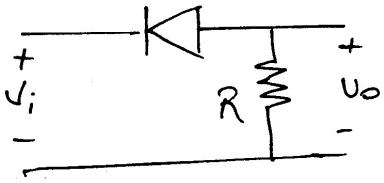
E/B

# CLIPPERS

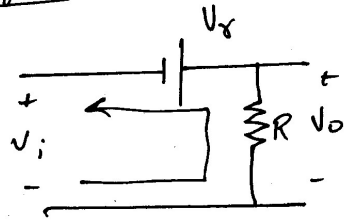
## (I) Simple Series Clipper / Biased Series Clipper.

### (A) Positive Clippers.

(i) 

(Simple clipper)

**Step 1:** When the diode is on: ($V_{\gamma_{Si}} = 0.7$ & $V_{\gamma_{Ge}} = 0.3$)

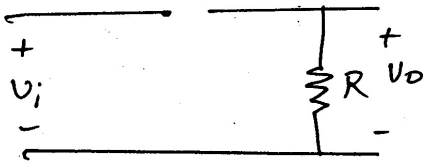



$-V_i + V_o - V_\gamma = 0$

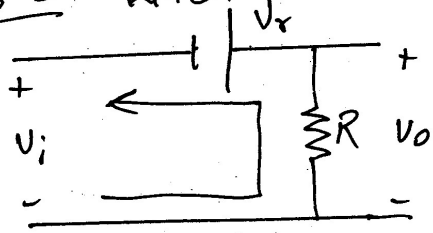
$\boxed{V_o = V_i + V_\gamma}$

**Step 2:** When the diode is off:

$\boxed{V_o = 0}$




**Step 3:** When is the diode on?

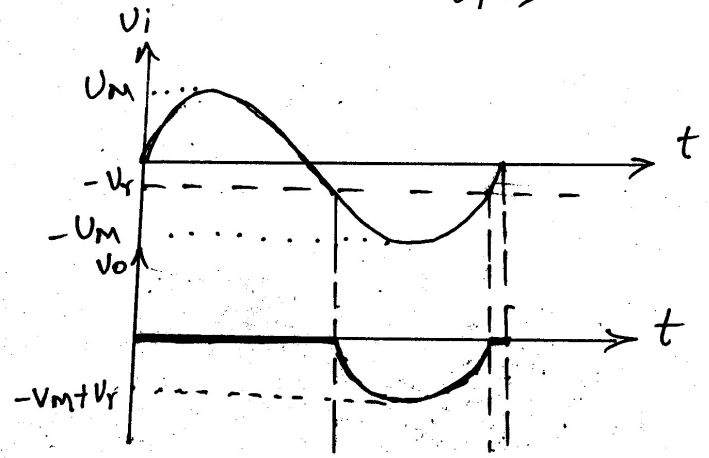



$-V_i - IR - V_\gamma = 0$

$\therefore V_i = -V_\gamma - IR$

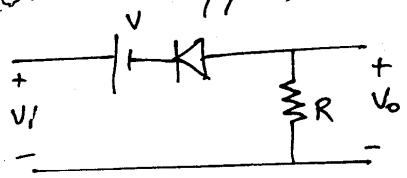
$V_i \leq -V_\gamma$ diode on

$V_i \geq -V_\gamma$ diode off

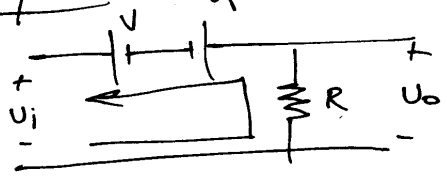



2388356

(ii) (Biased Clipper)



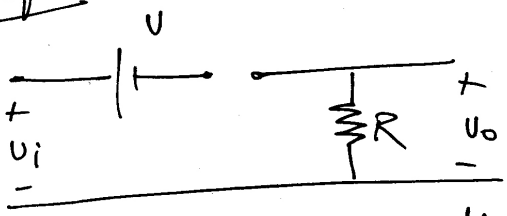

**Step 1 :** When the diode is on:




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

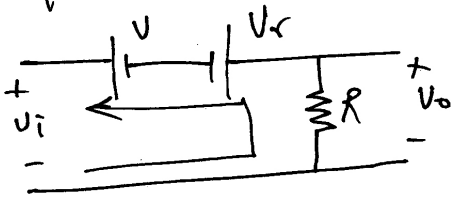
$$\boxed{V_o = +V_i - (V - V_r)}$$

**Step 2 :** When the diode is off:




$$\boxed{V_o = 0}$$

**Step 3 :** When is the diode on?

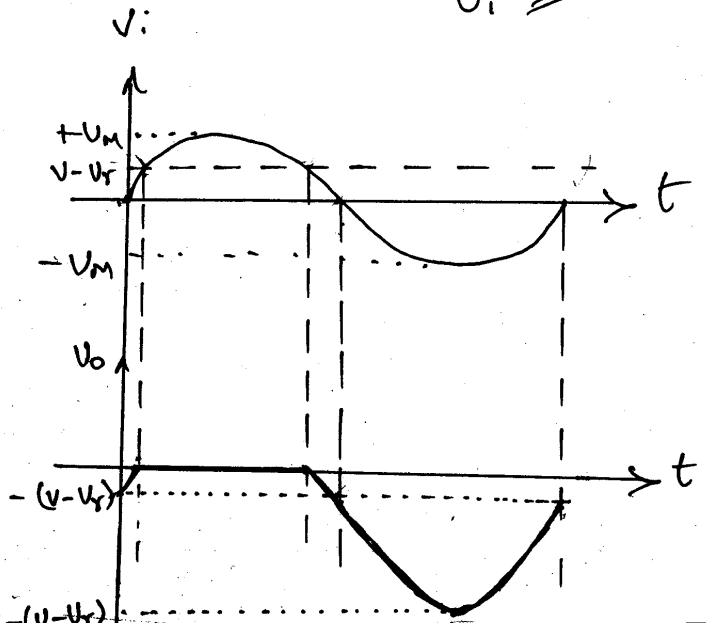



$$-V_i - IR - V_r + V = 0$$

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

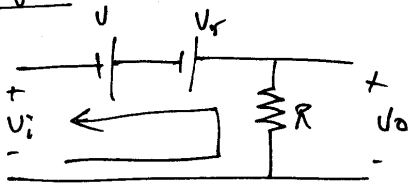
$V_i \leq V - V_\gamma$ diode is ON

$V_i \geq V - V_\gamma$ diode is OFF



(iii) (Biased Clipper)

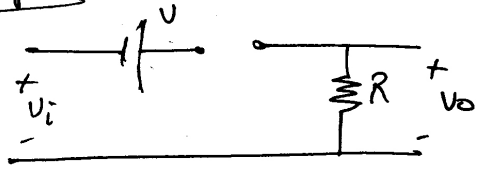

**Step 1:** When the diode is on:




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

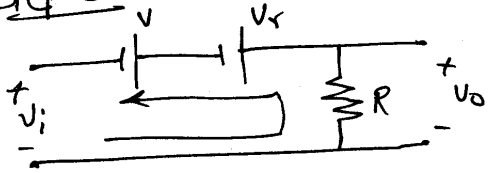
$$\boxed{V_o = V_i + (V + V_r)}$$

**Step 2:** When the diode is off:




$$\boxed{V_o = 0}$$

**Step 3:** When is the diode on?

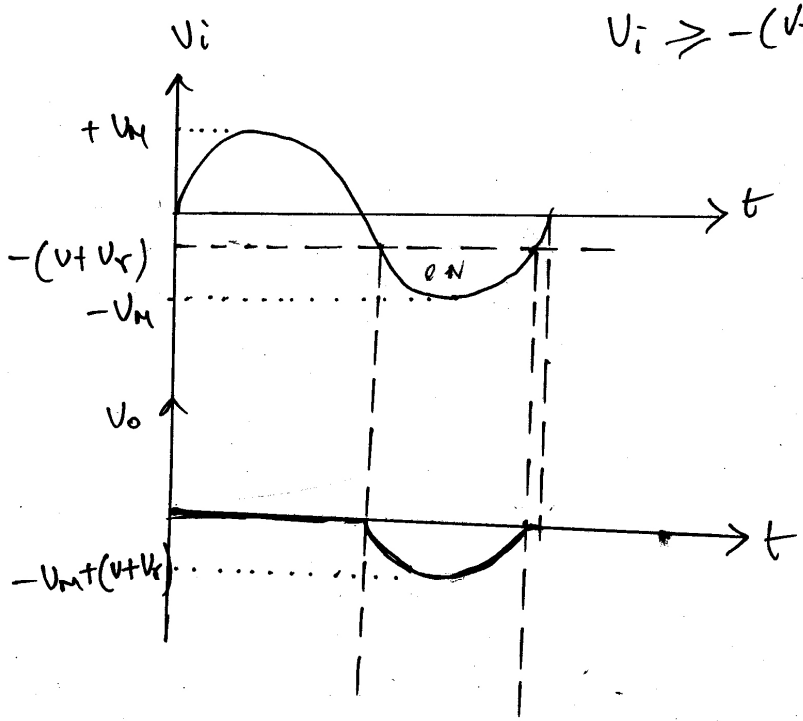



$$-V_i - IR - V_r - V = 0$$

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

$V_i \leq -(V + V_r)$ diode is on

$V_i \geq -(V + V_r)$ diode is off

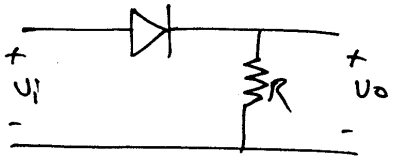



Tel: 9820246760

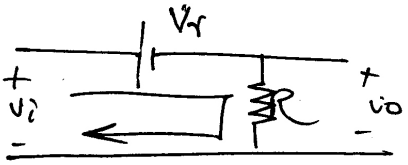
By ABHISHEK N.

## (B) Negative Clippers

### (i) Simple Clipper




**Step 1 :** When the diode is on :



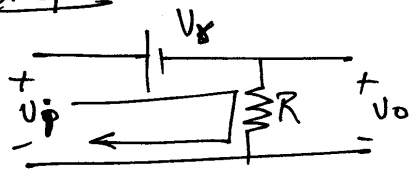

$$V_i - V_\gamma - V_o = 0$$

$$\boxed{V_o = V_i - V_\gamma}$$

**Step 2 :** When the diode is off :


$$\boxed{V_o = 0}$$

**Step 3 :** When is the diode on ?

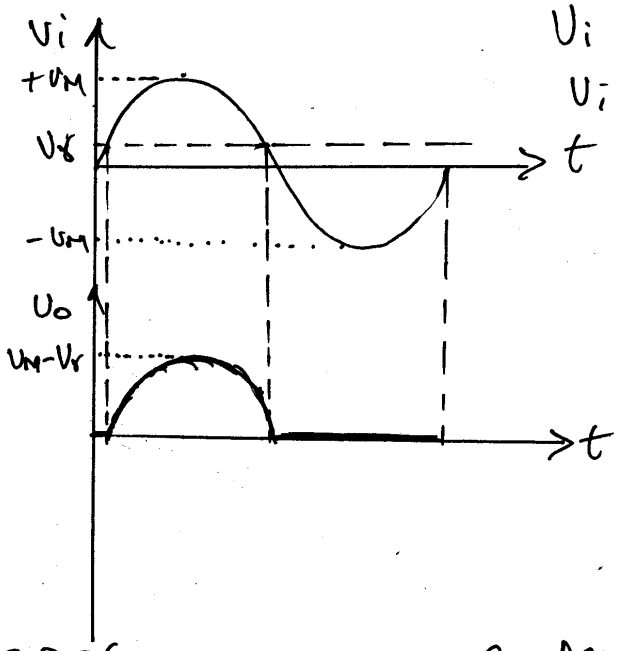



$$V_i - V_\gamma - IR = 0$$

$$V_i = IR + V_\gamma$$

$V_i \geq V_\gamma$ diode is on

$V_i \leq V_\gamma$ diode is off

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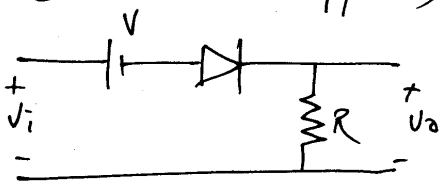
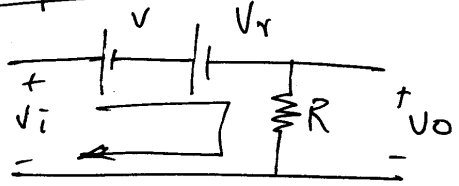
By Abhishek Navlakhi

## (ii) (Biased Clipper)



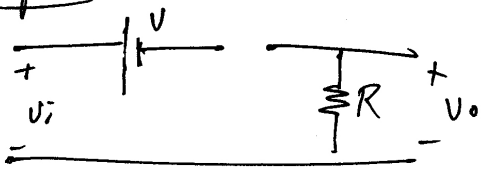

**Step 1**: When the diode is on:




$$V_i - V - V_r - V_o = 0$$

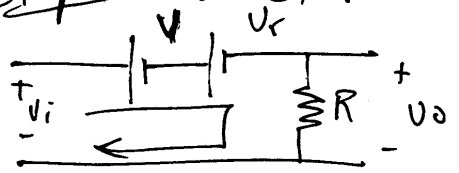
$$\boxed{V_o = V_i - (V + V_r)}$$

**Step 2**: When the diode is off:




$$\boxed{V_o = 0}$$

**Step 3**: When is the diode on?

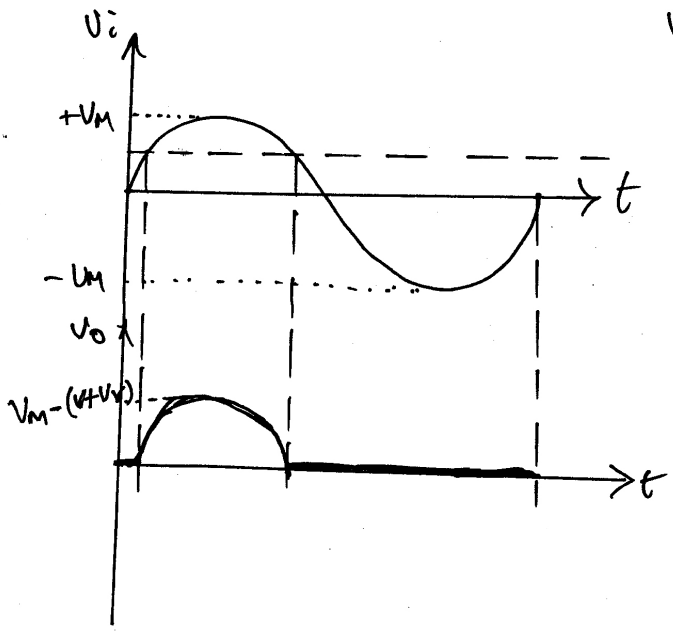



$$V_i - V - V_r - IR = 0$$

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

$V_i \geq V + V_r$ diode is on

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

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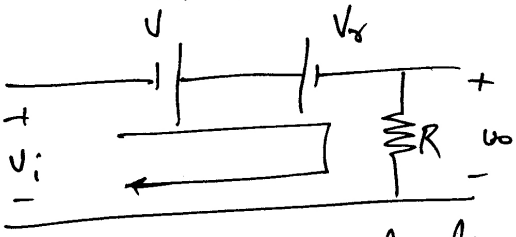
By Abhisher Navlakhi

(iii) (Biased Clipper)

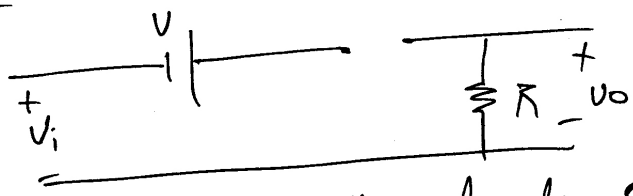

Step 1: When the diode is on




$v_i + V - V_\gamma - v_o = 0$

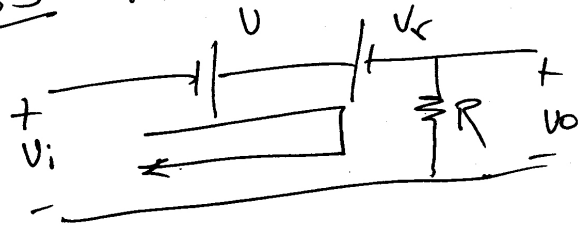
$\boxed{v_o = v_i + (V - V_\gamma)}$

Step 2: When the diode is off.




$\boxed{v_o = 0}$

Step 3: When is the diode on?

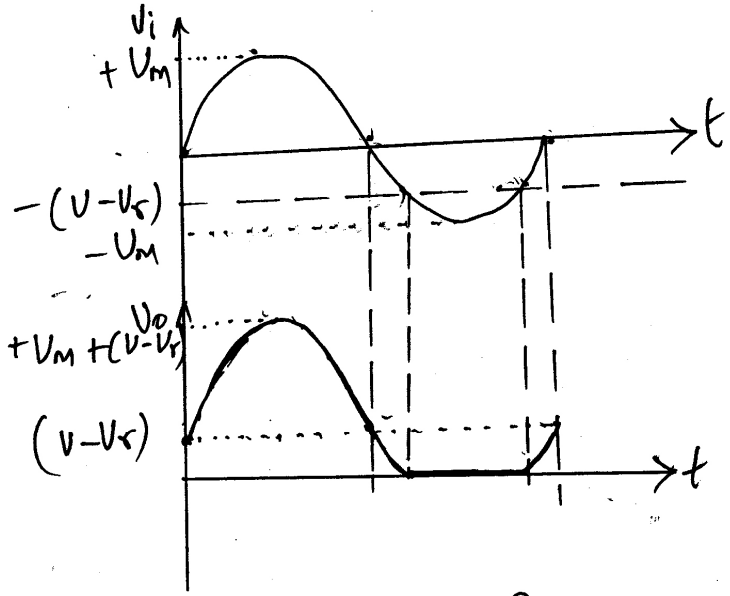



$v_i + V - V_\gamma - IR = 0$

$v_i = IR - (V - V_\gamma)$

$v_i \geq -(V - V_\gamma)$ diode on

$v_i < -(V - V_\gamma)$ diode off

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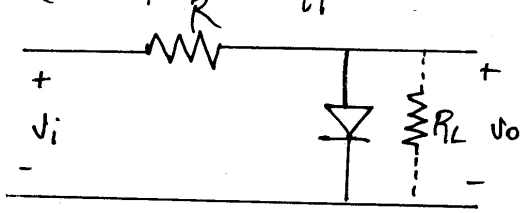
By ABHISHEK NAVLAKHI

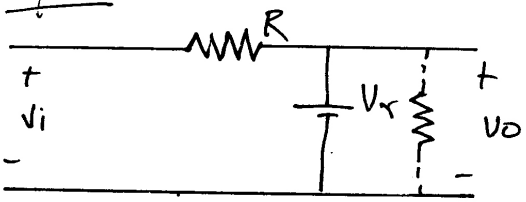
## (II) SIMPLE / BIASED PARALLEL CLIPPERS

### (A) POSITIVE CLIPPERS

(i) (Simple Clipper)

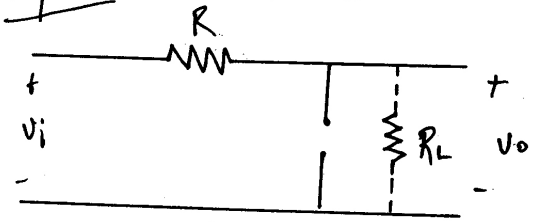



Step 1: When the diode is on:




$V_o = V_\gamma$

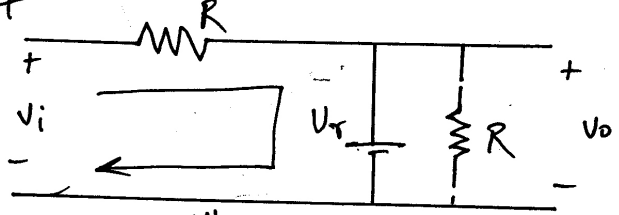
Step 2: When the diode is off:




No $R_L \Rightarrow \boxed{V_o = V_i}$

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

Step 3: When is the diode on?

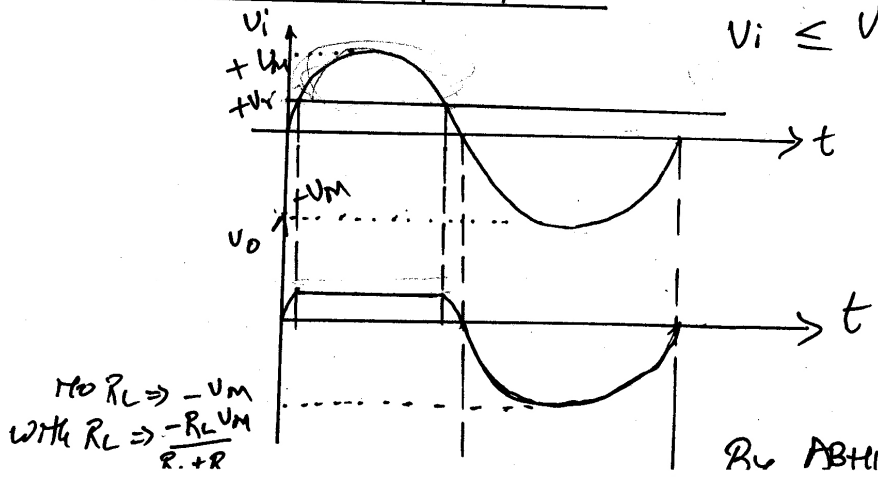



$V_i - IR - V_\gamma = 0$

$V_i = IR + V_\gamma$

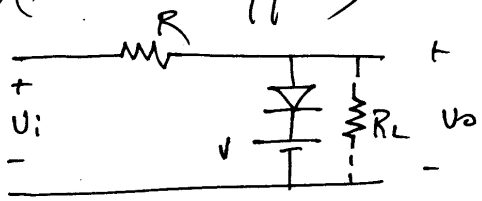
$V_i \geq V_\gamma$ diode on

$V_i \leq V_\gamma$ diode off

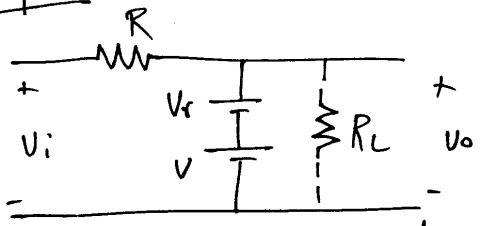



By ABHISHEK M.

(ii) (Biased Clipper)

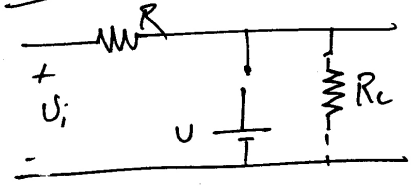



**Step 1 :** When the diode is on :




$$V_o = V + V_r$$

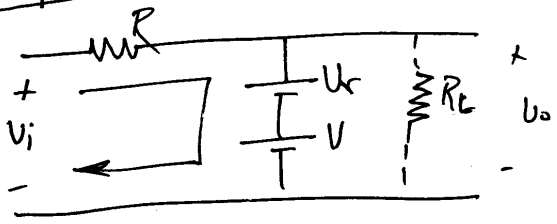
**Step 2 :** When the diode is off :




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 ?

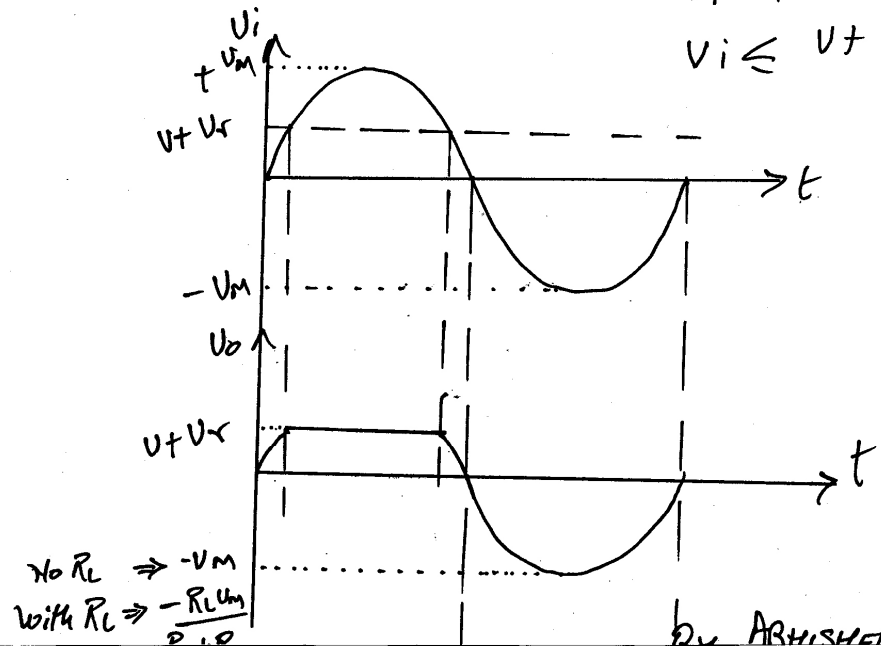



$V_i - IR - V_r - V = 0$

$V_i = IR + (V + V_r)$

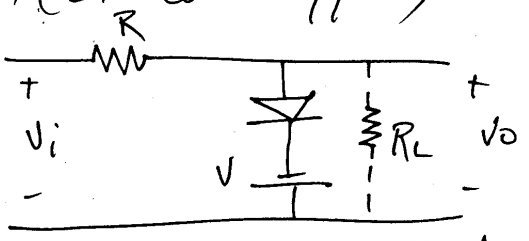
$V_i \geq V + V_r$ diode is on

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

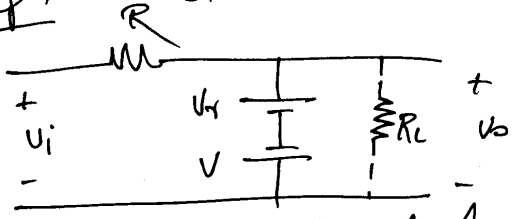



by ABHISHEK NAVLAKHI

(iii) (Biased Clipper)

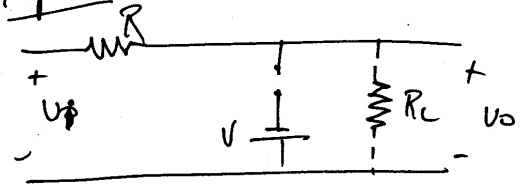



Step 1: When the diode is on:




$$V_o = -V + V_\gamma$$

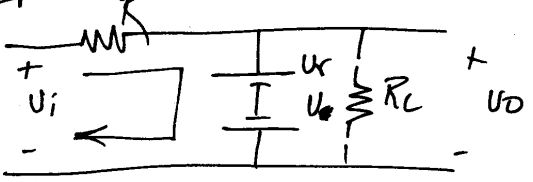
Step 2: When the diode is off:




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?

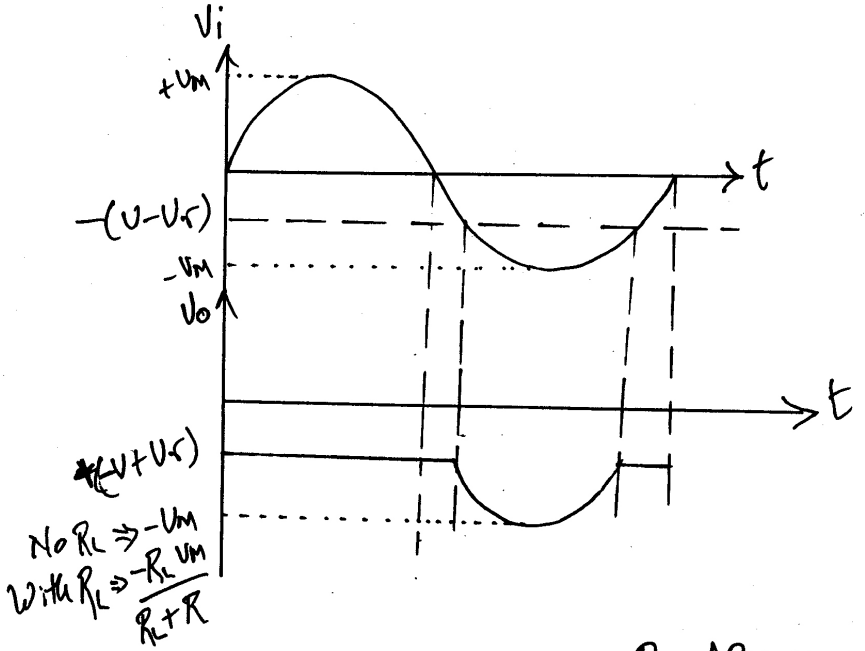



$V_i - IR - V_\gamma + V_o = 0$

$V_i = IR + (V - V_\gamma)$

$V_i \geq -(V - V_\gamma)$ diode on

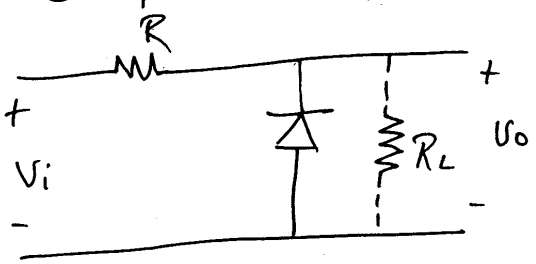
$V_i \leq -(V - V_\gamma)$ diode off



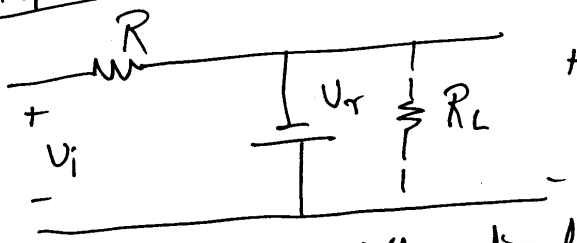

By ABHISHEK NAVLAKHI

## (B) NEGATIVE CLIPPER

### (i) (Simple Clipper)

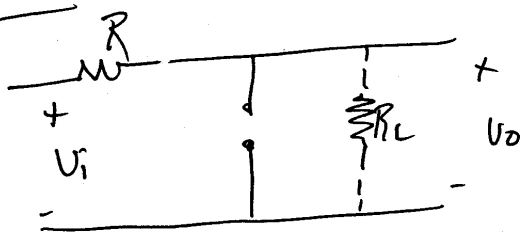



**Step 1:** When the diode is on.




$V_o = -V_r$

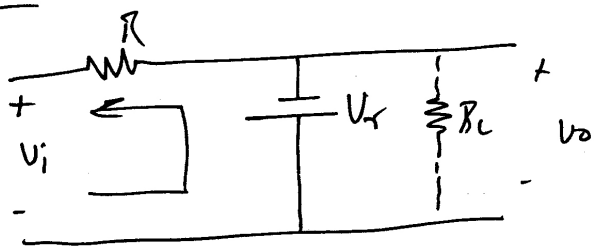
**Step 2:** When the diode is off:




No $R_L \Rightarrow V_o = V_i$

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

**Step 3:** When is the diode on?

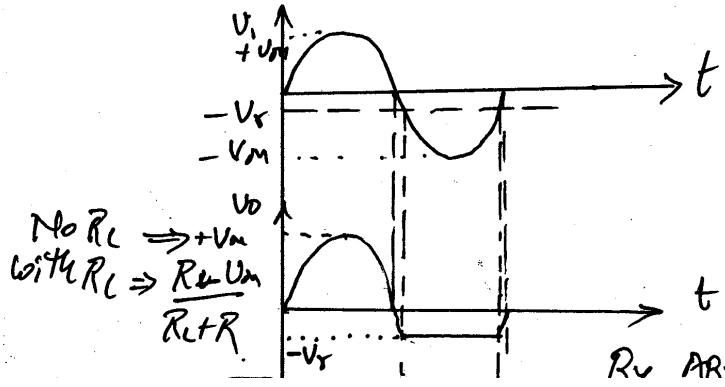



$-V_i - V_r - IR = 0$

$V_i = -V_r - IR$

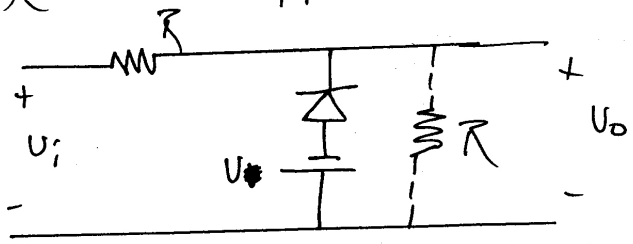
$V_i \leq -V_r$ diode on

$V_i \geq -V_r$ diode off

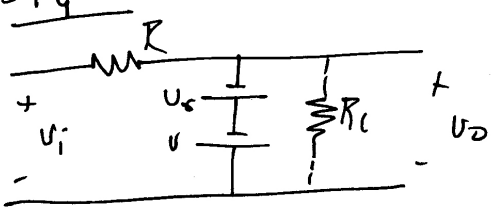



Rv ARHISHEK NAVLAKHI

(ii) (Biased Clipper)

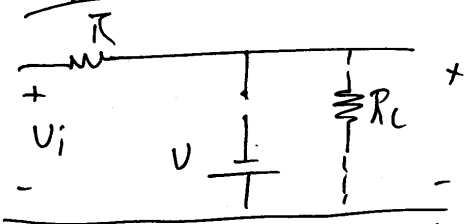



Step 1 : When the diode is on :




$$V_o = -V - V_\gamma$$

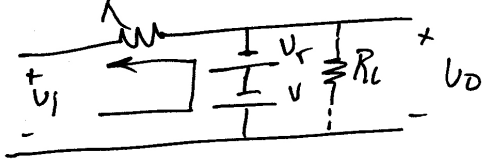
Step 2 : When the diode is off :




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 :

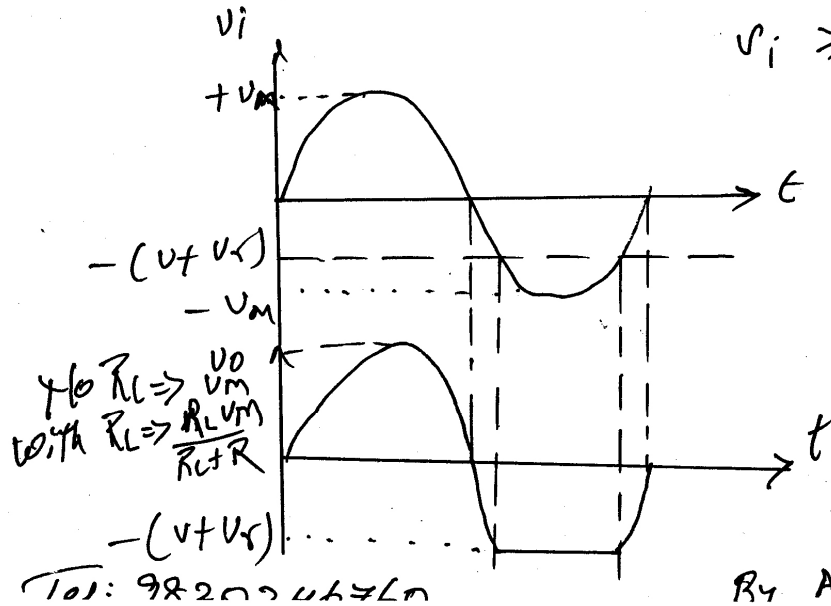



$$-V_i - V - V_\gamma - IR = 0$$

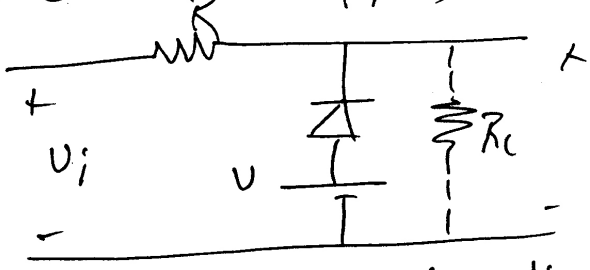
$$V_i = -IR - (V + V_\gamma)$$

$V_i \leq -(V + V_\gamma)$ diode on

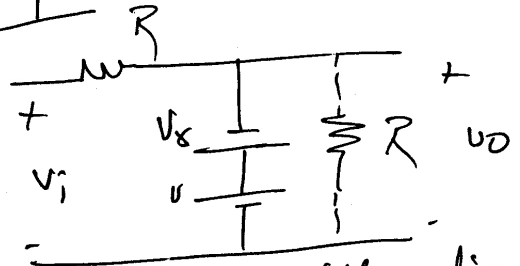
$V_i \geq -(V + V_\gamma)$ diode off



(iii) (Biased Clippers)

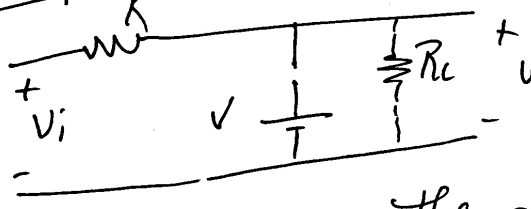



Step 1: When the diode is on.




$$v_o = V - V_r$$

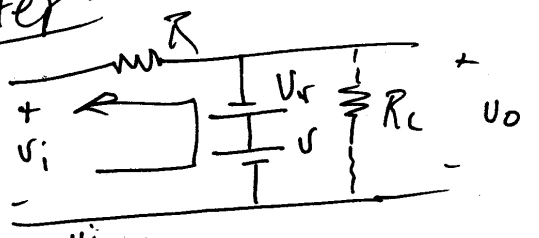
Step 2: When the diode is off.




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?

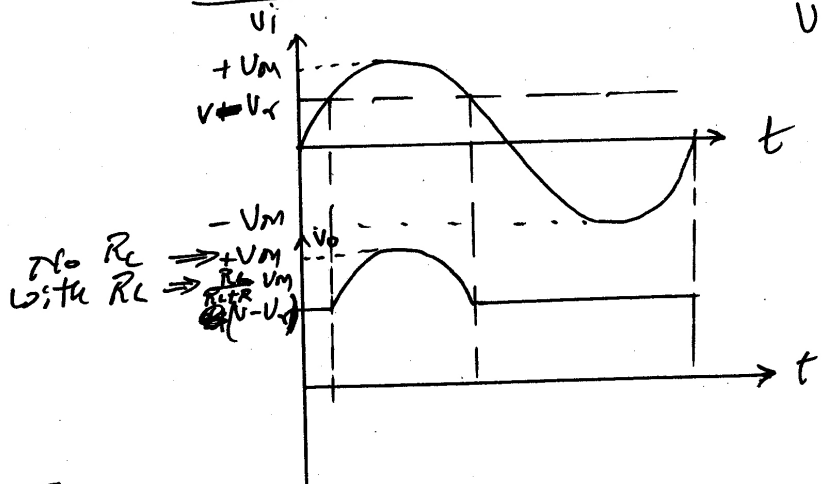



$$-v_i + V - V_r - IR = 0$$

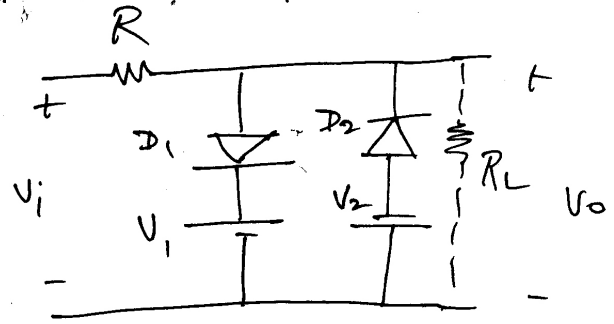
$$v_i = -IR + (V - V_r)$$

$v_i \leq V - V_r$ diode on

$v_i \geq V - V_r$ diode off



## (c) Double / Two-way clipper




**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?

$V_i - IR - V_r - V_1 = 0$

$V_i = IR + (V_1 + V_r)$

$V_i \geq V_1 + V_r$ on

$V_i \leq V_1 + V_r$ off.

**For D2**

**step 1 :** When D2 is on

$V_o = -V_2 - V_r$

**step 2** When D2 is off

$V_o = V_i$

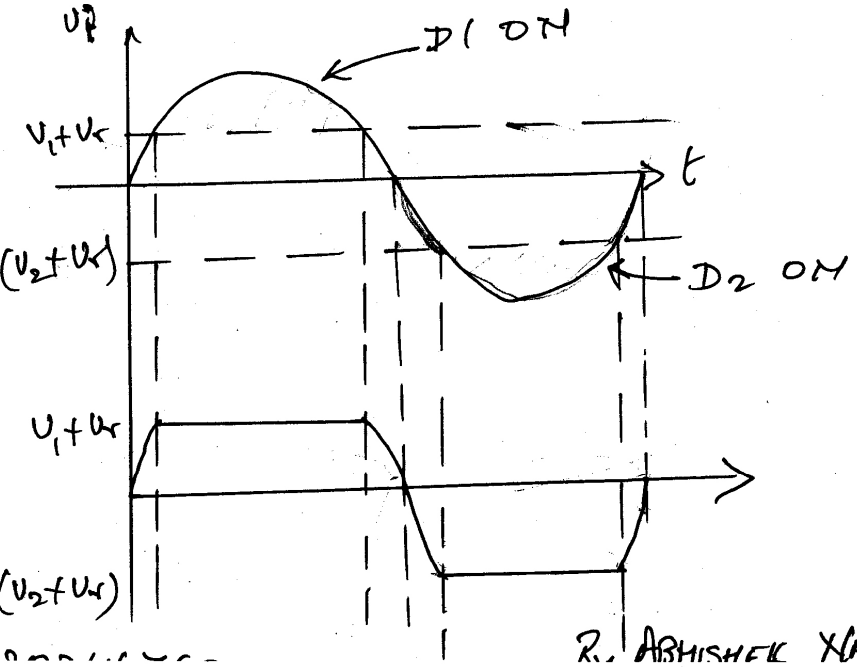
**step 3:** When is D2 on?

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

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

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

$V_i \geq -(V_2 + V_r)$ diode off.

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