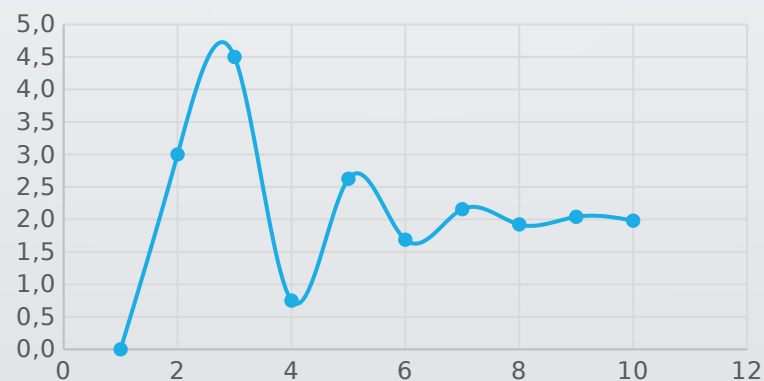


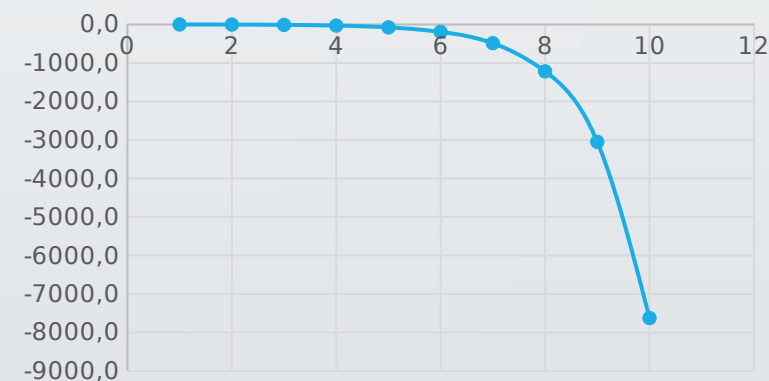
Opa retroalimentación

Generador triangulo

Realimentación Negativa



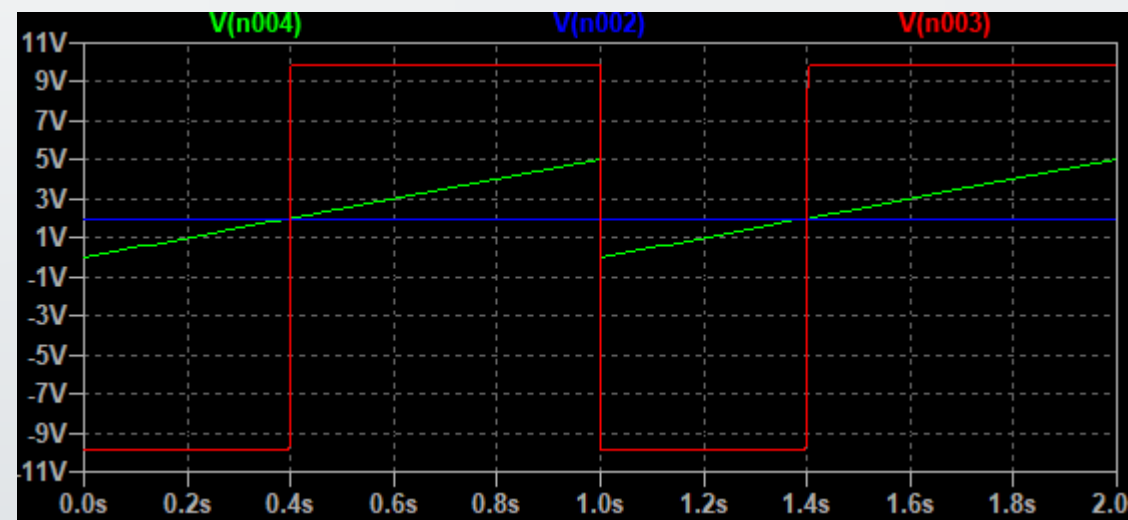
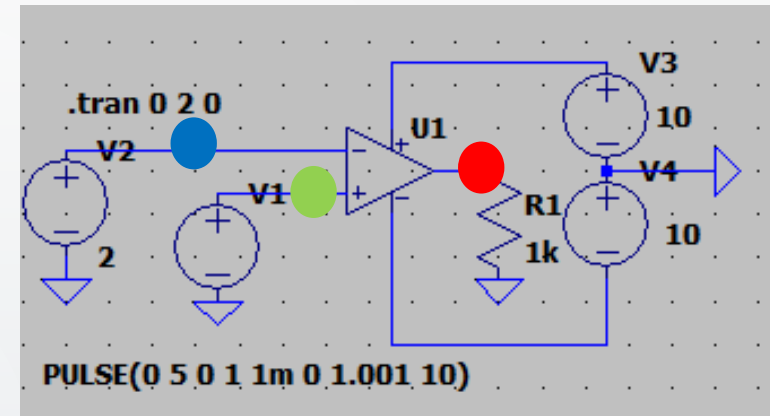
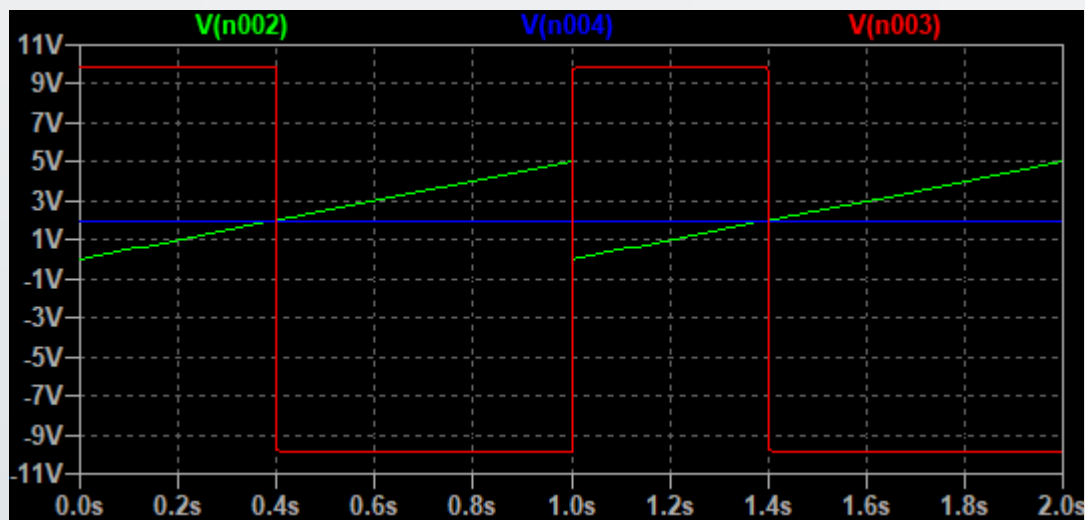
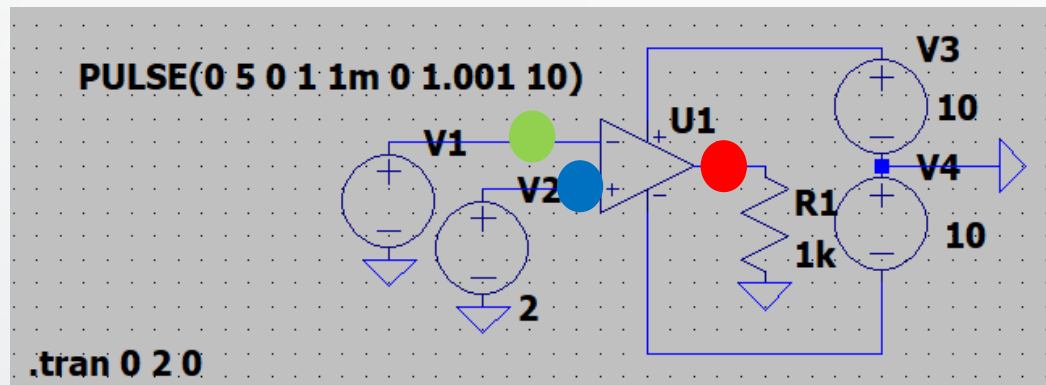
Realimentación Positiva



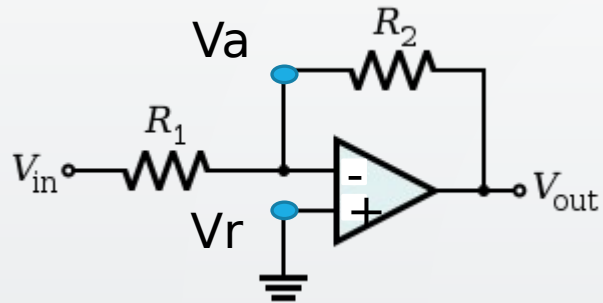
Comparador

$$V_o = i$$

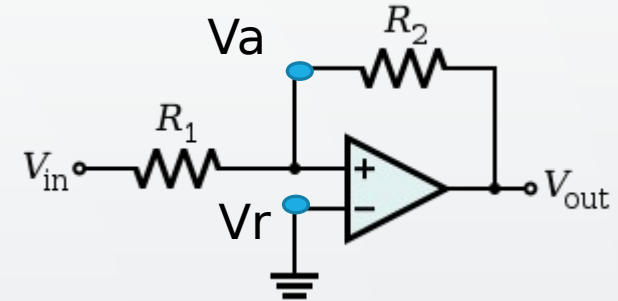
2



Inversor



Schmitt trigger



Tomado de: https://en.wikipedia.org/wiki/Schmitt_trigger

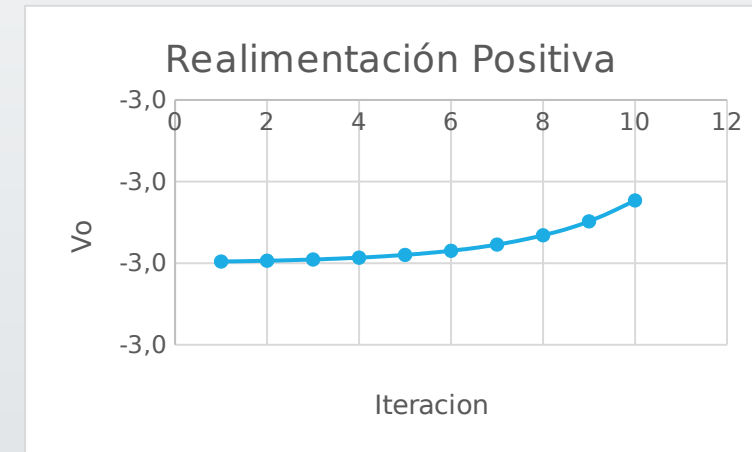
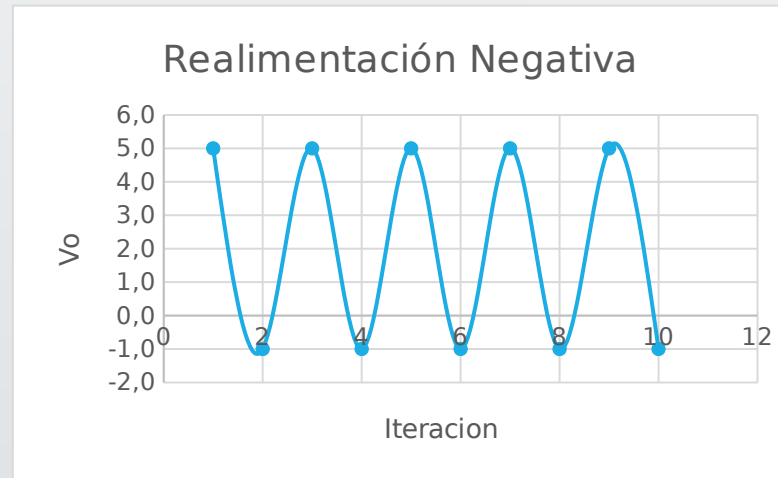
$$\frac{V_{in} - V_a}{R_1} = \frac{V_a - V_o}{R_2} \quad \longrightarrow \quad V_a = \frac{R_1 V_o + R_2 V_{in}}{R_1 + R_2}$$

$$V_o = i$$

Retroalimentación

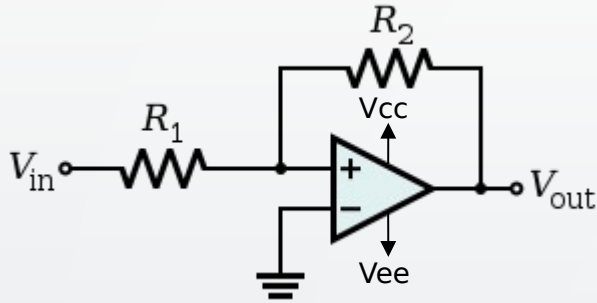
Realimentación Negativa						
Iteración	Vin	Vo	V+	V-	(V+)-(V-)	A
1	-2	8.0	0	3.0	-3.0	3
2	-2	-1.0	0	-1.5	1.5	3
3	-2	-5.5	0	-3.8	3.8	3
4	-2	5.8	0	1.9	-1.9	3
5	-2	0.1	0	-0.9	0.9	3
6	-2	2.9	0	0.5	-0.5	3
7	-2	1.5	0	-0.2	0.2	3
8	-2	2.2	0	0.1	-0.1	3
9	-2	1.9	0	-0.1	0.1	3
10	-2	2.1	0	0.0	0.0	3

Realimentación Positiva						
Iteración	Vin	Vo	V-	V+	(V+)-(V-)	A
1	-2	8.0	0	3.0	3.0	3
2	-2	17.0	0	7.5	7.5	3
3	-2	39.5	0	18.8	18.8	3
4	-2	95.8	0	46.9	46.9	3
5	-2	236.4	0	117.2	117.2	3
6	-2	587.9	0	293.0	293.0	3
7	-2	1466.8	0	732.4	732.4	3
8	-2	3664.1	0	1831.1	1831.1	3
9	-2	9157.3	0	4577.6	4577.6	3
10	-2	22890.2	0	11444.1	11444.1	3



El operacional se satura en el valor de la fuente positiva o negativa

Schmitt trigger



$$V^+ = \frac{R_1 V_o + R_2 V_{in}}{R_1 + R_2}$$

$$V^- = 0$$

$$V_o = V$$

Asumiendo estará en ese valor siempre que

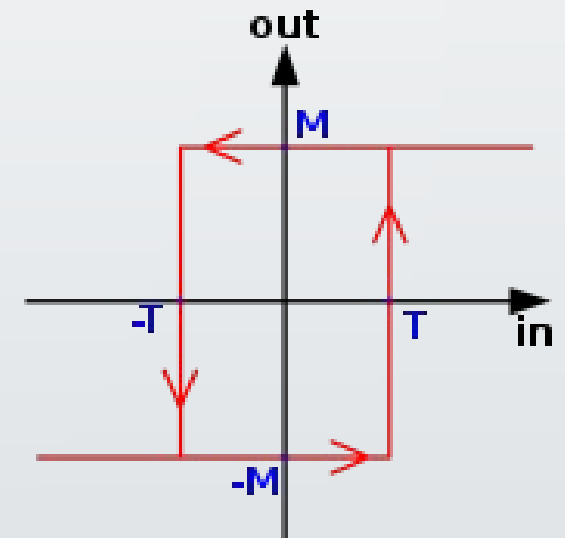
$$\frac{R_1 V_{CC} + R_2 V_{in}}{R_1 + R_2} > 0$$

Cuando , entonces

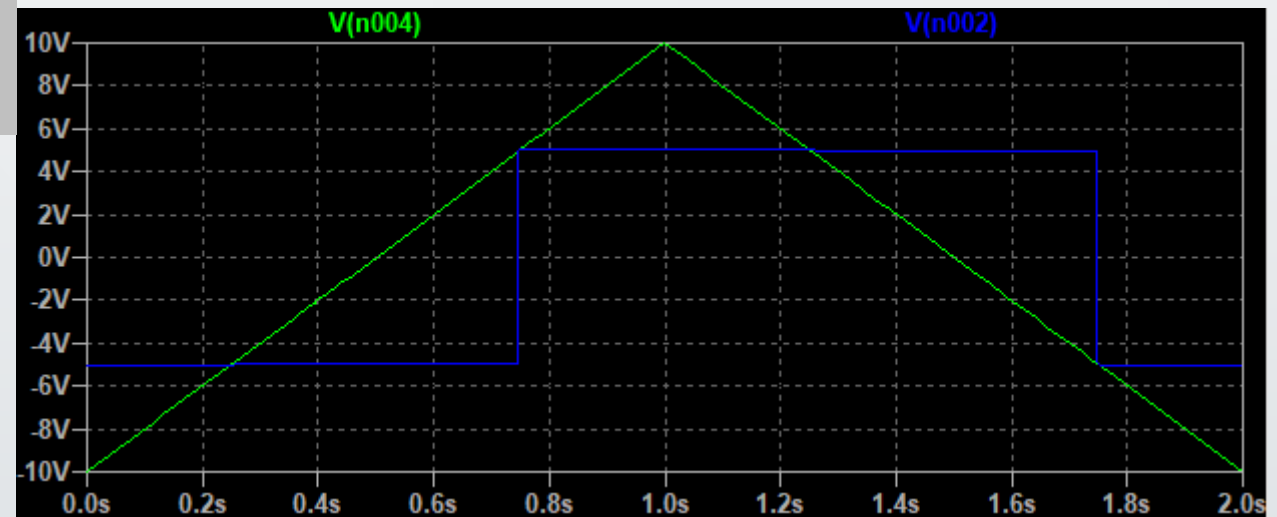
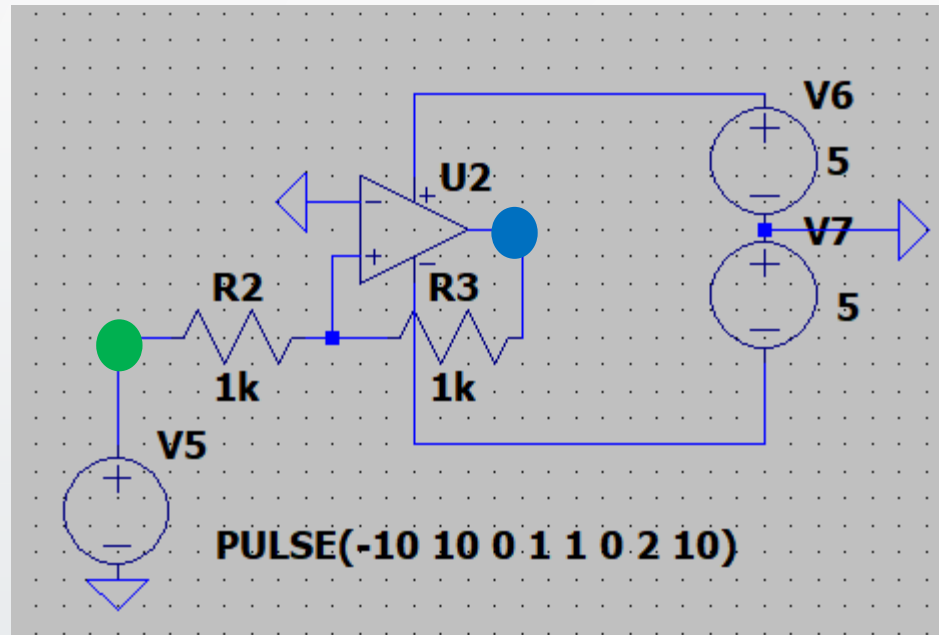
Luego estará en ese valor siempre que

$$\frac{R_1 V_{ee} + R_2 V_{in}}{R_1 + R_2} < 0$$

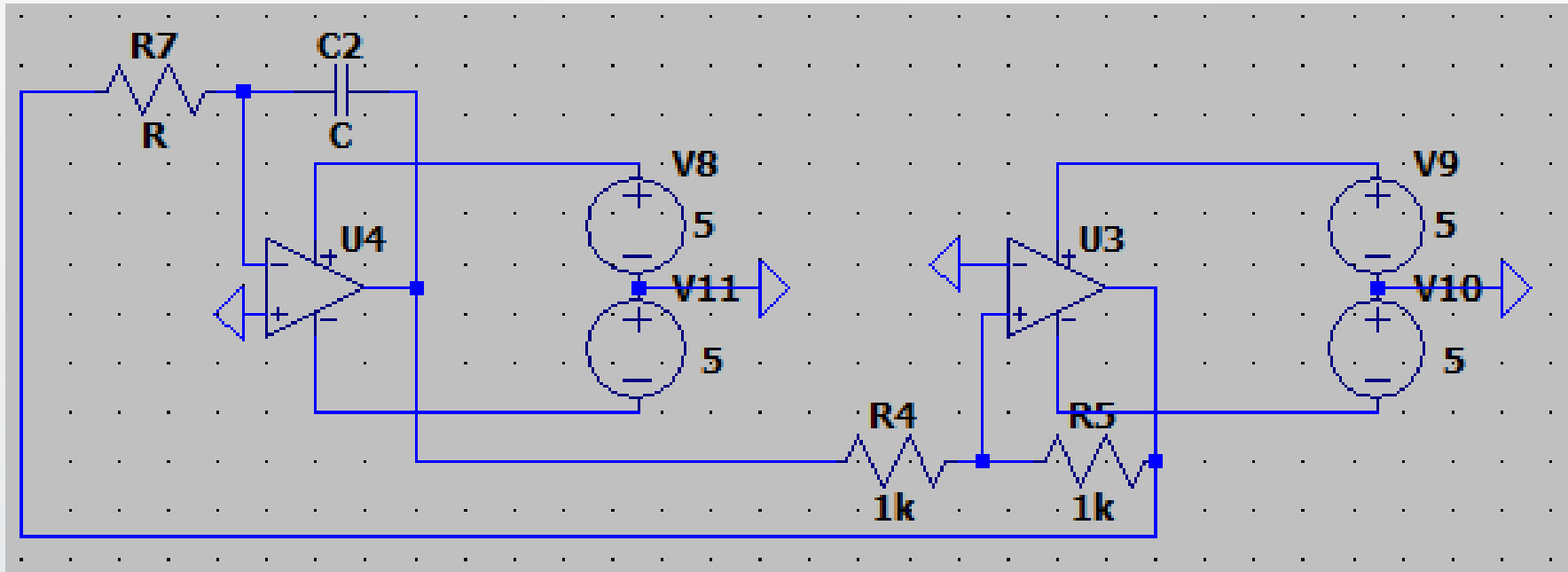
Cuando , entonces



Ejemplo Schmitt trigger



Ejemplo



7.69 For the op amp circuit in Fig. 7.134, find $v_o(t)$ for $t > 0$.

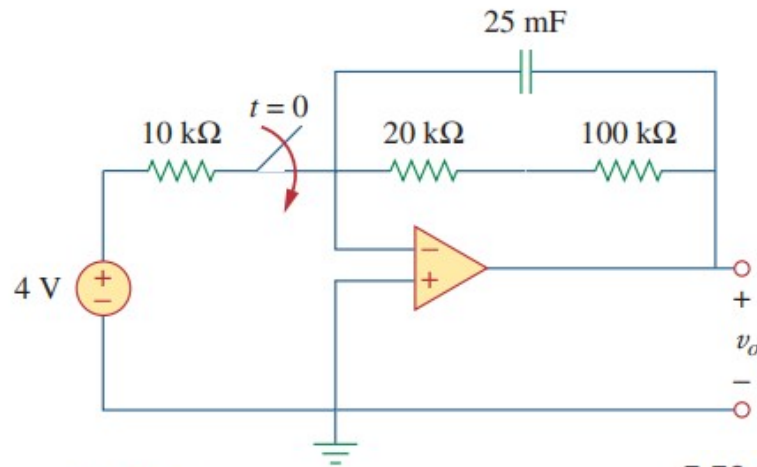


Figure 7.134

For Prob. 7.69.

7.73 For the op amp circuit of Fig. 7.138, let $R_1 = 10 \text{ k}\Omega$, $R_f = 20 \text{ k}\Omega$, $C = 20 \mu\text{F}$, and $v(0) = 1 \text{ V}$. Find v_o .

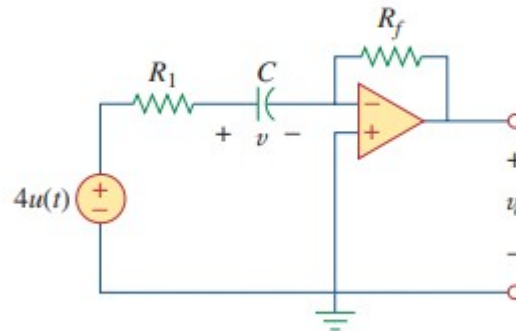


Figure 7.138

For Prob. 7.73.

7.55 Find $v(t)$ for $t < 0$ and $t > 0$ in the circuit of Fig. 7.121.

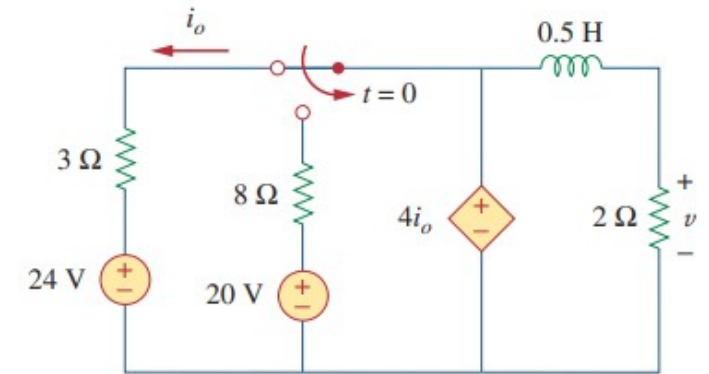


Figure 7.121

For Prob. 7.55.