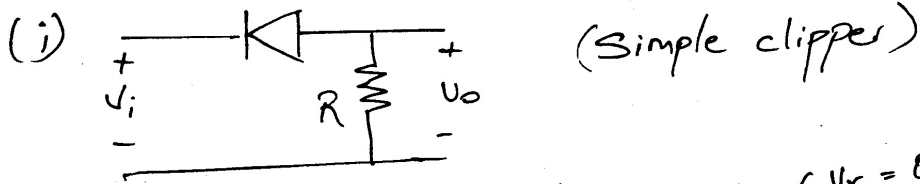


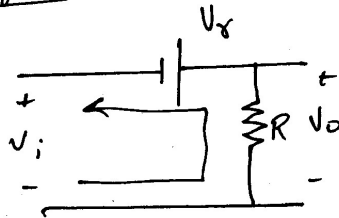
CLIPPERS

(I) SIMPLE SERIES CLIPPER / BIASED SERIES CLIPPER.

(A) POSITIVE CLIPPERS.



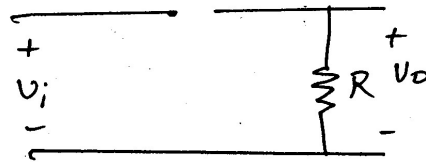
Step 1: When the diode is on: ($V_{r_i} = 0.7$ & $V_{r_{re}} = 0.3$)



$$-V_i + V_o - V_r = 0$$

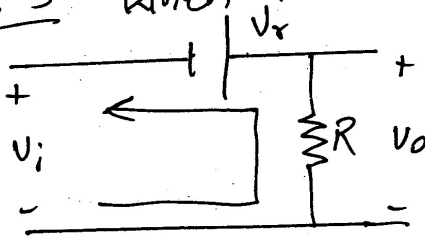
$$V_o = V_i + V_r$$

Step 2: When the diode is off:



$$V_o = 0$$

Step 3: When is the diode on?

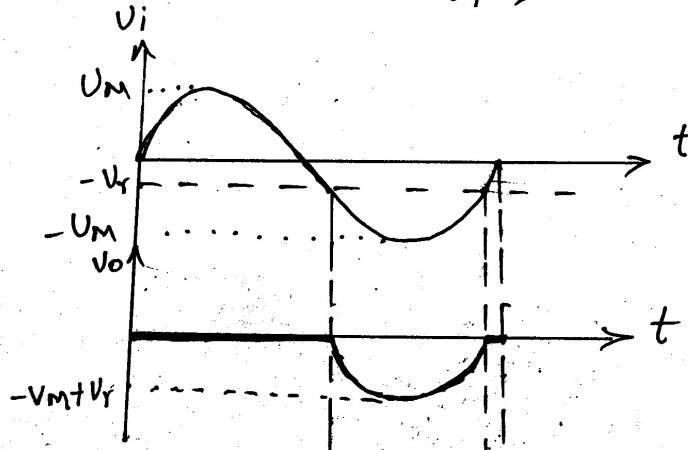


$$-V_i - IR - V_r = 0$$

$$\therefore V_i = -V_r - IR$$

$$V_i \leq -V_r \text{ diode on}$$

$$V_i \geq -V_r \text{ diode off}$$

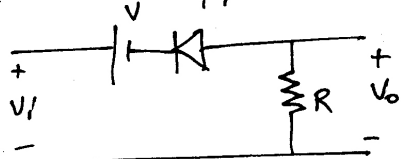


23868356

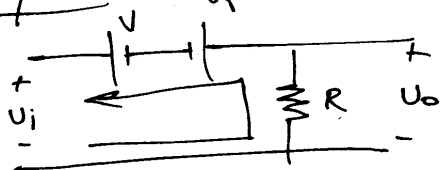


POWER

(ii) (Biased Clipper)



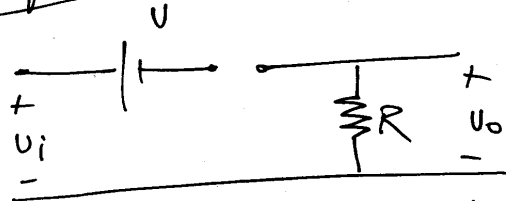
Step 1: When the diode is on:



$$-V_i + V - V_r + V = 0$$

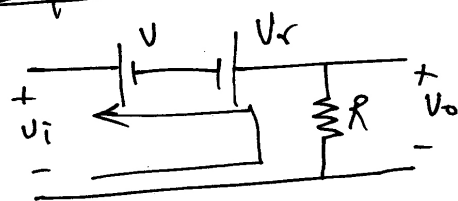
$$V_o = +V_i - (V - V_r)$$

Step 2: When the diode is off:



$$V_o = 0$$

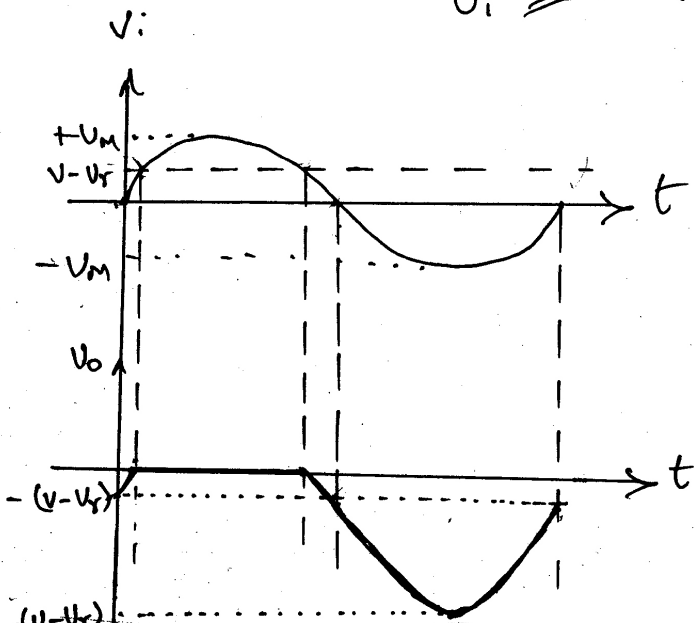
Step 3: When is the diode on?



$$-V_i - IR - V_r + V = 0$$

$$V_i = -IR + (V - V_r)$$

$V_i \leq V - V_r$ diode is on
 $V_i \geq V - V_r$ diode is off



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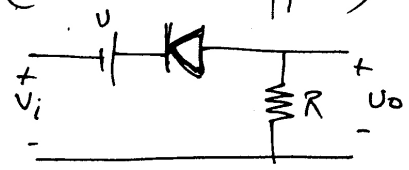
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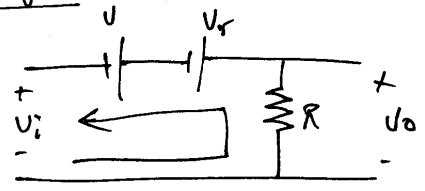


POWER

(iii) (Biased Clipper)



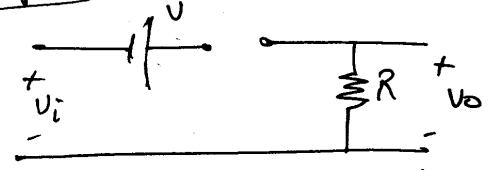
Step 1: When the diode is on:



$$-v_i + v_o - V - V_r = 0$$

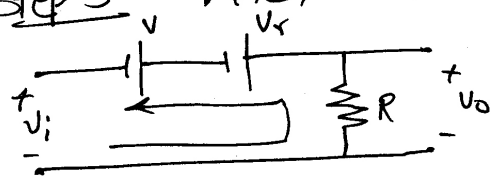
$$v_o = v_i + (V + V_r)$$

Step 2: When the diode is off:



$$v_o = 0$$

Step 3: When is the diode on?

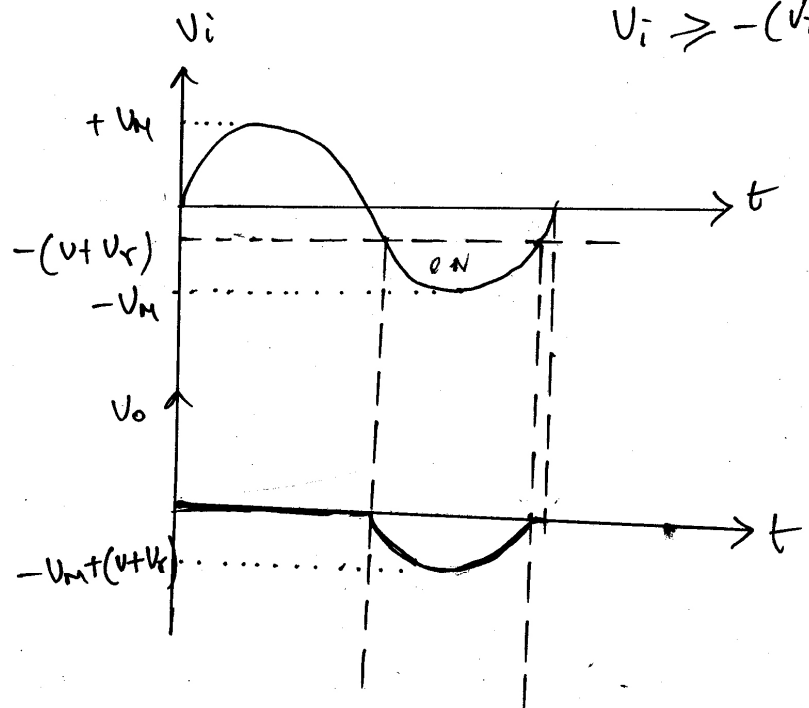


$$-v_i - IR - V - V_r = 0$$

$$v_i = -IR - (V + V_r)$$

$$v_i \leq -(V + V_r) \text{ diode is on}$$

$$v_i \geq -(V + V_r) \text{ diode is off}$$



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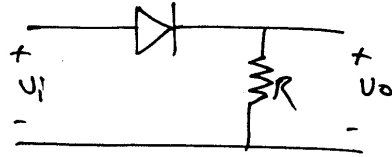
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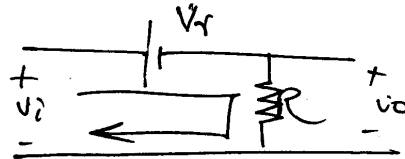
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(B) NEGATIVE CLIPPERS (i) (Simple Clipper)



Step 1: When the diode is on:



$$V_i - V_f - V_o = 0$$

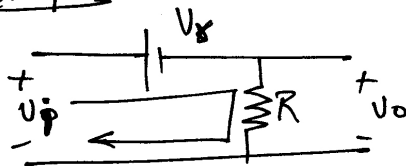
$$V_o = V_i - V_f$$

Step 2: When the diode is off:



$$V_o = 0$$

Step 3: When is the diode on?

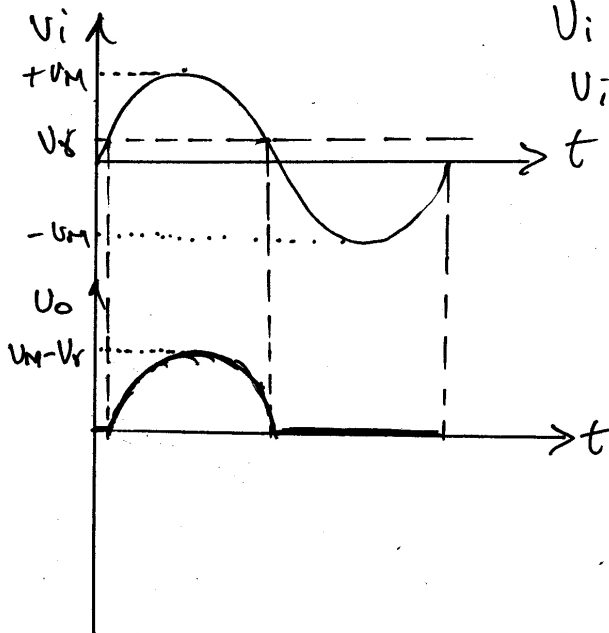


$$V_i - V_f - IR = 0$$

$$V_i = IR + V_f$$

$$V_i \geq V_f \quad \text{diode is on}$$

$$V_i \leq V_f \quad \text{diode is off}$$



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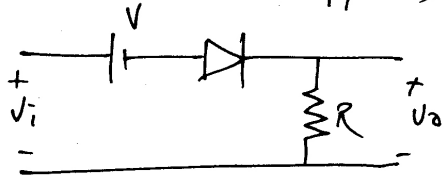
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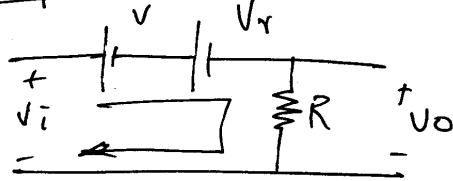
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(ii) (Biased Clipper)



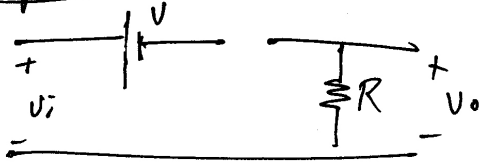
Step 1: When the diode is on:



$$v_i - V - V_r - v_o = 0$$

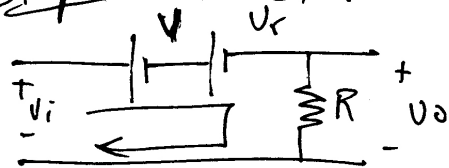
$$v_o = v_i - (V + V_r)$$

Step 2: When the diode is off:



$$v_o = 0$$

Step 3: When is the diode on?

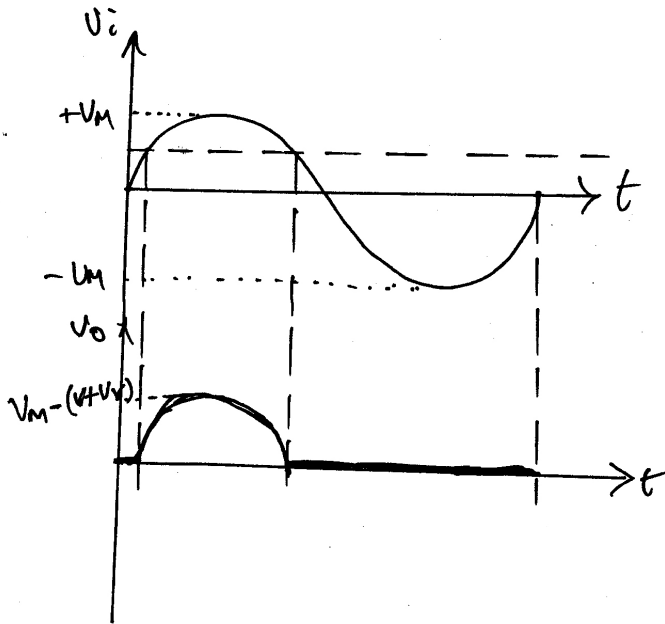


$$v_i - V - V_r - IR = 0$$

$$v_i = IR + (V + V_r)$$

$$v_i \geq V + V_r \text{ diode is on}$$

$$v_i \leq V + V_r \text{ diode is off.}$$



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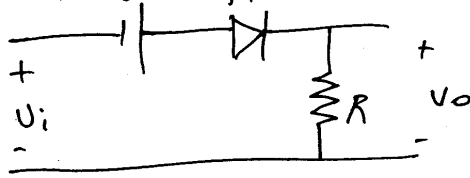
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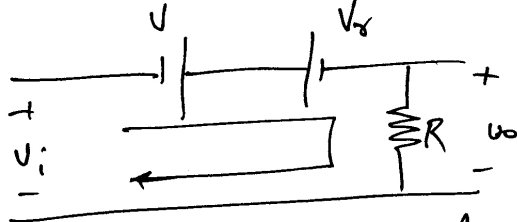


POWER

(iii) (Biased Clipper)



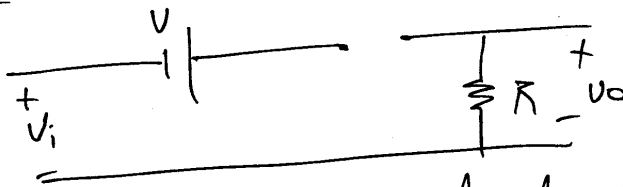
Step 1: When the diode is on



$$V_i + V - V_s - V_o = 0$$

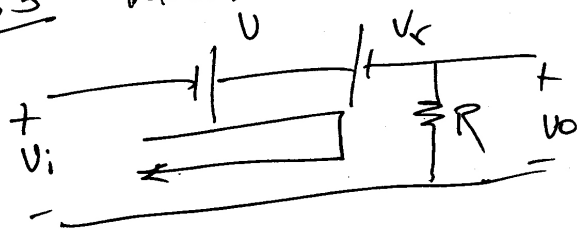
$$V_o = V_i + (V - V_s)$$

Step 2: When the diode is off



$$V_o = 0$$

Step 3: When is the diode on?

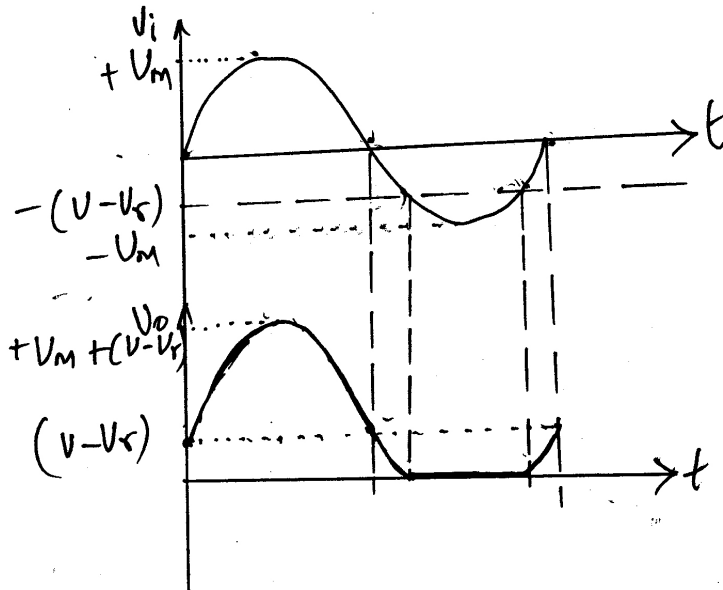


$$V_i + V - V_s - IR = 0$$

$$V_i = IR - (V - V_s)$$

$$V_i \geq -(V - V_s) \text{ diode on}$$

$$V_i < -(V - V_s) \text{ diode off}$$



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By ARHISHK NAULAKHI

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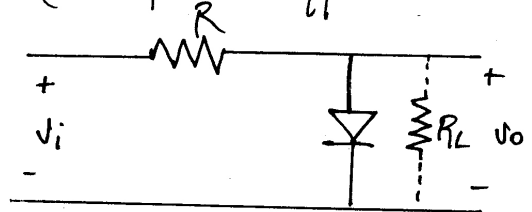
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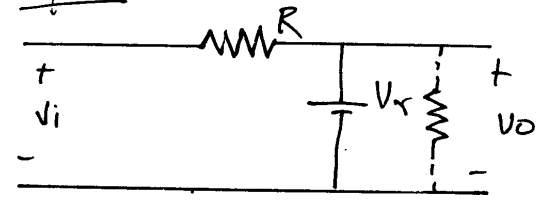
(II) SIMPLE/BIASED PARALLEL CLIPPERS

(A) POSITIVE CLIPPERS

(i) (Simple Clipper)

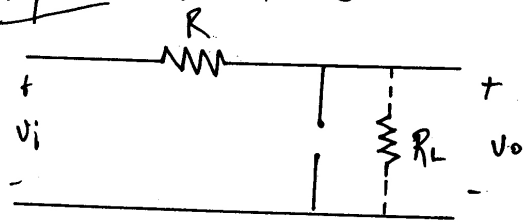


Step 1: When the diode is on:



$$v_o = V_f$$

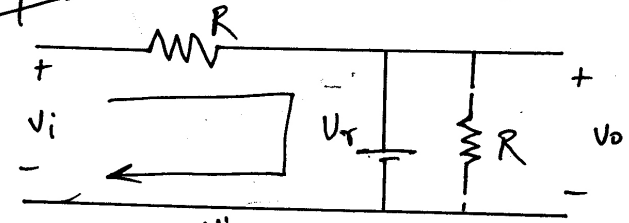
Step 2: When the diode is off:



No $R_L \Rightarrow v_o = v_i$

With $R_L \Rightarrow v_o = \frac{R_L}{R+R_L} v_i$

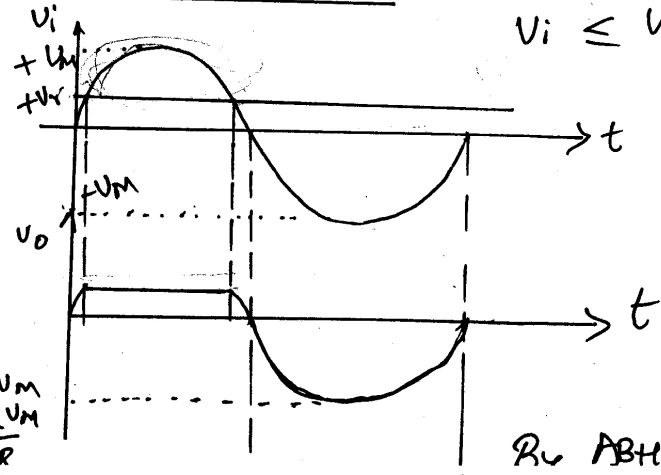
Step 3: When is the diode on?



$$v_i - IR - V_f = 0$$

$$v_i = IR + V_f$$

$v_i \geq V_f$ diode on
 $v_i < V_f$ diode off



No $R_L \Rightarrow -V_m$
 With $R_L \Rightarrow -\frac{R_L V_m}{R+R_L}$

By ABHISHEK M.

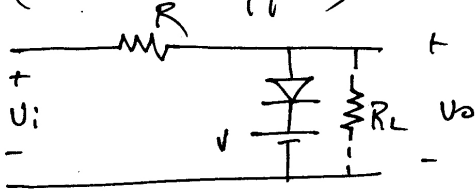
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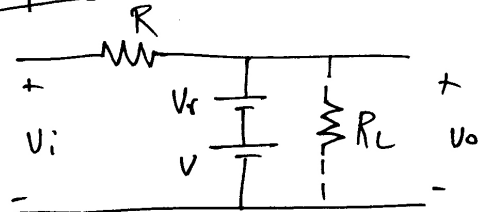


POWER

(ii) (Biased Clipper)

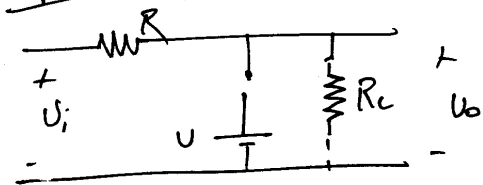


Step 1: When the diode is on:



$$V_o = V + V_r$$

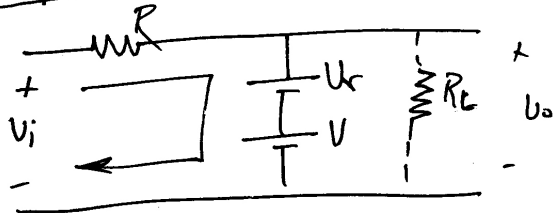
Step 2: When the diode is off:



No $R_L \Rightarrow V_o = V_i$

With $R_L \Rightarrow V_o = \frac{R_L}{R_L + R} V_i$

Step 3: When is the diode on?

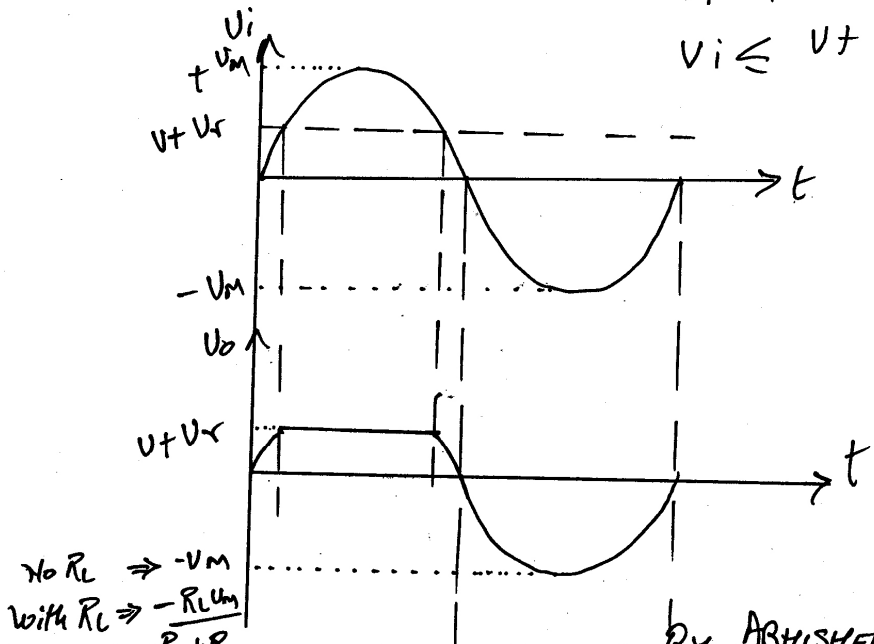


$$V_i - IR - V_r - V = 0$$

$$V_i = IR + (V + V_r)$$

$V_i \geq V + V_r$ diode is on

$V_i \leq V + V_r$ diode is off.



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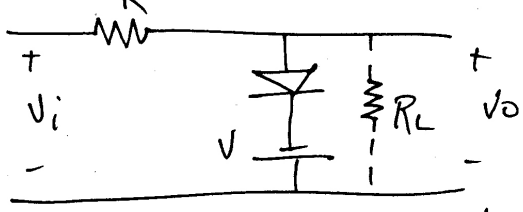
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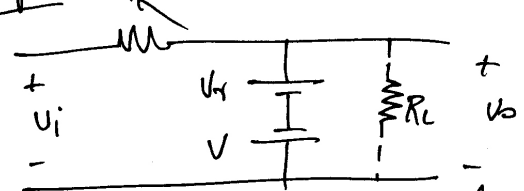


POWER

(iii) (Biased Clipper)

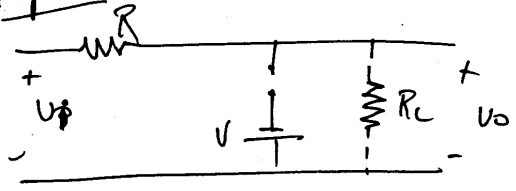


Step 1: When the diode is on:



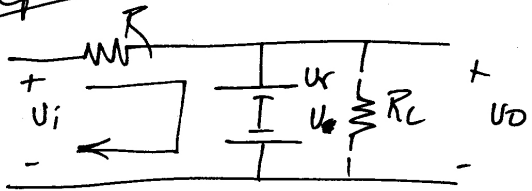
$$V_o = -V + V_r$$

Step 2: When the diode is off:



No $R_L \Rightarrow V_o = V_i$
 With $R_L \Rightarrow V_o = \frac{R_L}{R_L + R} \cdot V_i$

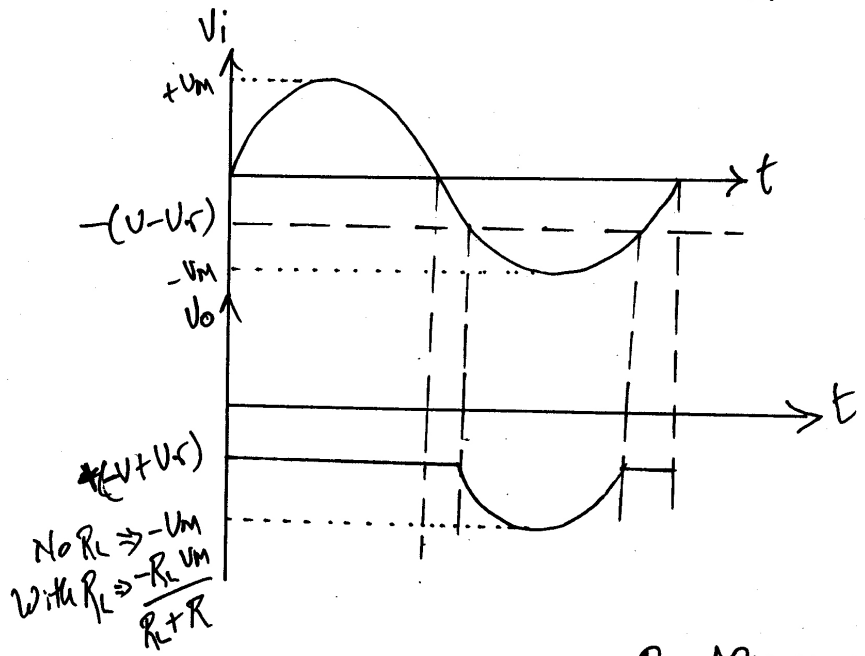
Step 3: When is the diode on?



$$V_i - IR - V_r + V = 0$$

$$V_i = IR + (V - V_r)$$

$V_i \geq -(V - V_r)$ diode on
 $V_i \leq -(V - V_r)$ diode off



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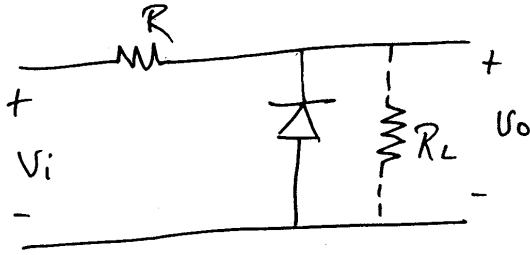
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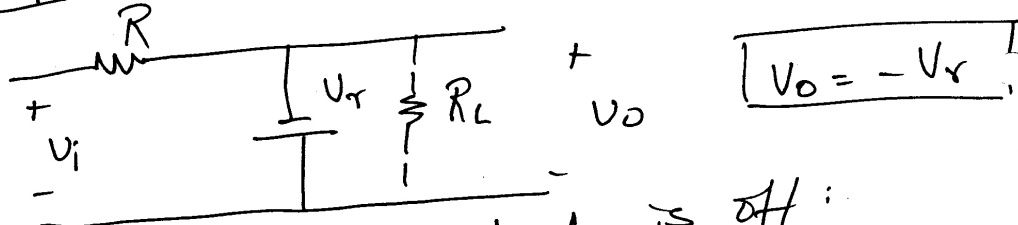


POWER

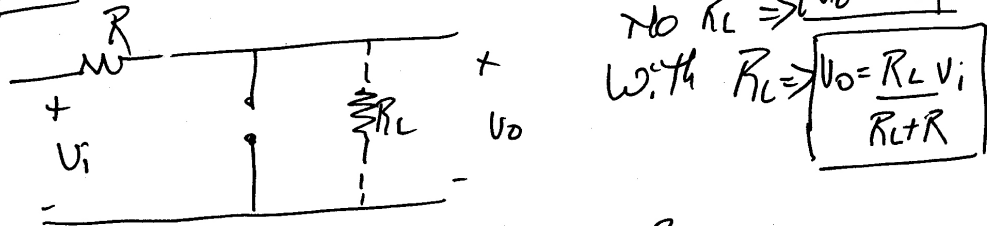
(B) NEGATIVE CLIPPER
(i) (Simple Clipper)



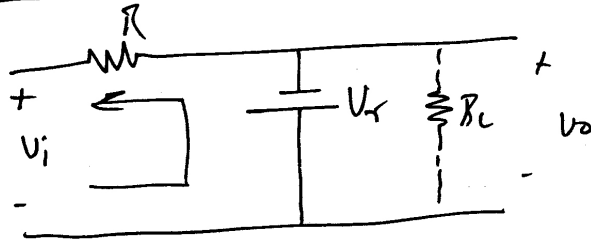
Step 1: When the diode is on.



Step 2: When the diode is off:



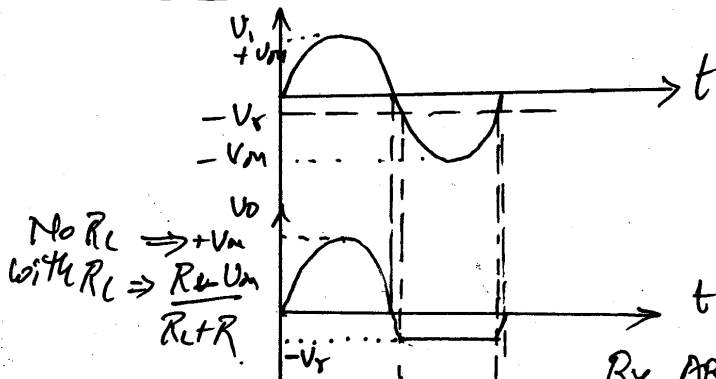
Step 3: When is the diode on?



$$-V_i - V_r - IR = 0$$

$$V_i = -V_r - IR$$

$V_i \leq -V_r$ diode on
 $V_i \geq -V_r$ diode off



RV ARHISUDH NAVLAKHI

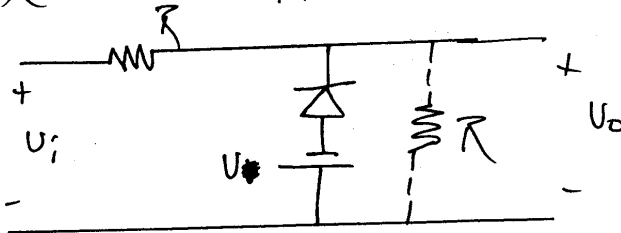
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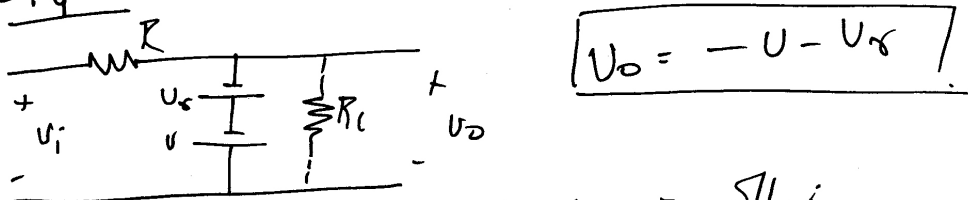


POWER

(ii) (Biased Clipper)

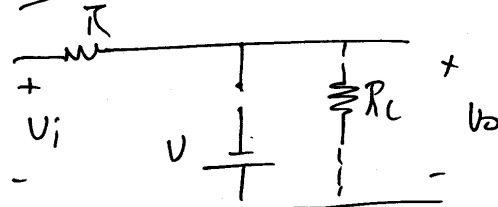


Step 1: When the diode is on:



$$V_o = -U - U_s$$

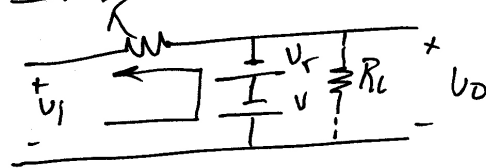
Step 2: When the diode is off:



No $R_L \Rightarrow V_o = U_i$

With $R_L \Rightarrow V_o = \frac{R_L}{R_L + R} U_i$

Step 3: When is the diode on:

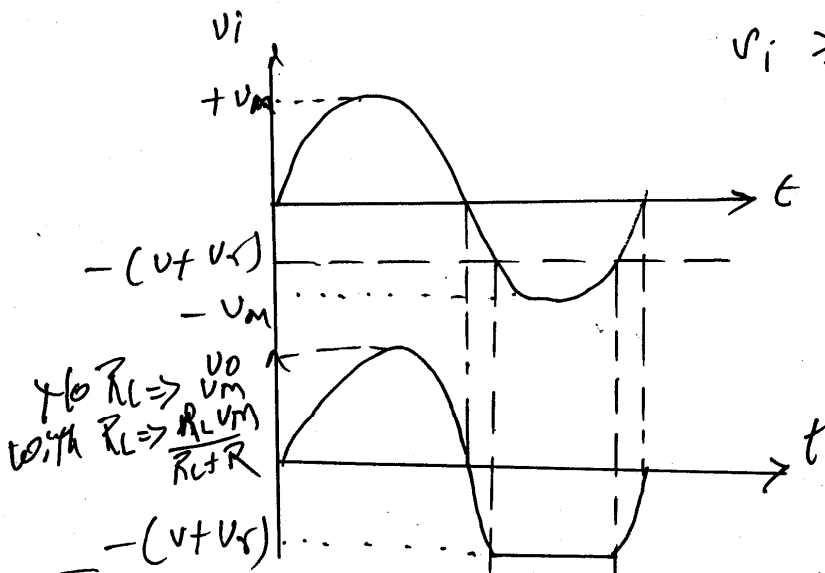


$$-u_i - U - U_s - IR = 0$$

$$u_i = -IR - (U + U_s)$$

$$u_i \leq -(U + U_s) \text{ diode on}$$

$$u_i \geq -(U + U_s) \text{ diode off}$$



No $R_L \Rightarrow V_o = u_m$
With $R_L \Rightarrow \frac{R_L u_m}{R_L + R}$

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By ABHIRAM x12111111

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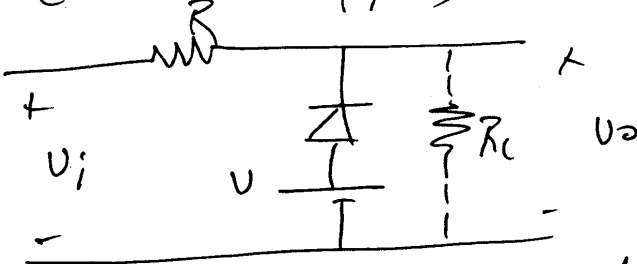
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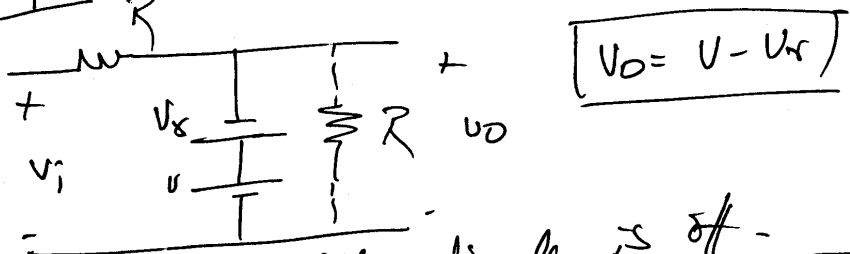


POWER

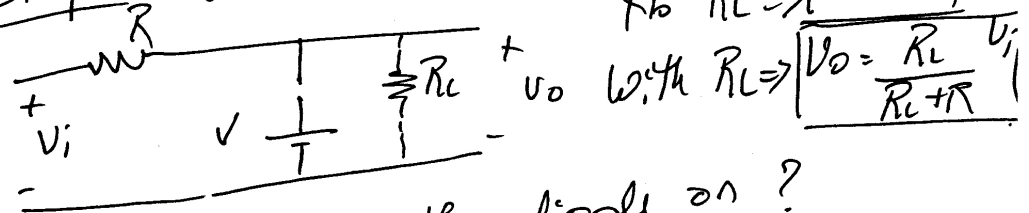
(iii) (Biased Clippers)



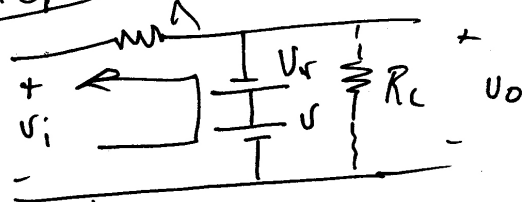
Step 1: When the diode is on.



Step 2: When the diode is off.



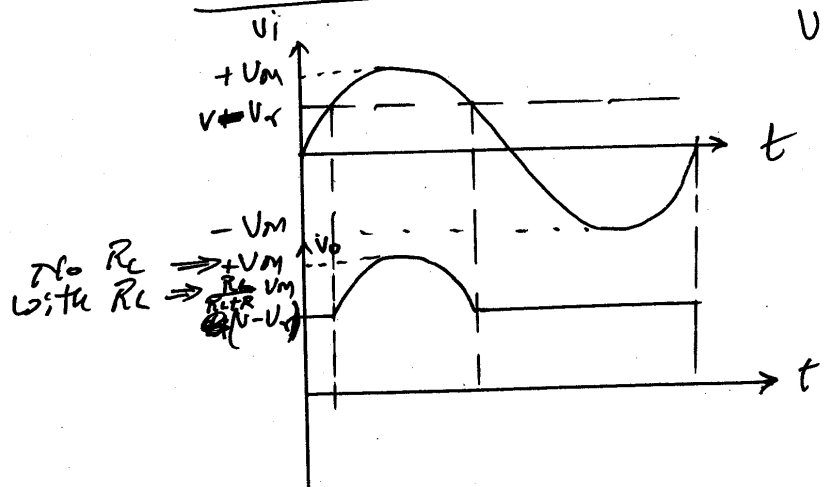
Step 3: When is the diode on?



$$-V_i + V - V_r - IR = 0$$

$$V_i = -IR + (V - V_r)$$

$V_i \leq V - V_r$ diode on
 $V_i \geq V - V_r$ diode off



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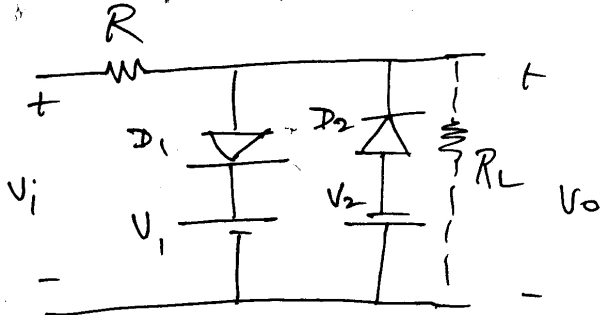
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(C) DOUBLE / TWO-WAY CLIPPER



POWER



For D1:

step 1: when D1 is on

$$V_o = V_1 + V_r$$

step 2: when D1 is off

$$V_o = V_i$$

step 3: when is D1 on?

$$V_i - IR - V_r - V_1 = 0$$

$$V_i = IR + (V_1 + V_r)$$

$$V_i \geq V_1 + V_r \text{ on}$$

$$V_i \leq V_1 + V_r \text{ off.}$$

For D2

step 1: when D2 is on

$$V_o = -V_2 - V_r$$

step 2: when D2 is off

$$V_o = V_i$$

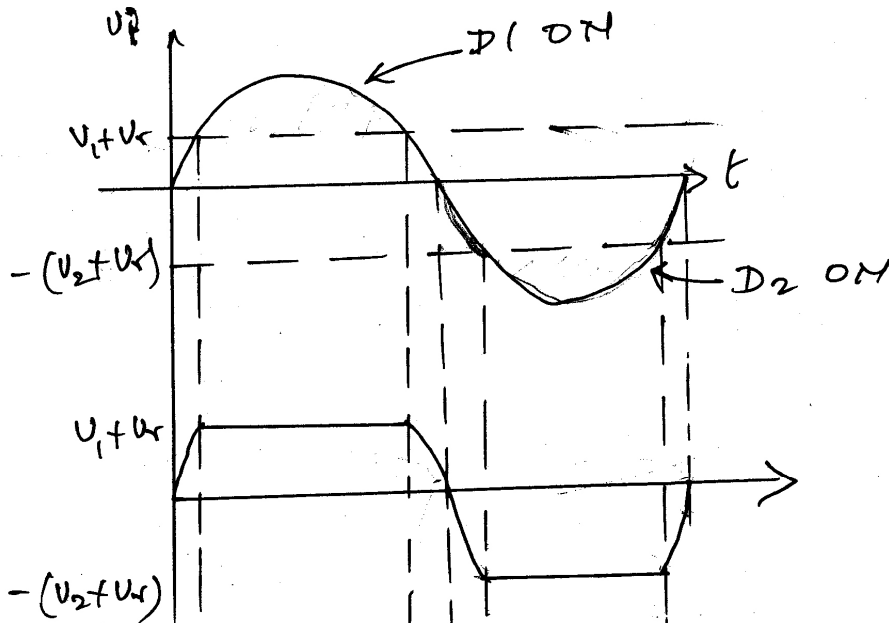
step 3: when is D2 on?

$$-V_i - V_2 - V_r - IR = 0$$

$$V_i = -IR - (V_2 + V_r)$$

$$V_i \leq -(V_2 + V_r) \text{ diode on}$$

$$V_i > -(V_2 + V_r) \text{ diode off.}$$



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