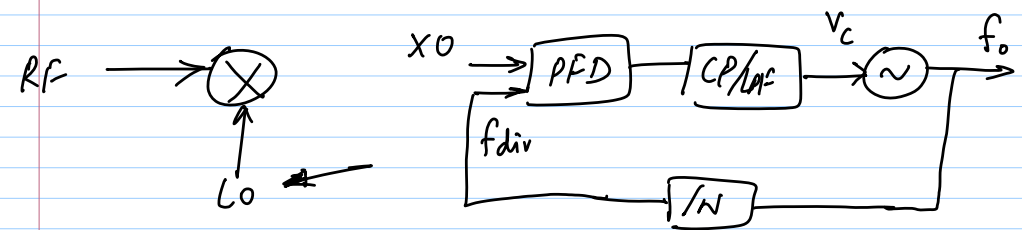


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Lec 32



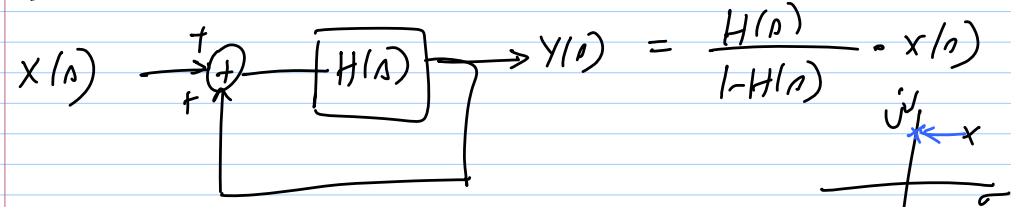
$$f_o = K_{vco} \cdot V_c + f_{fr}$$

LC-Osc

Types of VCO: Wien-bridge Osc., Hartley Osc, Colpitts, Ring Osc., Relaxation Osc.

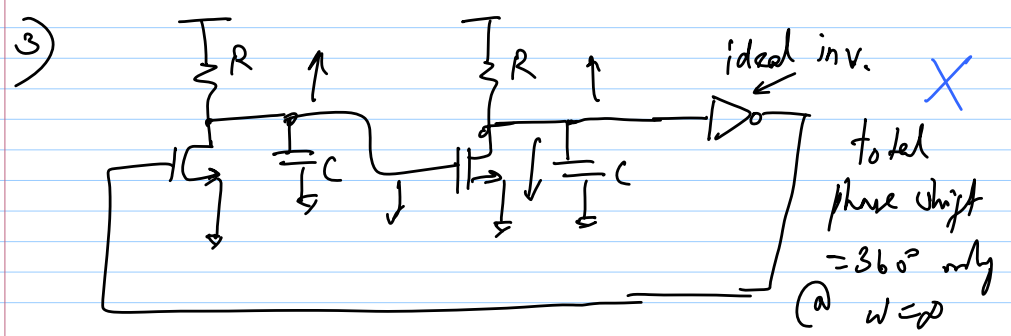
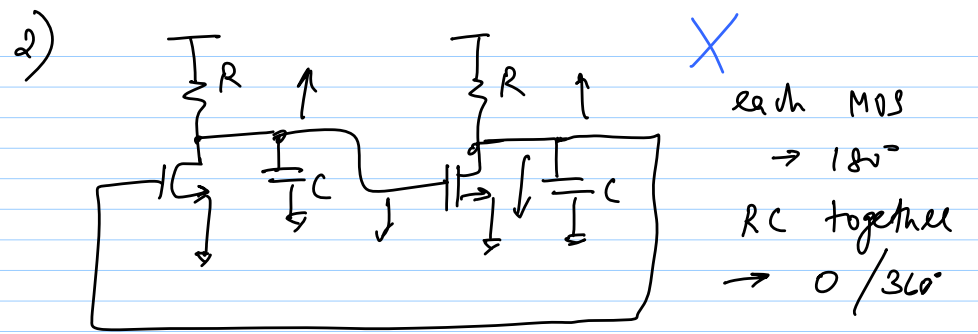
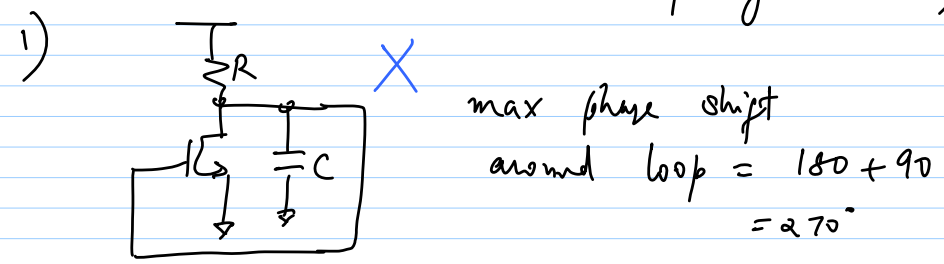
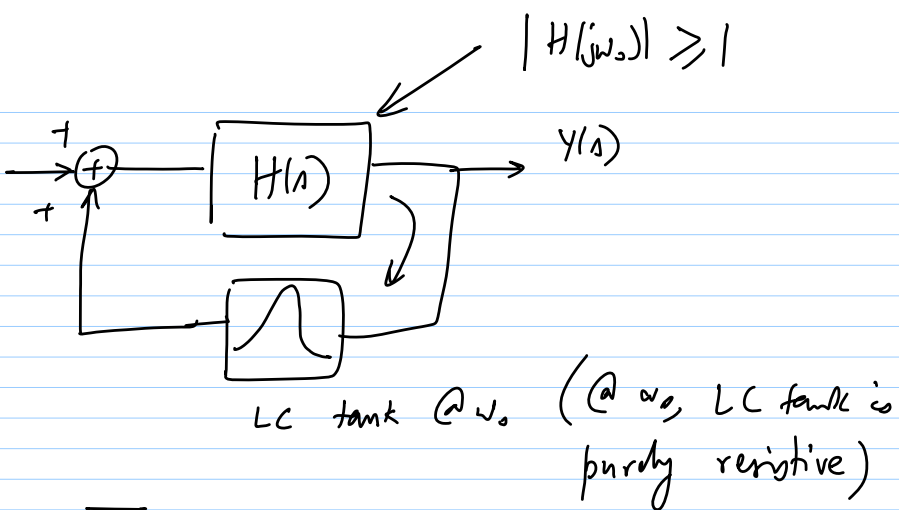
LC Osc. - very good spectral purity (phase noise)

Barkhausen Criterion

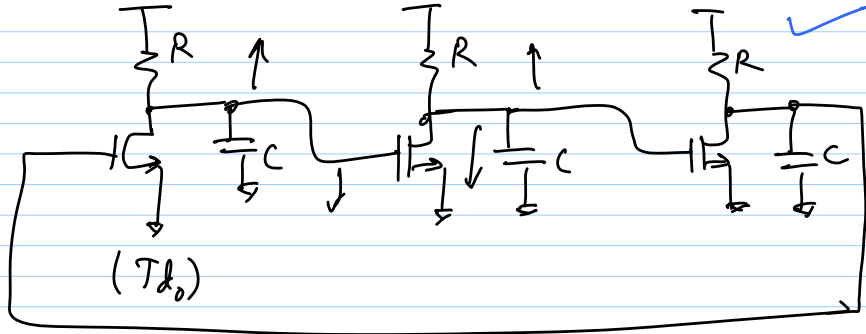


$H(s) = 1 \Rightarrow$ self-sustaining osc.

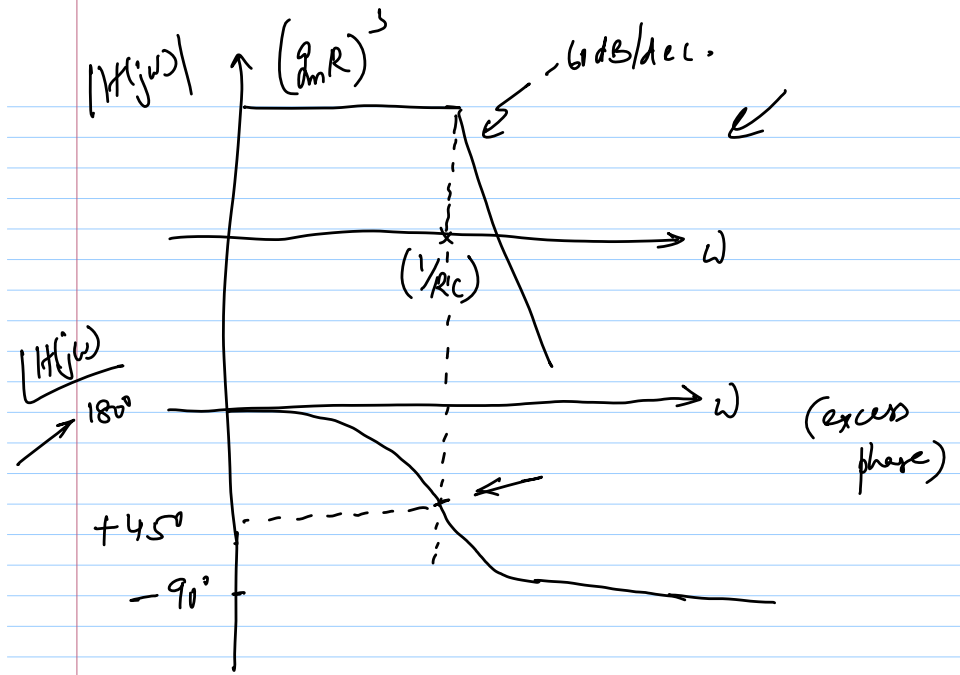
- 1) $|H(j\omega_o)| = 1$ (necessary but not sufficient criteria)
- 2) $\angle H(j\omega_o) = 360^\circ$



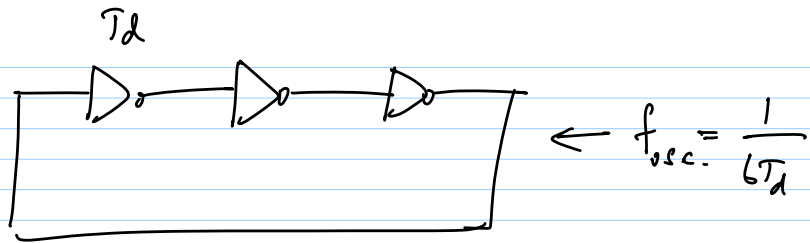
4)



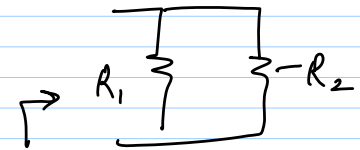
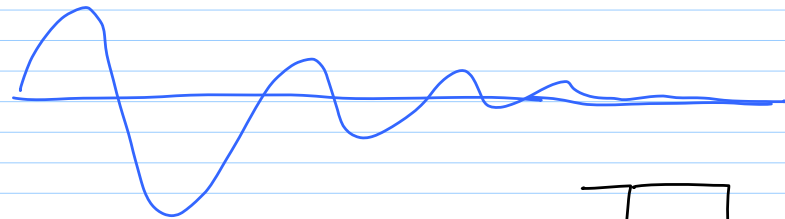
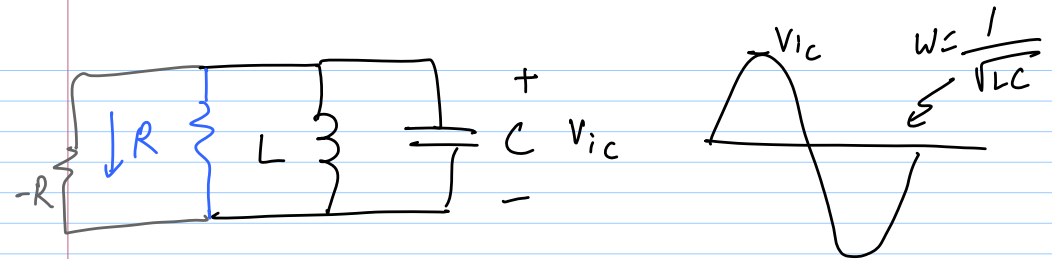
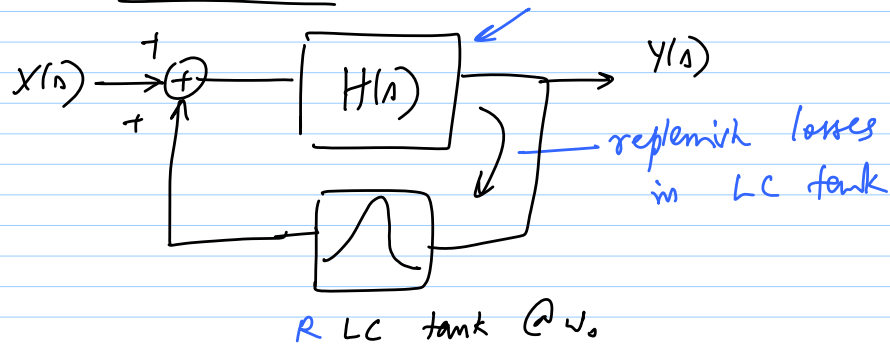
can oscillate



5)



LC - Osc.



for $R_x < 0$, $|R_2| < |R_1|$