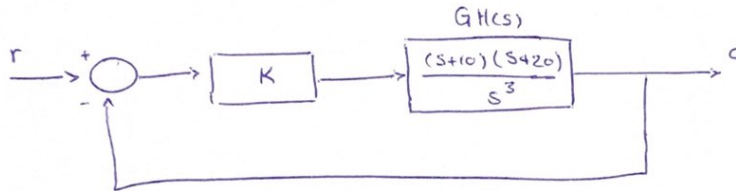


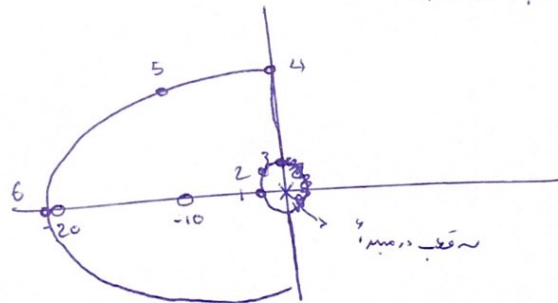
#1



مقدار و قطب های حلقه باز

$$1 + K \frac{(s+10)(s+20)}{s^3} = 0$$

$K=1 \rightarrow$



$$f(s) = \frac{(s+10)(s+20)}{s^3}$$

①  $s = 2 \angle 180^\circ \rightarrow f(s) = \frac{10 \times 20}{2} = 10 \angle 180^\circ$

②  $f(s) = 10 \angle 225^\circ \rightarrow f(s) = 10 \angle 225^\circ$

③  $f(s) = 10 \angle 90^\circ \rightarrow f(s) = 10 \angle -90^\circ$

④  $f(s) = 10 \angle -90^\circ \rightarrow f(s) = \frac{10 \times 20}{(10 \angle 90^\circ)^3} = 10 \angle 270^\circ$