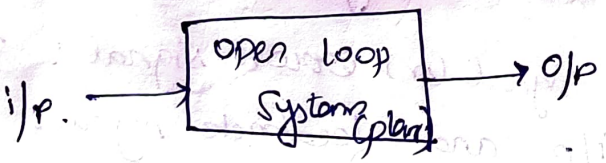
→ When a no. of elements or components are connected in a sequence to perform a specific function is called a system.

→ In a system when the o/p quality is controlled by input quality is called a control system.

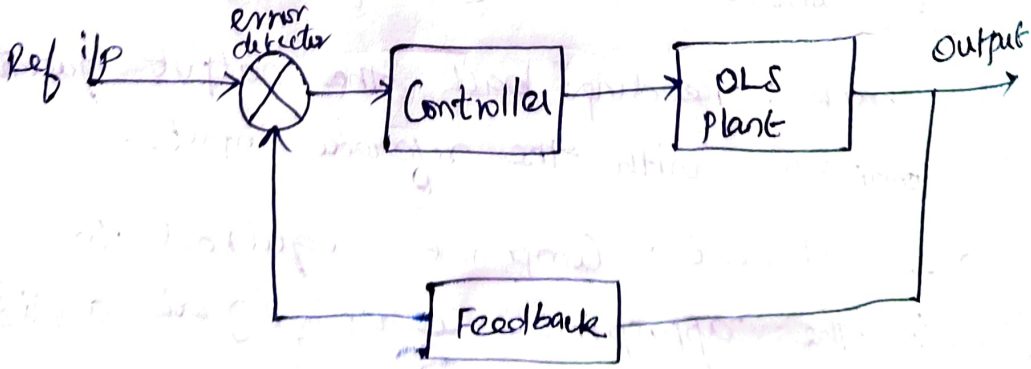
Open loop system:-

→ Physical quantity which does not automatically correct the variation in its o/p is called OLS.

→ It mean that o/p is not feedback to i/p



Closed Loop system.



Adv of OLS.

* Simple & economical
* easier to construct
* Stable

Disadv of OLS

* inaccurate & unreliable
* External disturbance are not corrected automatically.

Adv of CLS.

* Accurate
* Accurate even in the presence of non-linearities

Disadv.

* Complex & costlier
* Reduces overall gain of the system.
* Stability is the major problem.
* It may lead to oscillatory response

Transfer function

$$= \frac{\text{Laplace transform of output}}{\text{Laplace transform of input}} \Big| \text{with zero initial conditions.}$$