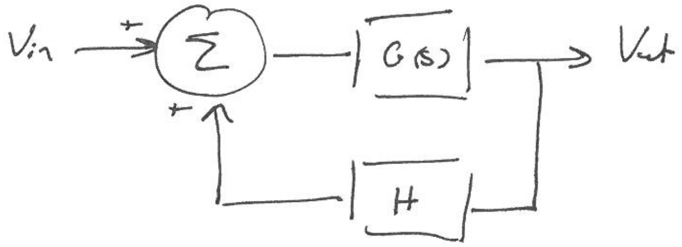
+ve <u>FEEDBACK</u>:



$$\Rightarrow H_{CL}(s) = \frac{G(s)}{1 + H\,G(s)}$$

$$G(s) = \cancel{A(0)}\ \frac{K}{(s - p_{OL1})(s - p_{OL2})} \quad .. \quad (K = p_{OL1} . p_{OL2} . A(0))$$

$$\Rightarrow 1 + H\,G(s) = 1 + \frac{H.K}{(s - p_{OL1})(s - p_{OL2})} = (s - p_{OL1})(s - p_{OL2}) + HK$$

$$= s(s - p_{OL2}) - p_{OL1}(s - p_{OL2}) + HK$$

$$= s^2 - s\,p_{OL2} - s\,p_{OL1} + p_{OL1}\,p_{OL2} + HK$$

$$= s^2 - s(p_{OL1} + p_{OL2}) + p_{OL1}\,p_{OL2} + HK$$

$$\Rightarrow P_{CL1}/P_{CL2} = \frac{\overbrace{p_{OL1} + p_{OL2}} \pm \sqrt{\left[(p_{OL1} + p_{OL2})^2 - 4(p_{OL1}\,p_{OL2} + HK)\right]}}{2}$$

* For P_{CL1}/P_{CL2} = real :

If $\left[(p_{OL1} + p_{OL2})^2 - 4(p_{OL1}\,p_{OL2} + HK)\right]^{1/2} > p_{OL1} + p_{OL2}$

$\Rightarrow$ One closed loop pole gets pushed into the RHP.

$\rightarrow$ Increasing H.K will make this more likely.

* For P_{CL1}/P_{CL2} = complex :

$$\Re(P_{CL1}/P_{CL2}) = \frac{p_{OL1} + p_{OL2}}{2} = -ve$$

$\Rightarrow$ How does a complex pole get into the RHP???