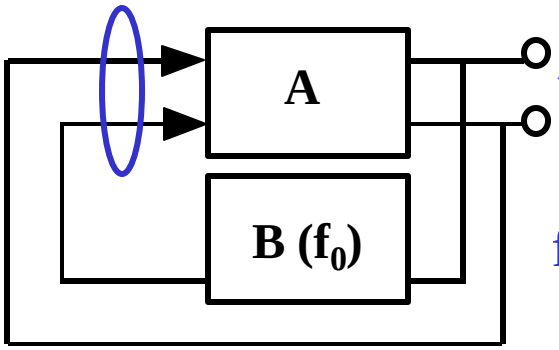
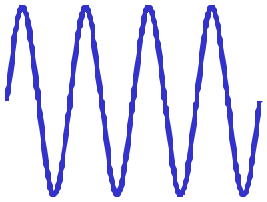
Osciladores Sinusoidales

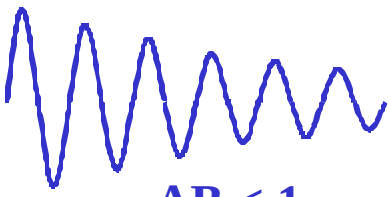
- Ganancia de lazo y fase
- Tensión de inicio
- Decrecimiento del producto AB=1



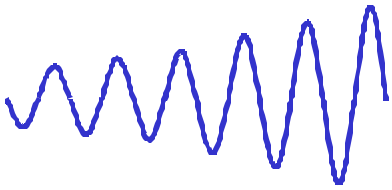
f = 0



AB = 1

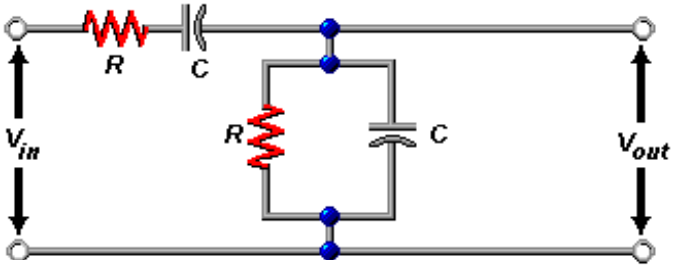


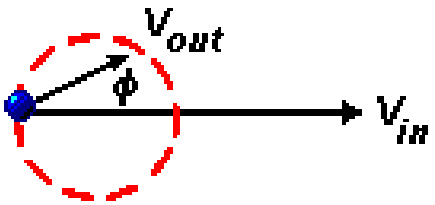
AB < 1

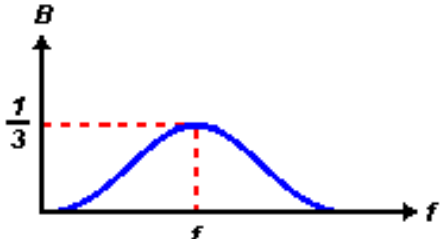


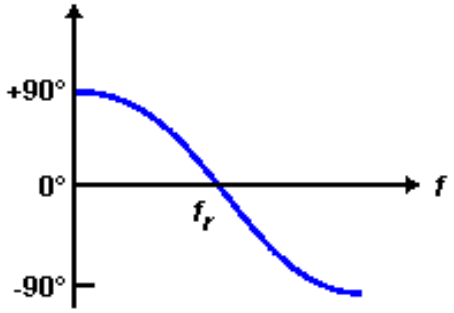
AB > 1

Circuito de adelanto atraso









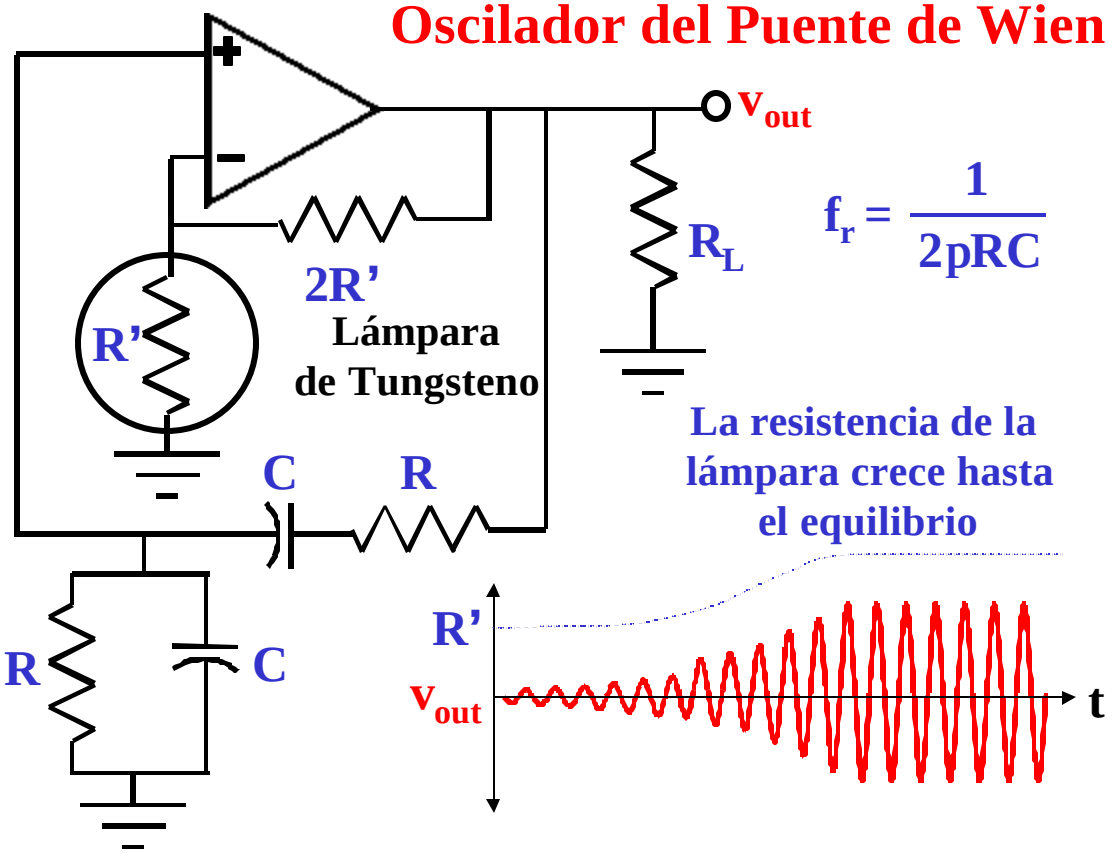
$$B = \frac{1}{\sqrt{9 - (X_C/R - R/X_C)^2}}$$

$$\ddot{o} = \arctan \frac{X_C/R - R/X_C}{3}$$

$$B_{max} \Rightarrow X_C = R \Rightarrow f = f_r$$

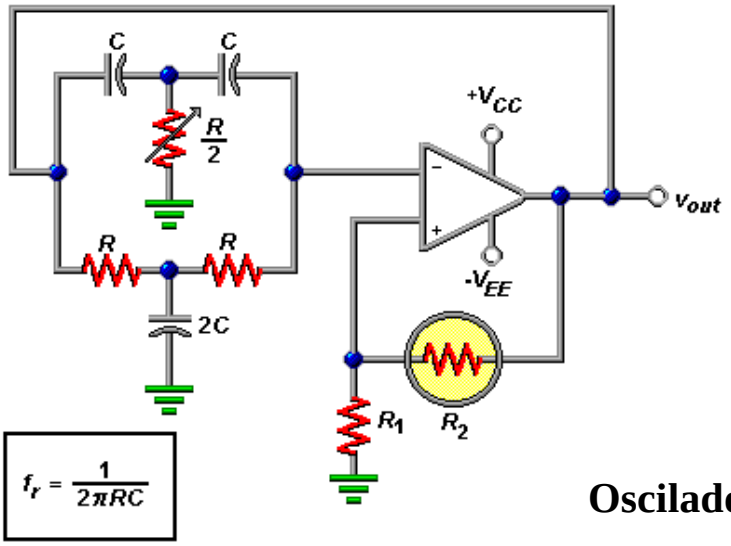
$$f_r = \frac{1}{2\Pi RC}$$

Oscilador del Puente de Wien



$$f_r = \frac{1}{2\pi RC}$$

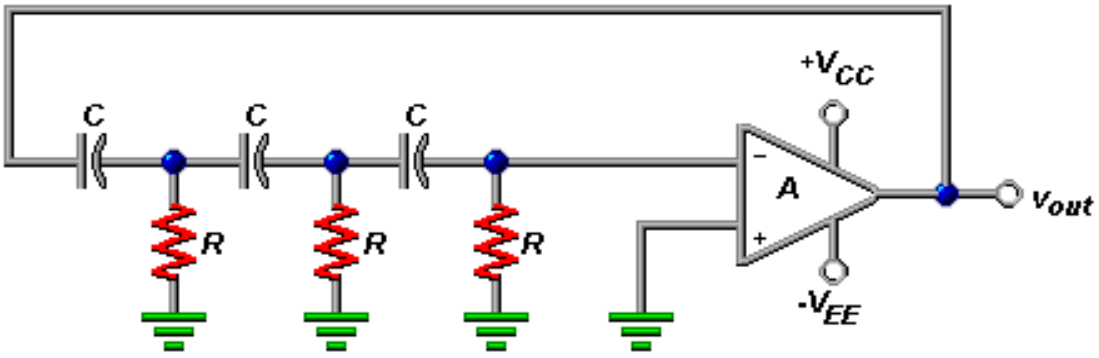
La resistencia de la lámpara crece hasta el equilibrio



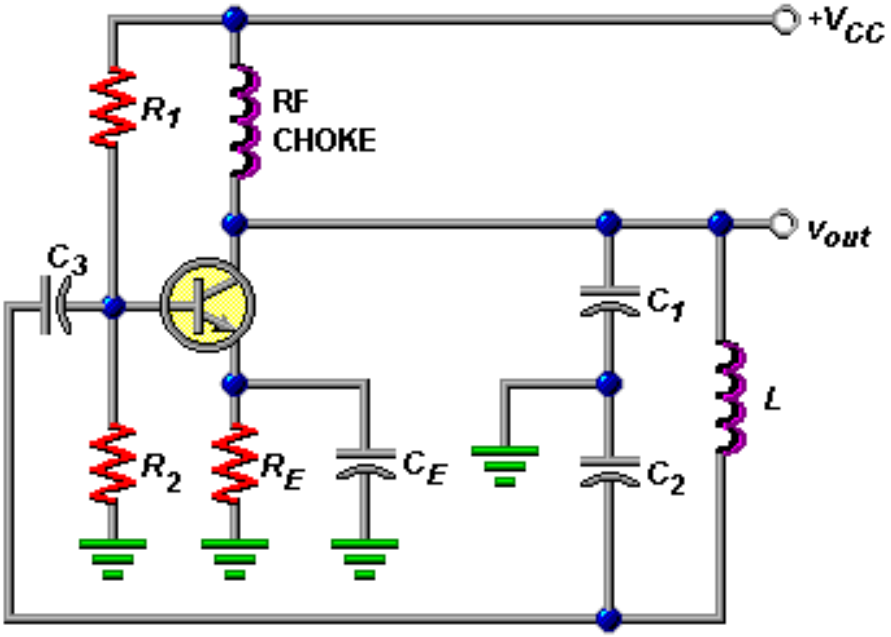
$f_r = \frac{1}{2\pi RC}$

Oscilador doble T

Oscilador de corrimiento de fase



Oscilador Colpitts



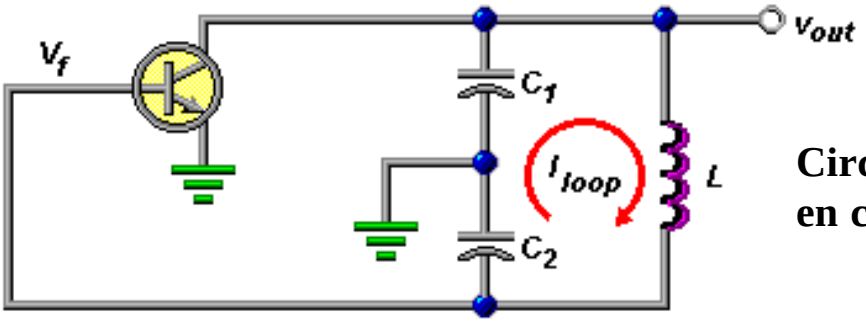
$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$C = \frac{C_1 C_2}{C_1 + C_2}$$

$$B = \frac{C_1}{C_2}$$

$$A_{min} = \frac{C_2}{C_1}$$

Oscilador Colpitts



Circuito equivalente en c.a.

❑ **Frecuencia de resonancia**

$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

❑ **Con carga acoplada de arranque**

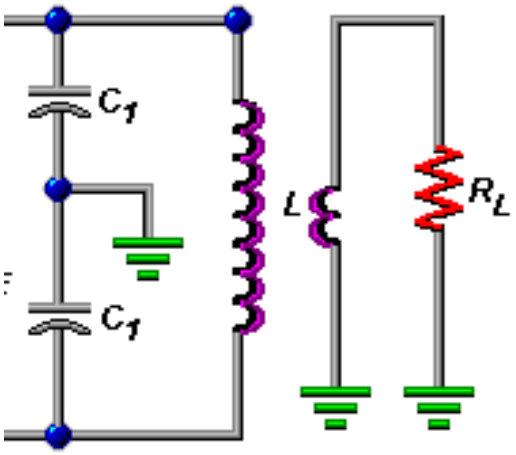
$$f_r = \frac{1}{2\Pi\sqrt{LC}}\sqrt{\frac{Q^2}{Q^2+1}}$$

❑ **Condición de arranque**

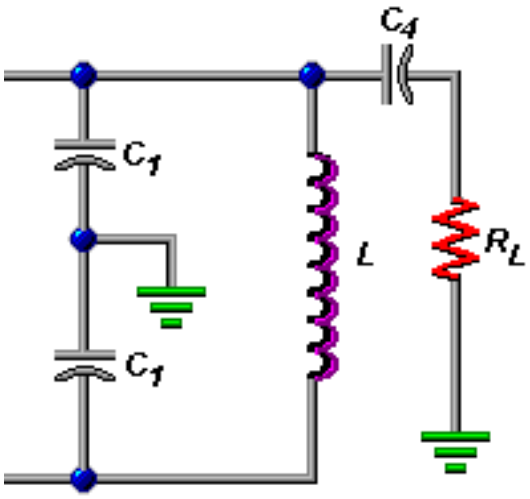
$$B = \frac{C_1}{C_2}$$

$$A_{min} = \frac{C_2}{C_1}$$

Oscilador Colpitts

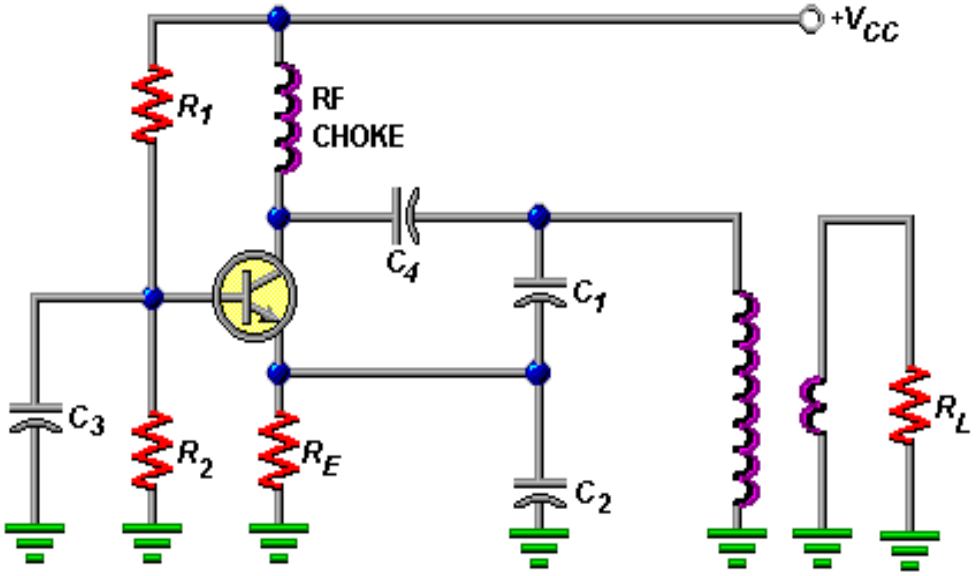


Acoplamiento inductivo



Acoplamiento por capacitor

Oscilador Colpitts base común



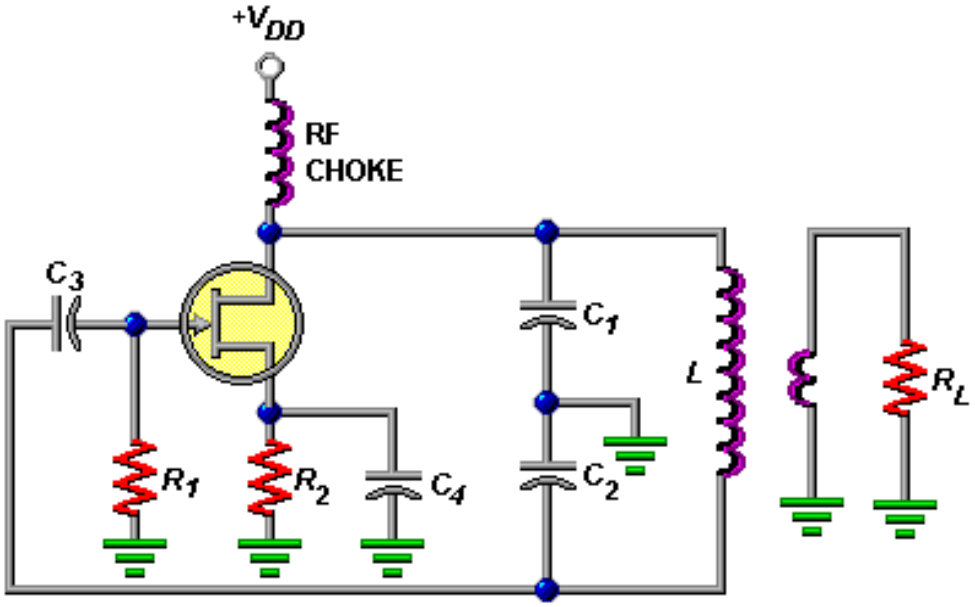
$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$C = \frac{C_1 C_2}{C_1 + C_2}$$

$$B = \frac{C_1}{C_1 + C_2}$$

$$A_{min} = \frac{C_1 + C_2}{C_1}$$

Oscilador Colpitts con fet



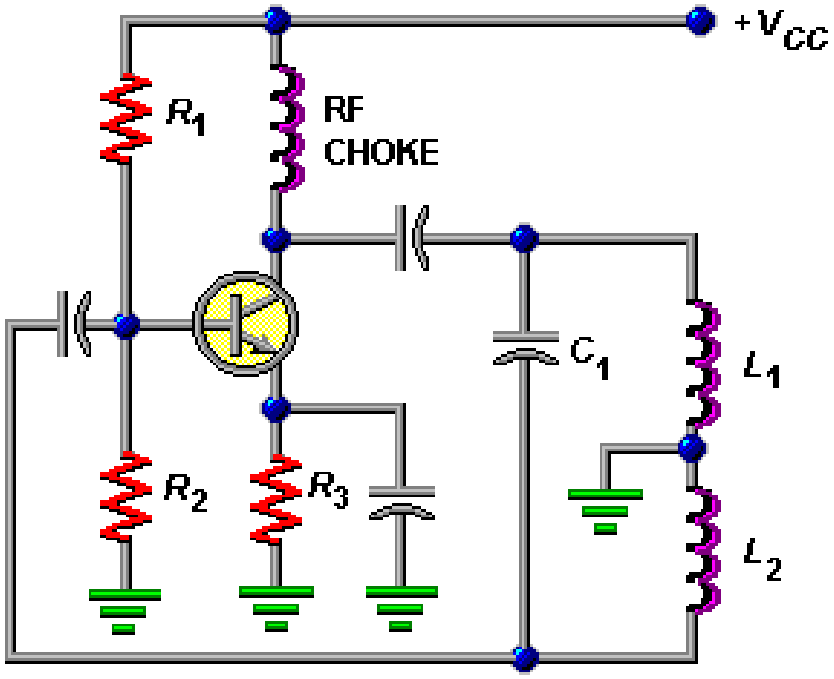
$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$C = \frac{C_1 C_2}{C_1 + C_2}$$

$$B = \frac{C_1}{C_2}$$

$$A_{min} = \frac{C_2}{C_1}$$

Oscilador Hartley



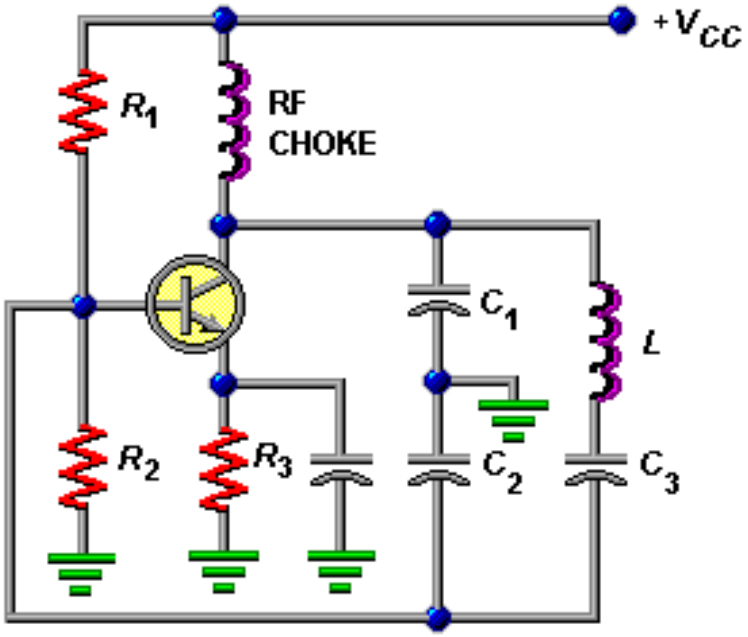
$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$L = L_1 + L_2$$

$$B = \frac{L_2}{L_1}$$

$$A_{min} = \frac{L_1}{L_2}$$

Oscilador Clapp



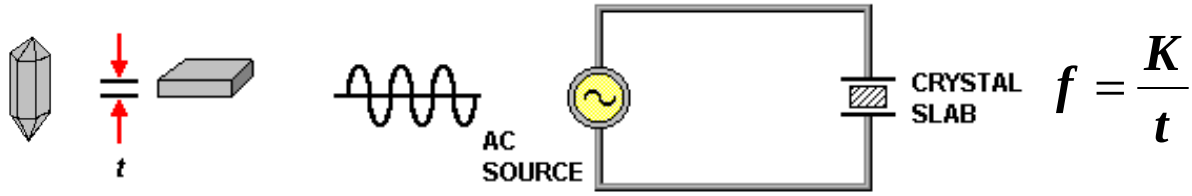
$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

$$C = \frac{1}{1/C_1 + 1/C_2 + 1/C_3}$$

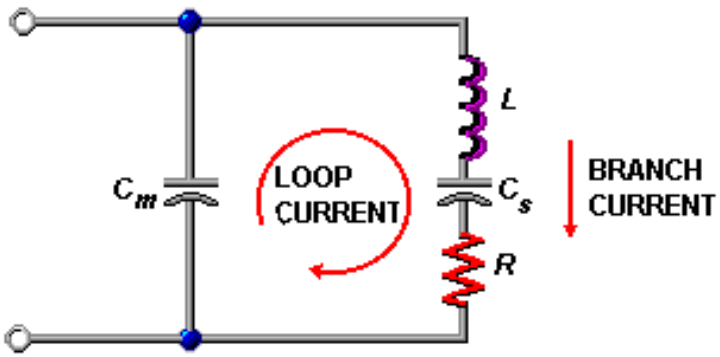
$$B = \frac{C_1}{C_2}$$

$$A_{min} = \frac{C_2}{C_1}$$

Cristal de cuarzo



$$f = \frac{K}{t}$$

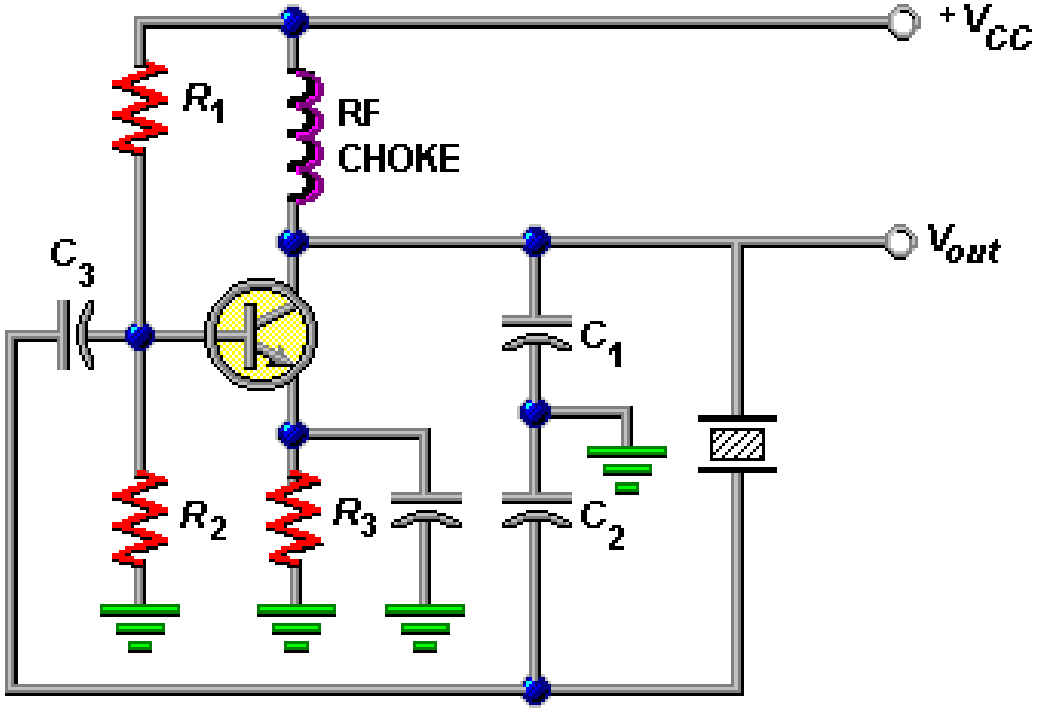


$$f_s = \frac{1}{2\Pi\sqrt{LC_s}}$$

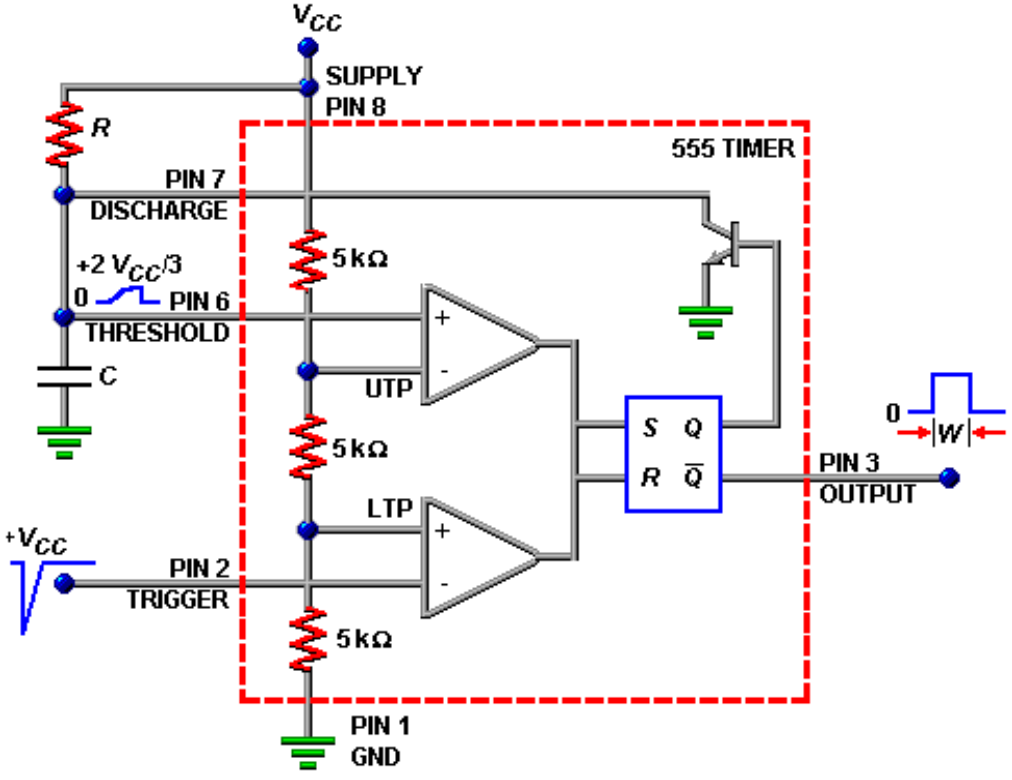
$$C_p = \frac{C_m C_s}{C_m + C_s}$$

$$f_p = \frac{1}{2\Pi\sqrt{LC_p}}$$

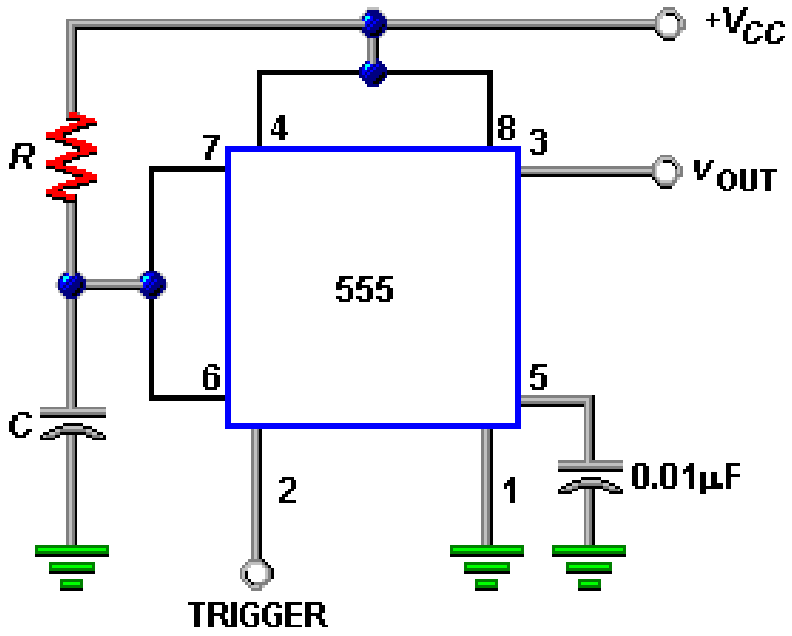
Oscilador a cristal - Colpitts



El temporizador IC 555 – Operación monoestable



El temporizador IC 555 – Operación monoestable

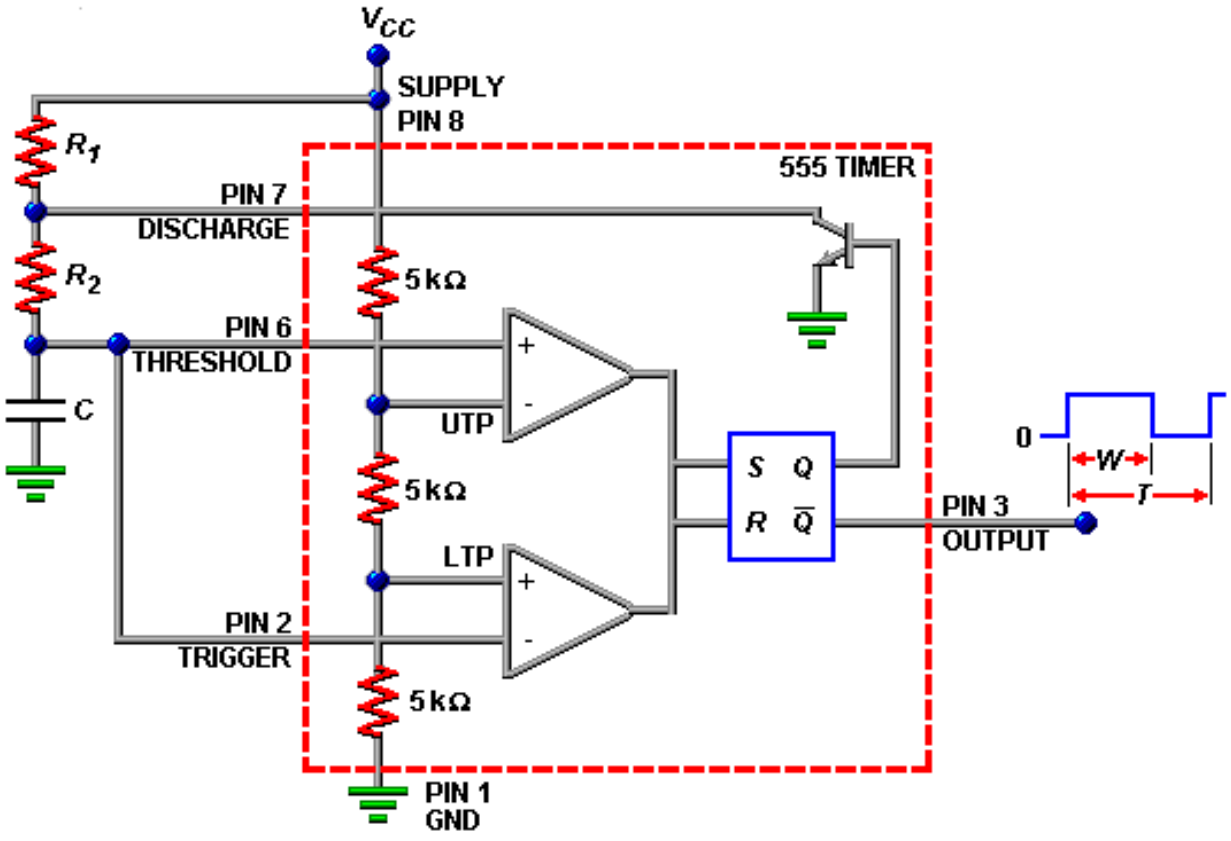


$$UTP = \frac{2V_{CC}}{3}$$

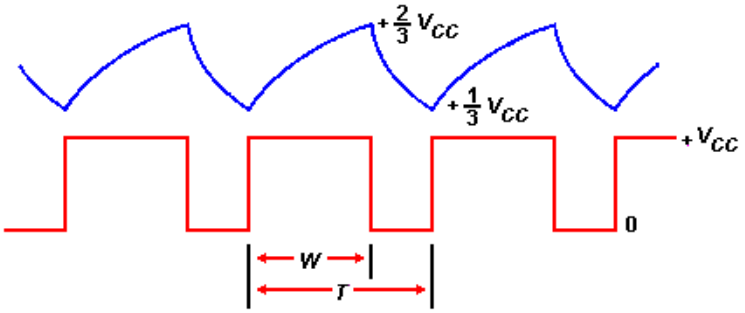
$$LTP = \frac{V_{CC}}{3}$$

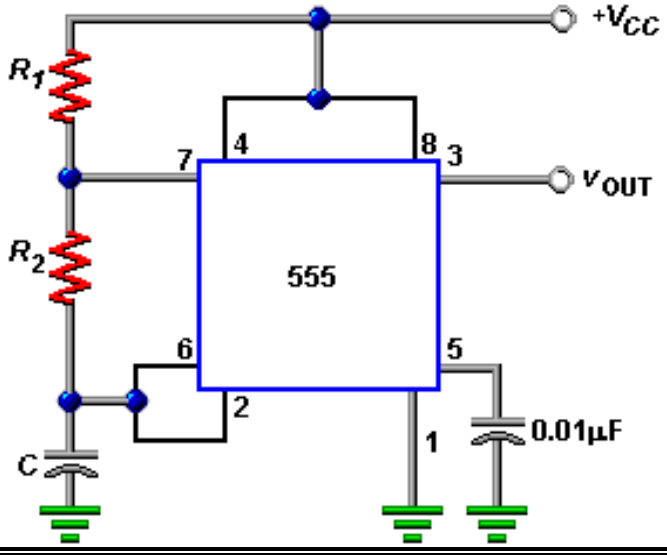
$$W = 1.1RC$$

Operación astable



Operación astable





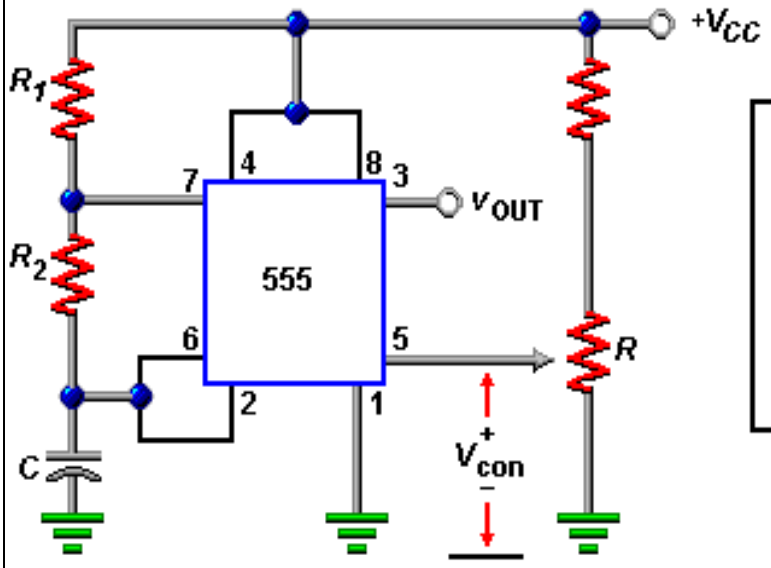
$$W = 0.693\,(R_1 + R_2)C$$

$$T = 0.693\,(R_1 + 2R_2)C$$

$$f = \frac{1.44}{(R_1 + 2R_2)C}$$

$$D = \frac{R_1 + 2R_2}{R_1 + 2R_2}$$

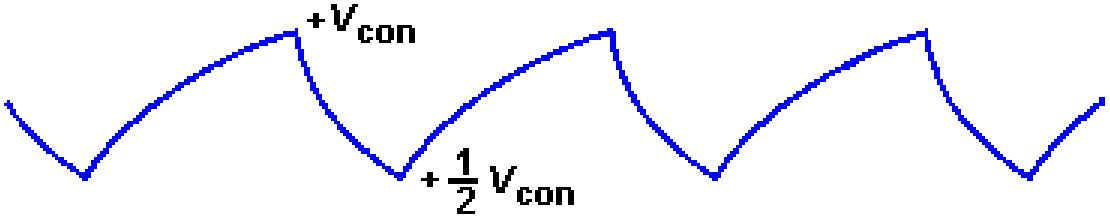
Oscilador controlado por tensión



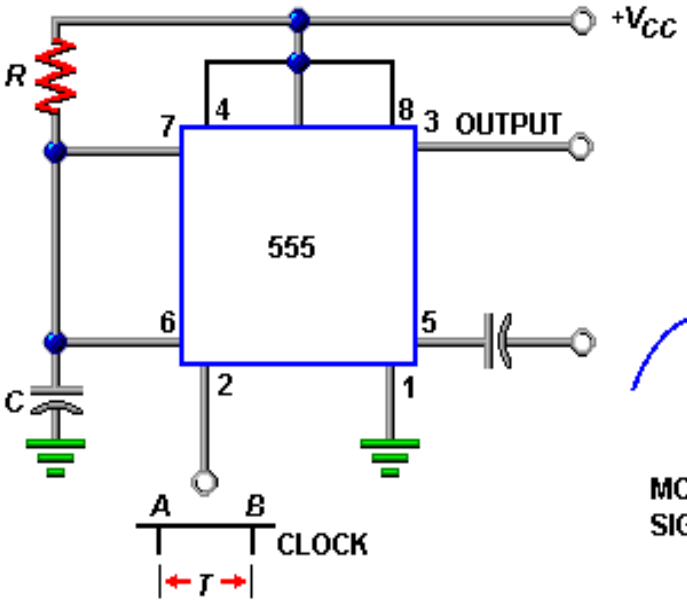
$$W = -(R_1 + R_2)C \ln \frac{V_{CC} - V_{con}}{V_{CC} - 0.5V_{con}}$$

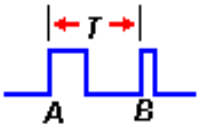
$$T = W + 0.693R_2C$$

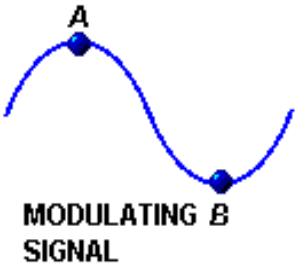
$$f = \frac{1}{W + 0.693R_2C}$$



Modulación de ancho de pulso con el CI555







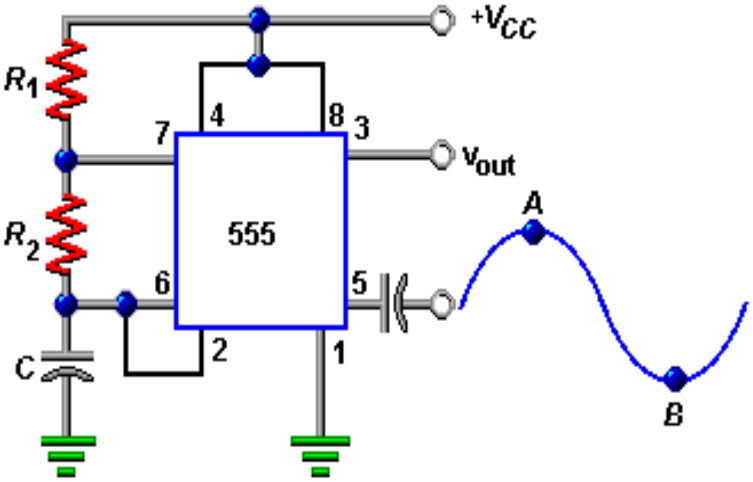
$$T = \frac{1}{f_{clock}}$$

$$UTP = \frac{2V_{CC}}{3} + v_{mod}$$

$$W = -RC \ln\left(1 - \frac{UTP}{V_{CC}}\right)$$

$$D = \frac{W}{T}$$

Modulación de posición de pulso con el CI555

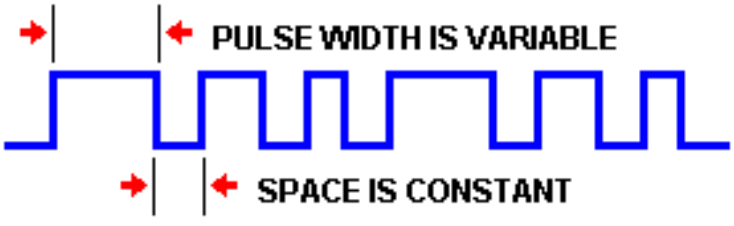


$$UTP = \frac{2V_{CC}}{3} + v_{mod}$$

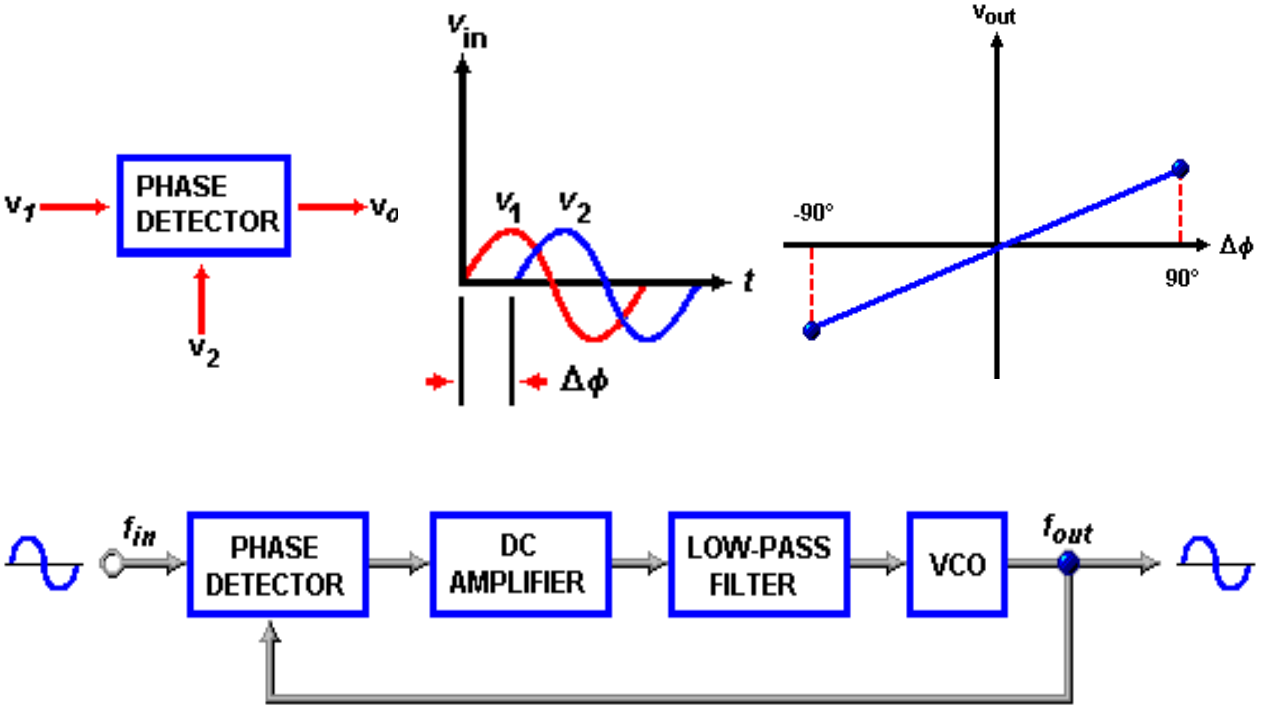
$$W = -(R_1 + R_2)C \ln \frac{V_{CC} - UTP}{V_{CC} - 0.5UTP}$$

$$T = W + 0.693R_2C$$

$$Space = 0.693R_2C$$



Lazo de enganche de fase



Lazo de enganche de fase

- **Es posible generar una señal de igual frecuencia que la de la entrada.**
- **Se puede remover ruido de una señal.**
- **Se puede demodular señales de FM.**
- **Se utilizan en la forma de CI como el NE565.**