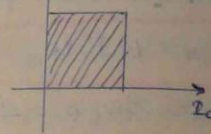
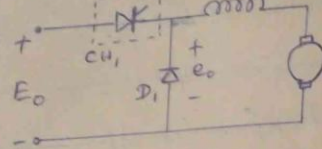
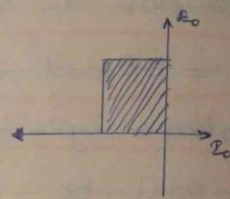
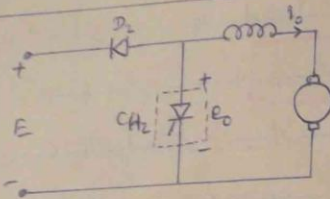


First quadrant choppers



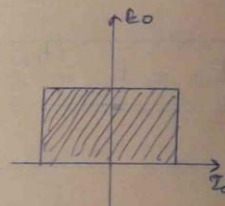
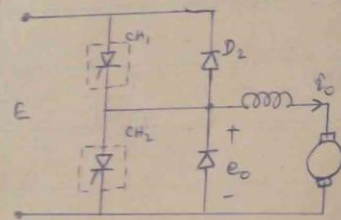
$e_0 = 0$ ,  $CH_1$  OFF  
 $D_1$  ON

Second quadrant or negative choppers



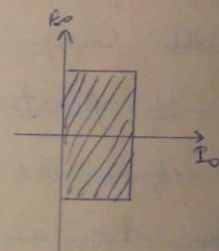
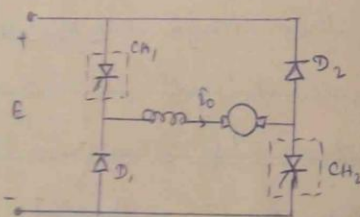
$e_0 = 0$ ,  $CH_2$  ON  
 $= E$ ,  $CH_2$  OFF  
 $D_2$  ON

Two quadrant type A choppers



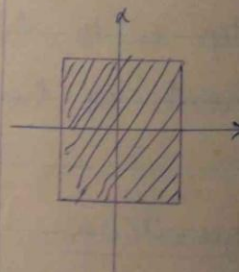
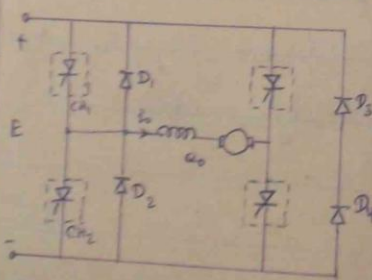
$e_0 = E$ ,  $CH_1$  ON  
or  $D_2$  ON  
 $= 0$ ,  $CH_2$  or  $D_1$  ON  
 $i_0 = \text{Positive } CH_1 \text{ or } D_1 \text{ ON}$   
 $= \text{Negative } CH_2 \text{ or } D_2 \text{ ON}$

Two quadrant type B choppers



$e_0 = +E$ ,  $CH_1$  &  $CH_2$  ON  
 $e_0 = -E$ ,  $CH_1$  &  $CH_2$  OFF  
 $D_1$  &  $D_2$  ON

Four quadrant choppers



$CH_4$  ON &  $CH_3$  OFF  
 $CH_1$  &  $CH_2$  operated  
 $E_0 = \text{positive}$   
 $I_0 = \text{Reversible}$   
 $CH_2$  ON &  $CH_1$  OFF  
 $CH_3$  &  $CH_4$  operated  
 $E_0 = \text{Negative}$   
 $I_0 = \text{Reversible}$