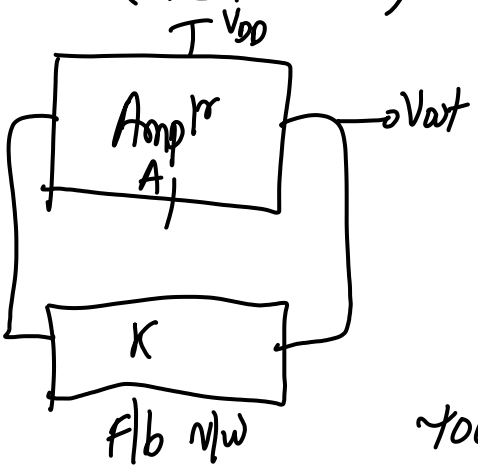
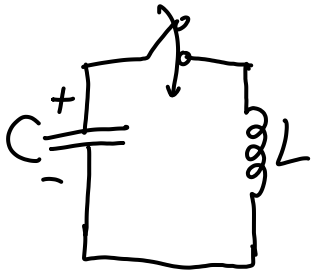
AEC lec 34 12/10/23

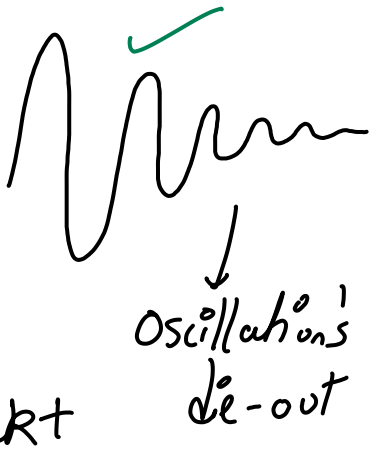
LC oscillators:

↳ Ampl^r + F/b n/w (LC tank ckt)





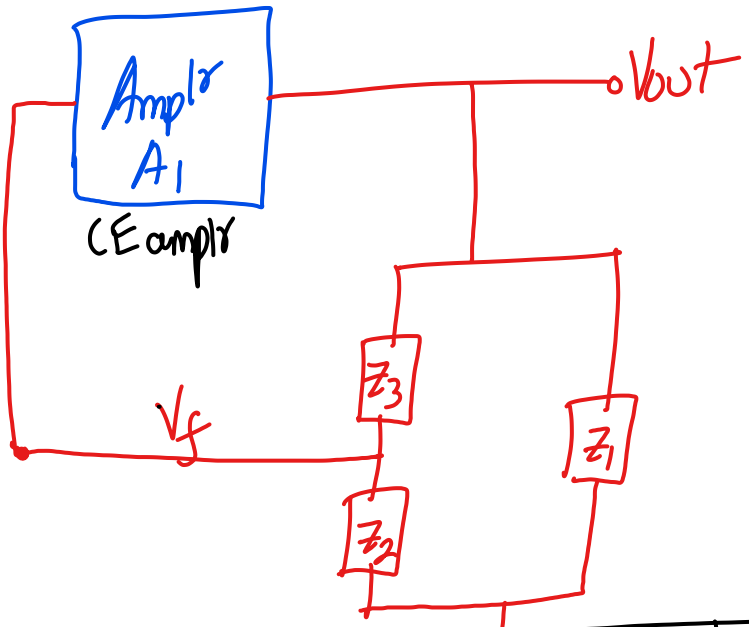
LC tank ckt



Oscillations die-out

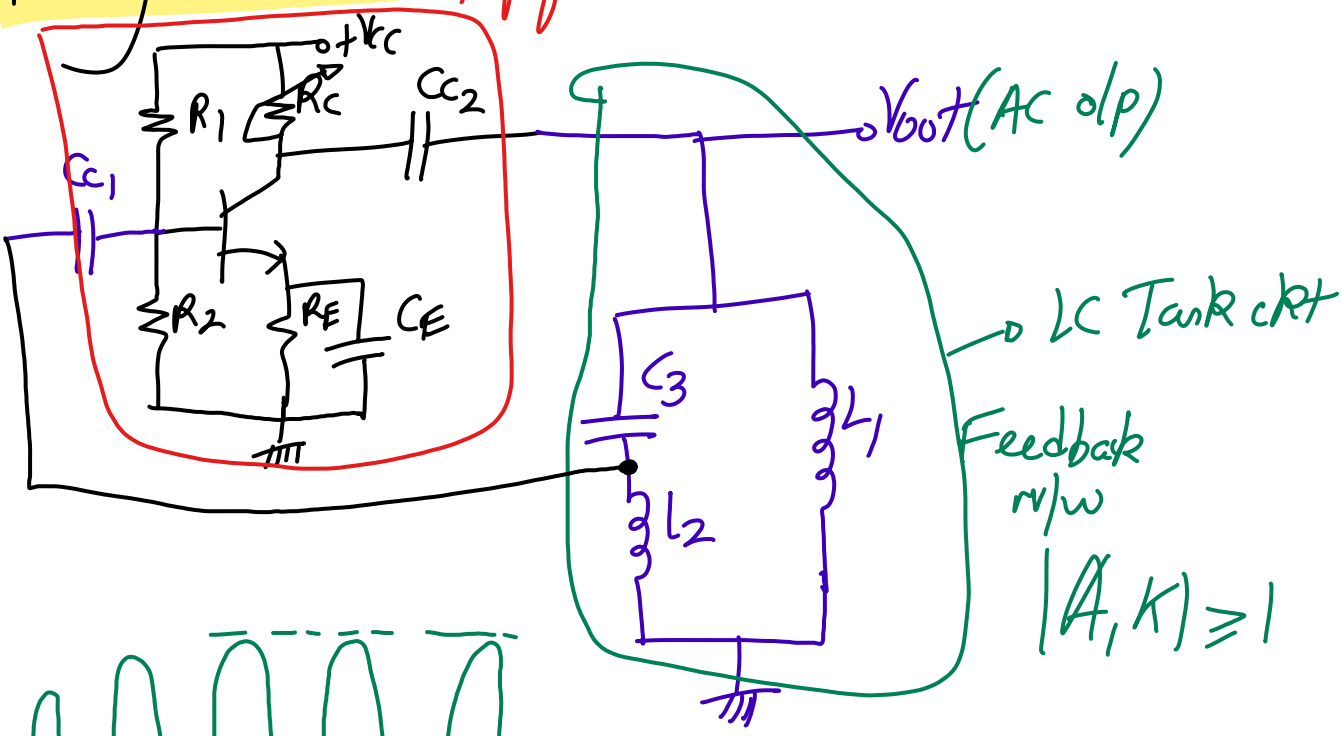
$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$

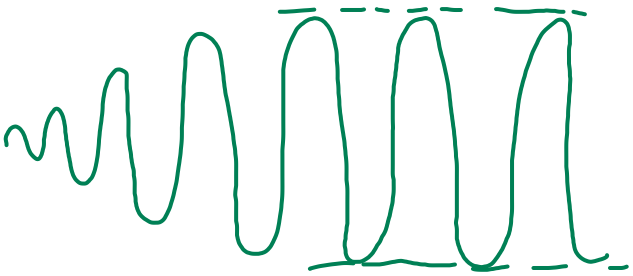
~100 KHz, MHz mH μF (High freq^n)



	Z_1	Z_2	Z_3
Hartley oscillator	L	L	C
Colpitts oscillator	C	C	L

Hartley oscillator: Amplifier





Ampl^r − 180°

LC Tank ckt − 180°

360°

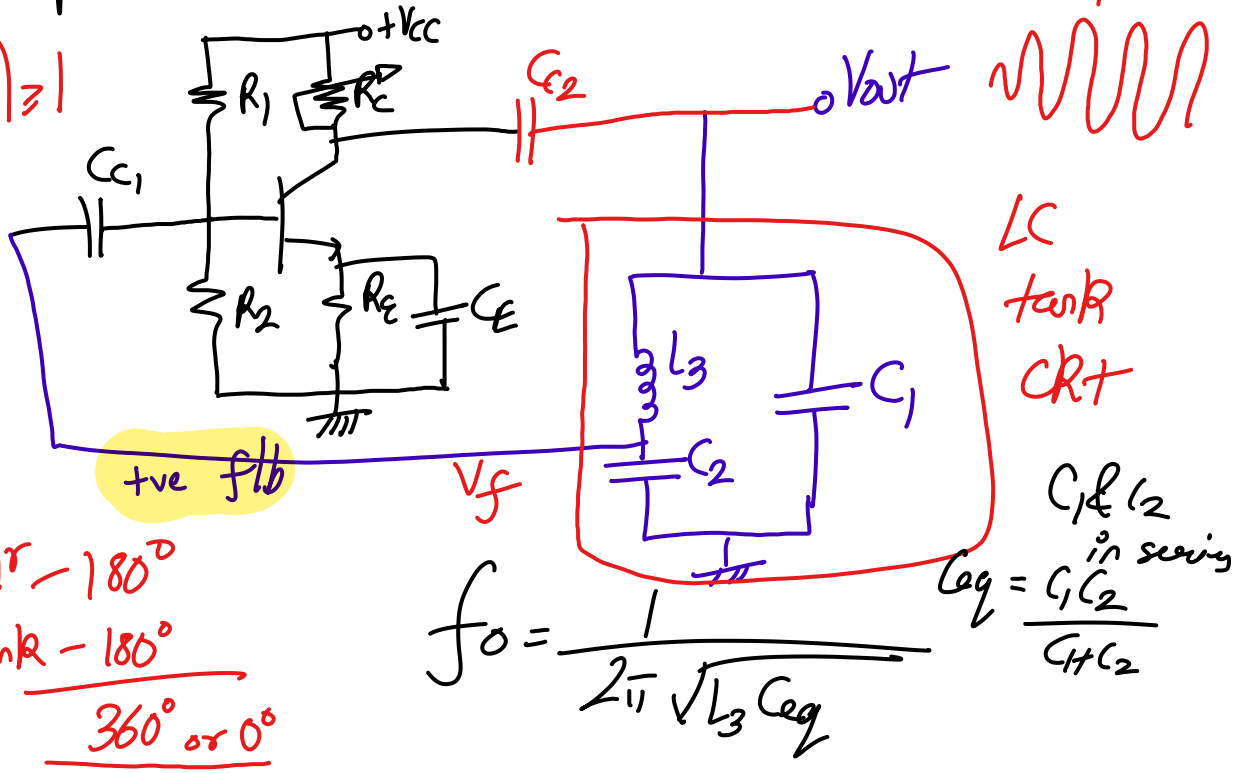
$$f_0 = \frac{1}{2\pi\sqrt{L_{eq}C_3}}$$

$$L_{eq} = L_1 + L_2$$

$$|A_V| = \frac{L_1}{L_2}$$

Colpitts oscillators:

$|A_1K| \geq 1$



Ampl^r -180°

LC tank -180°

360° or 0°

$$f_o = \frac{1}{2\pi\sqrt{L_3 C_{eq}}}$$

C_1 & C_2 in series

$$C_{eq} = \frac{C_1 C_2}{C_1 + C_2}$$

Compare RC & LC oscillators:- (low f & high f)

		RC	LC
①	F/b n/w	R&C	L&C
②	freq^n	low (Audio)	high (RF)
③	Phase shift :-	0°	180°
④		RC phase shift Wein bridge	Hartley Colpitts