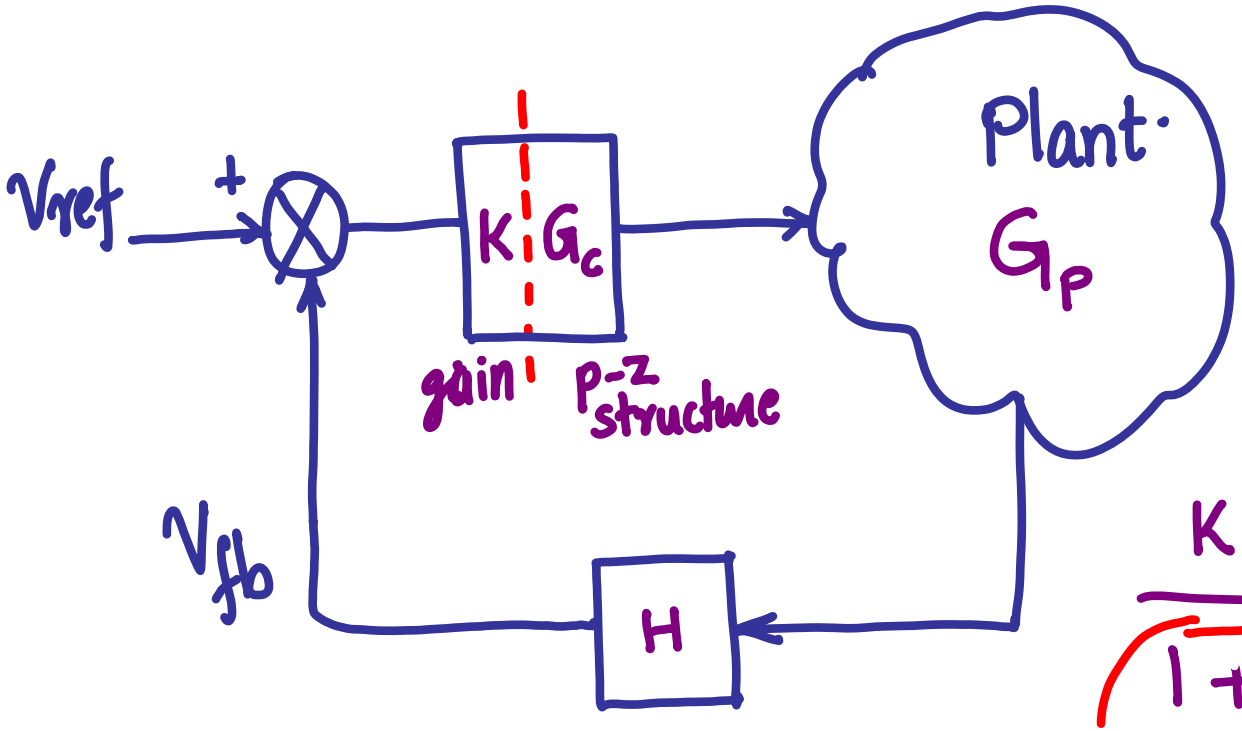
Root locus Method

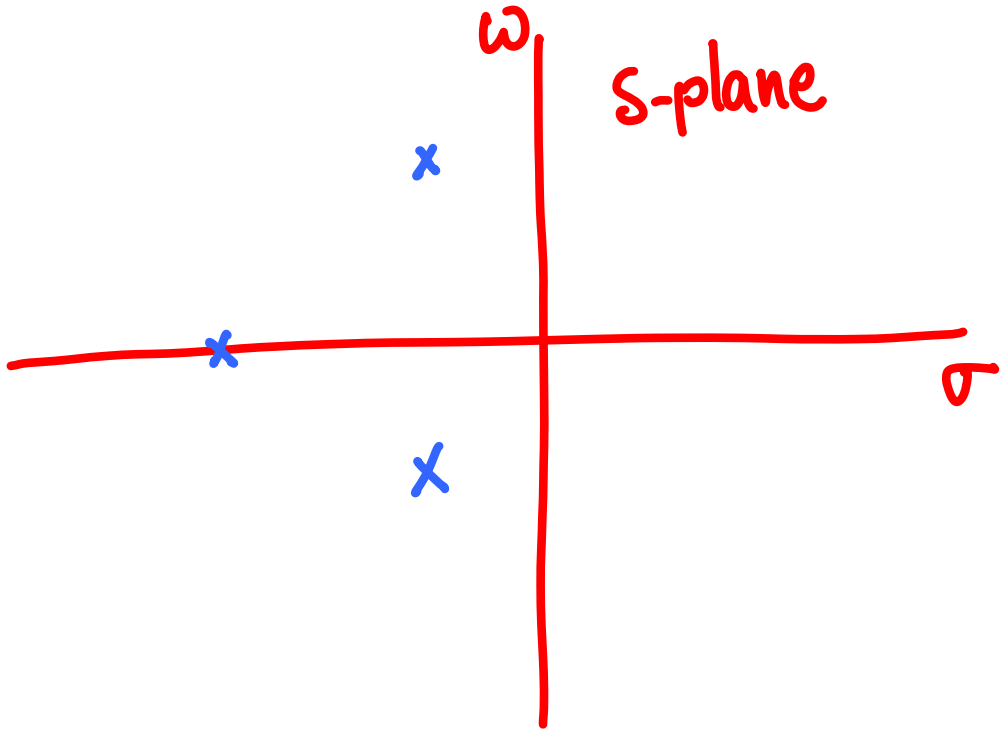


$$\frac{KG_cG_p}{1 + KG_cG_pH}$$

closed loop poles.

$1 + K G_c G_p H = 0$ $\Rightarrow$ characteristic eqn.

roots $\Rightarrow$ closed loop pole location.



$$1 + K G_c G_p H = 0$$

$$K G_c G_p H = -1$$

0 to ∞

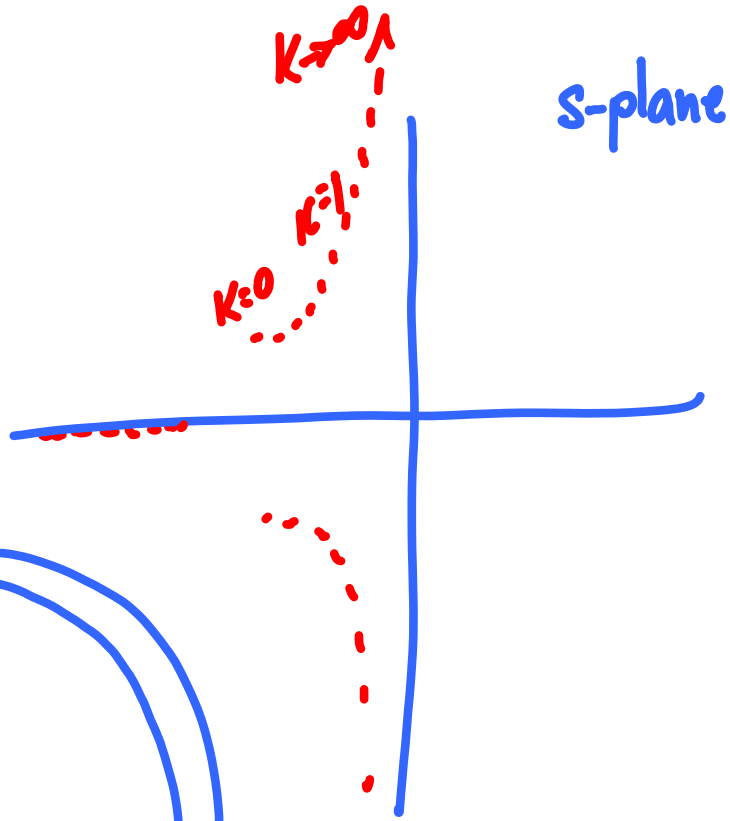
or

$$|K G_c G_p H| = 1$$

&

$$\angle K G_c G_p H = \pi$$

$$(2n+1)\pi$$



$$\frac{KG}{1+KG}$$

$H = 1$

$G_c = 1$

$1 + KG = 0$

$KG = -1$

$K \cdot \frac{n_g(s)}{d_g(s)} = -1$

$n_g(s)$ → zeros of G

$d_g(s)$ → poles of G

$G \to \infty$

$KG = -1$

$K \to 0$, $G \to \infty$

$\therefore$ at open loop pole points of G $K = 0$

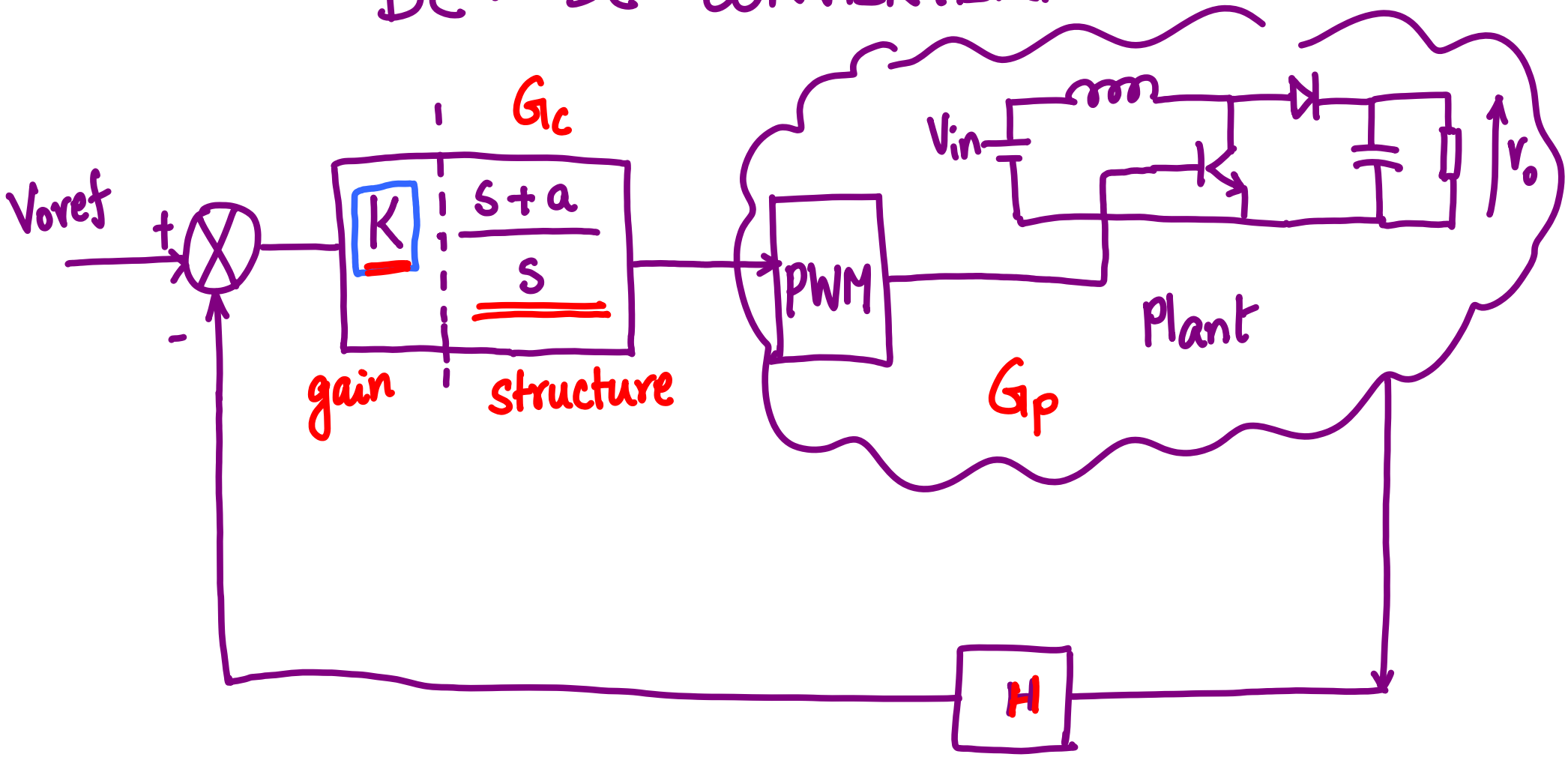
$KG = -1$

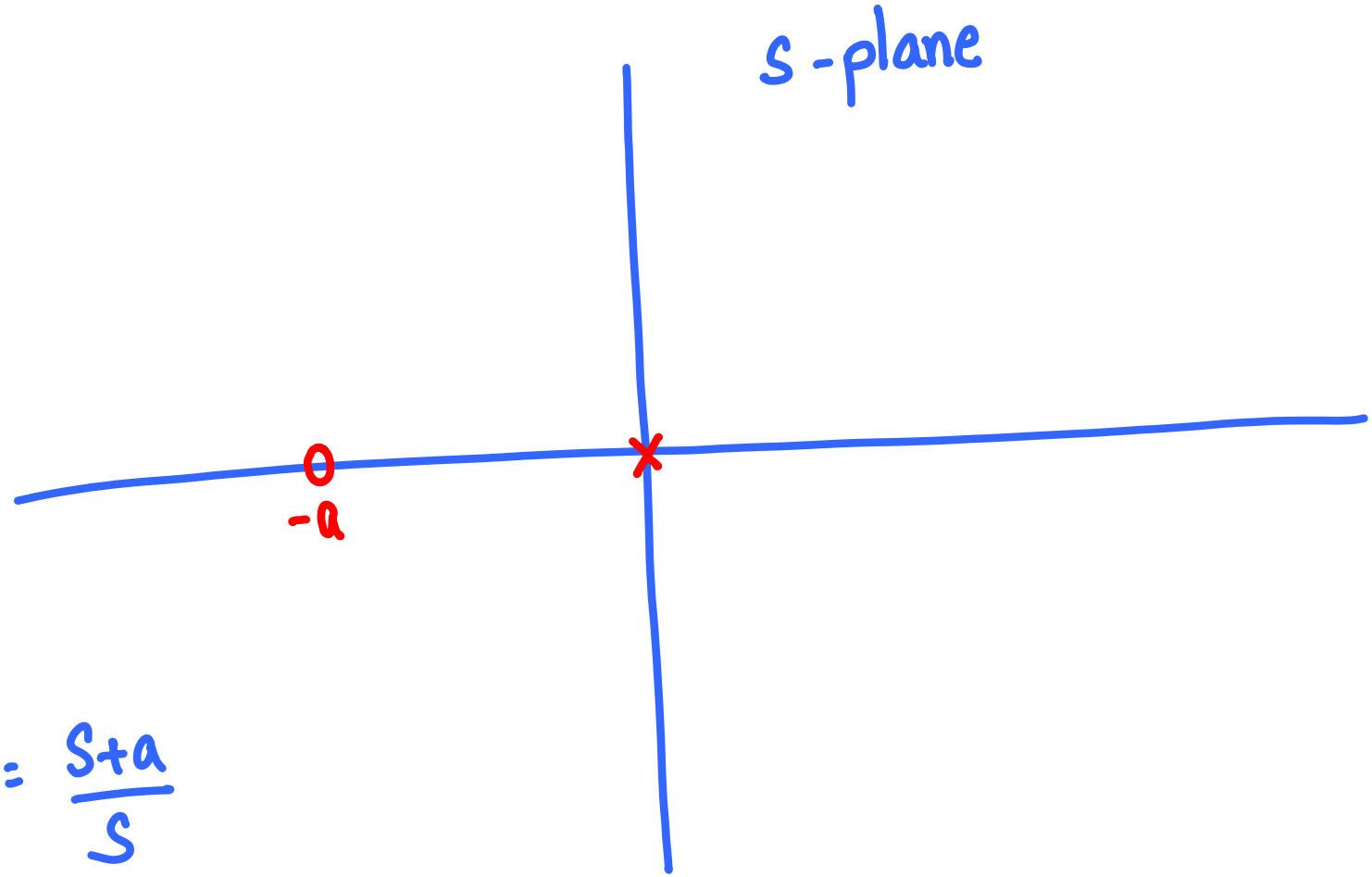
$K \to \infty$, $G \to 0$

$\therefore$ at open loop zero points of G $K \to \infty$

- As K is VARIED from 0 to ∞ the root locus starts from open loop POLE ($K=0$) and ends on open loop zero ($K=\infty$)

DC - DC CONVERTER.





$$G_c = \frac{s+a}{s}$$

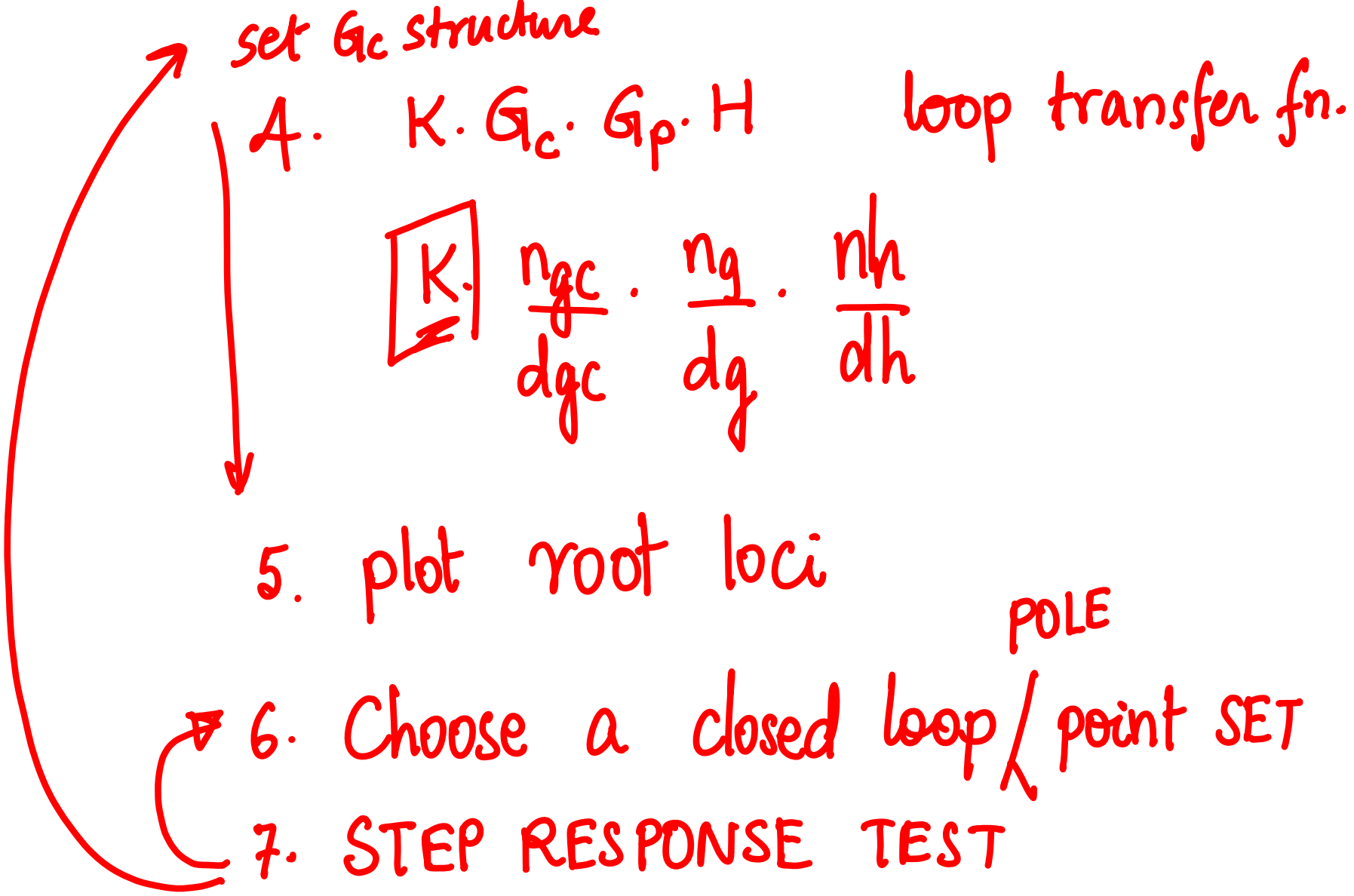
OCTAVE

open source

1. MODEL $(G_p) = \frac{n_g}{d_g}$

2. Control Structure $(G_c) = \frac{n_{gc}}{d_{gc}} = \frac{1}{s} = \frac{s+a}{s} = 1 + \frac{a}{s}$

3. Define feedback transfer fn. $\Rightarrow H = \frac{nh}{dh}$


set Gc structure
4. K · Gc · Gp · H loop transfer fn.
K · ngc/dgc · ng/dg · nh/dh
5. plot root loci
POLE
6. Choose a closed loop / point SET
7. STEP RESPONSE TEST