

EE 2019

Oscillators

5/4/2017

\* clock source

Autonomous

circuit

(no input signal)

— Digital circuits

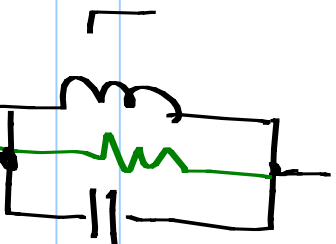
— Sampling

\* (Sinusoidal) RF carriers

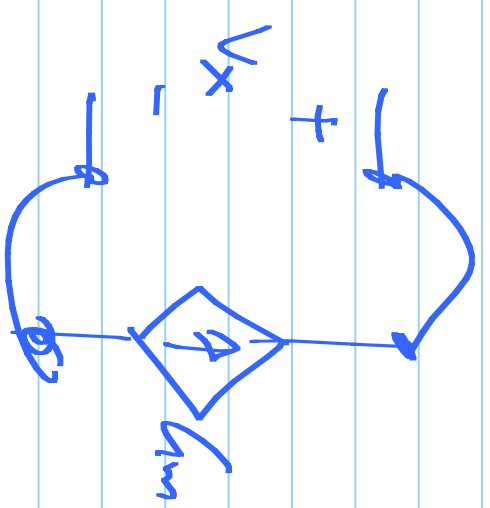
\* Sinusoidal signal sources

Lossless L & C

$$V_o = V_p \cdot \cos\left(\frac{t}{\sqrt{LC}}\right)$$

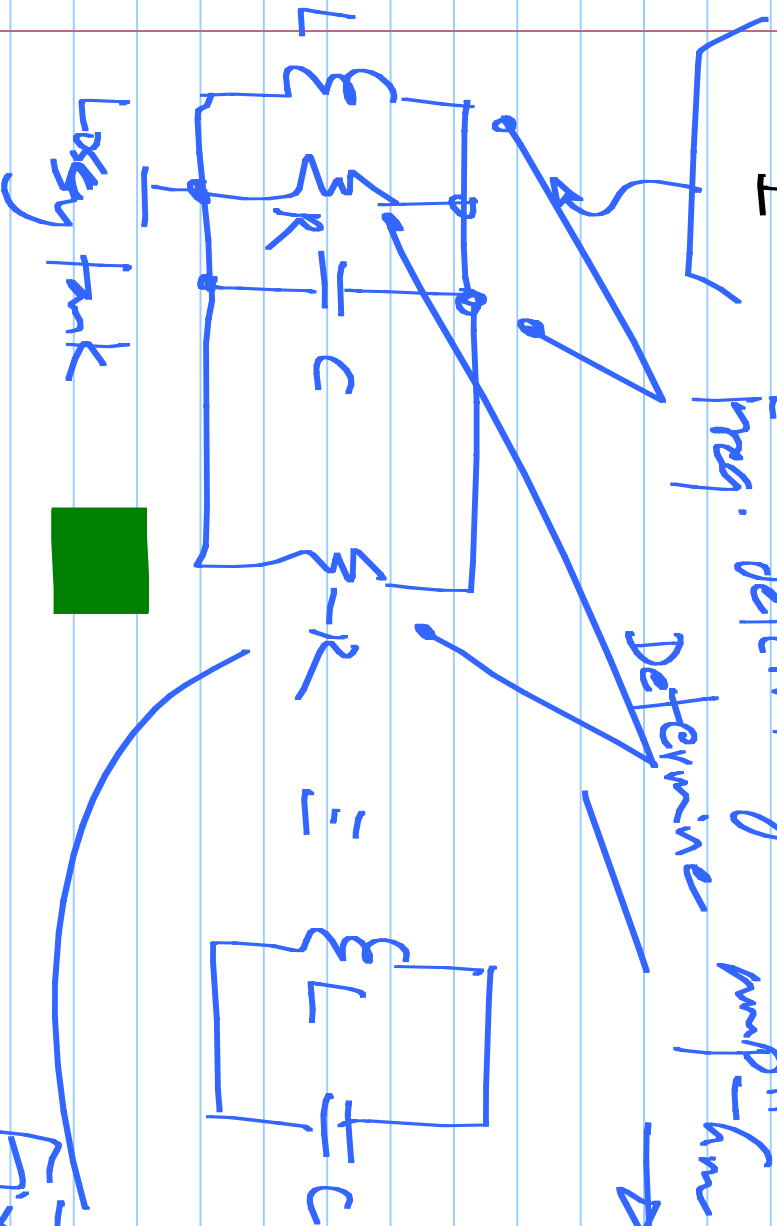


freq. determining components  
Determine amp. limit



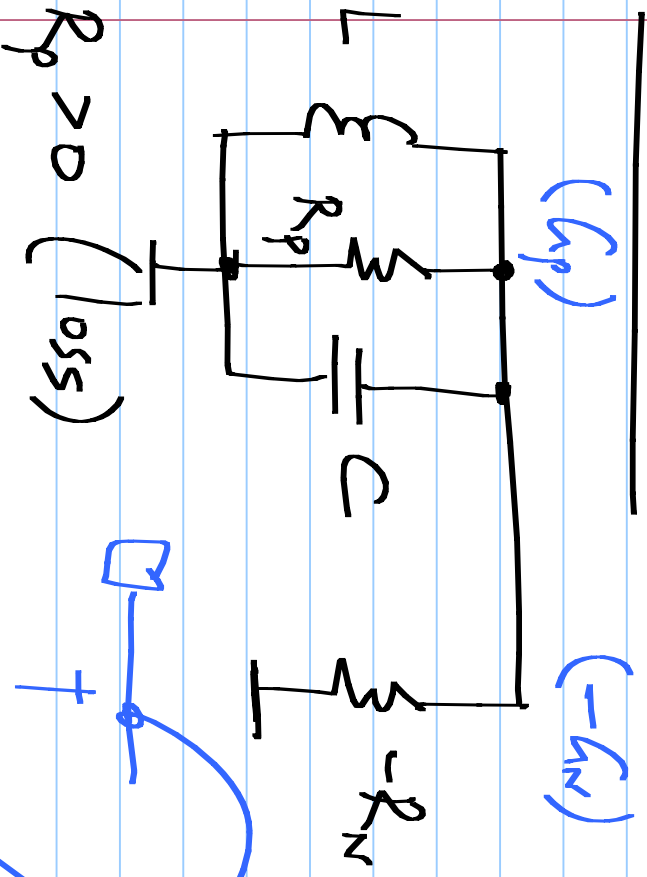
Nonlinear controlled source

Fixes the amplitude



LC oscillator :

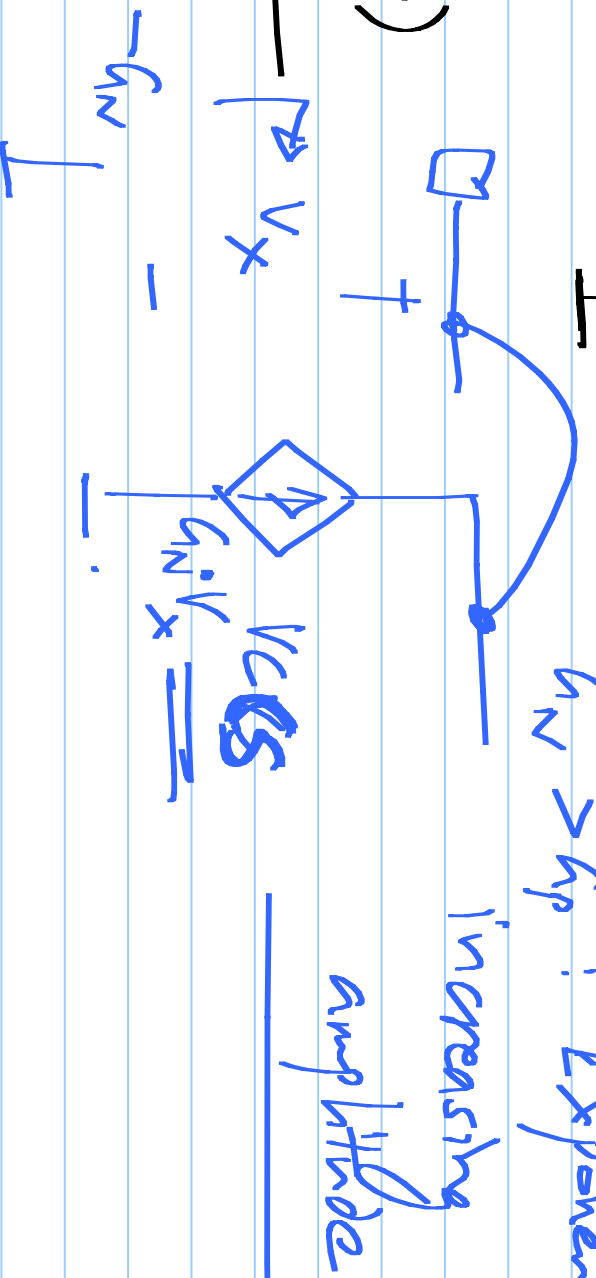
$g_N \geq g_p$



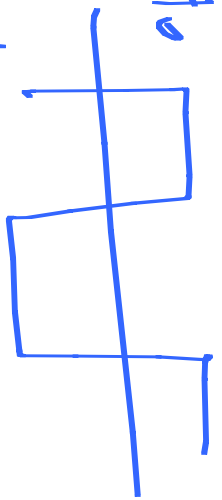
$g_N = g_p$  : constant

amplitude

$g_N > g_p$  : Exponentially

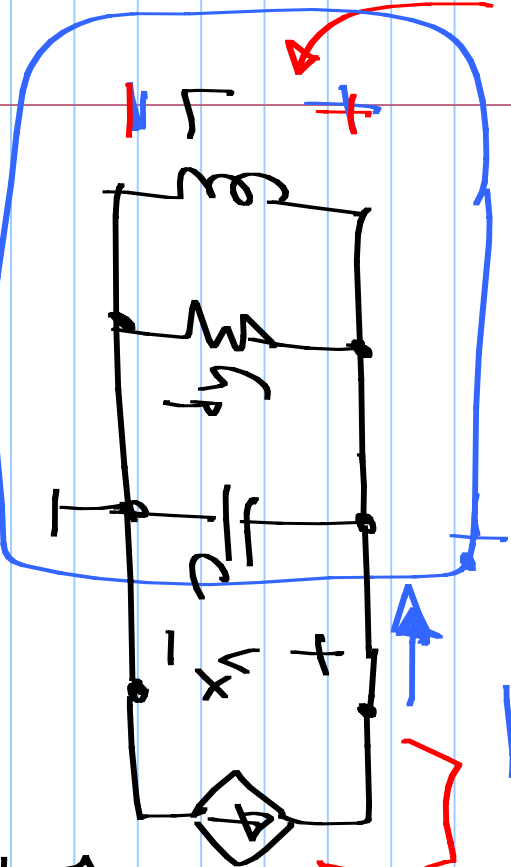
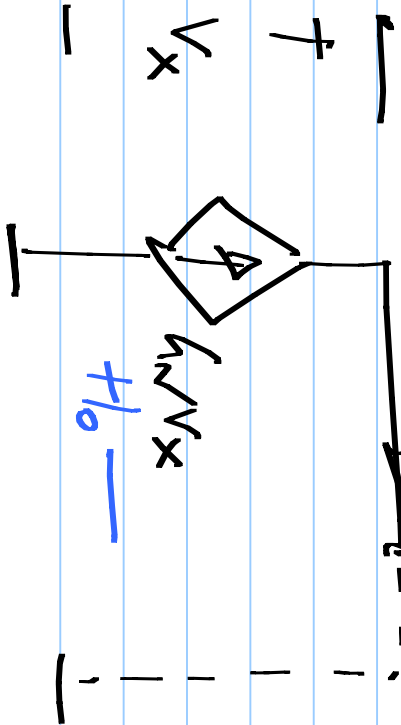


VCCS:



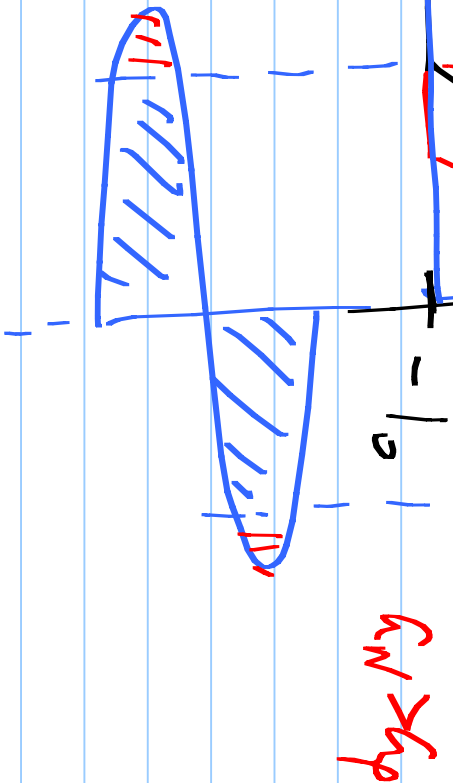
+10

$$\hat{I}_b = G_M \cdot U_x$$

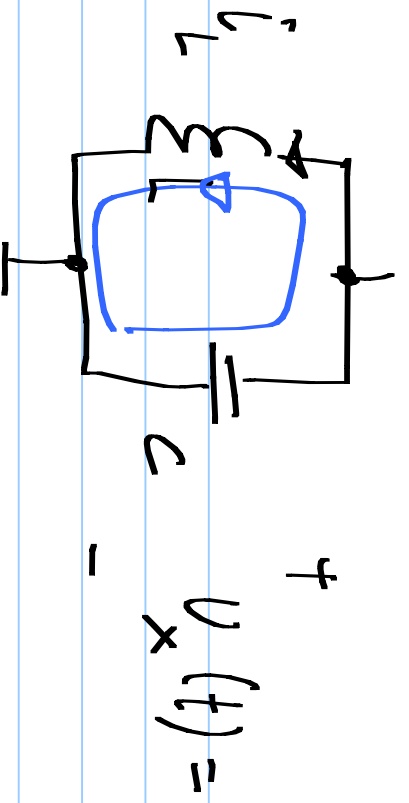


{+10}

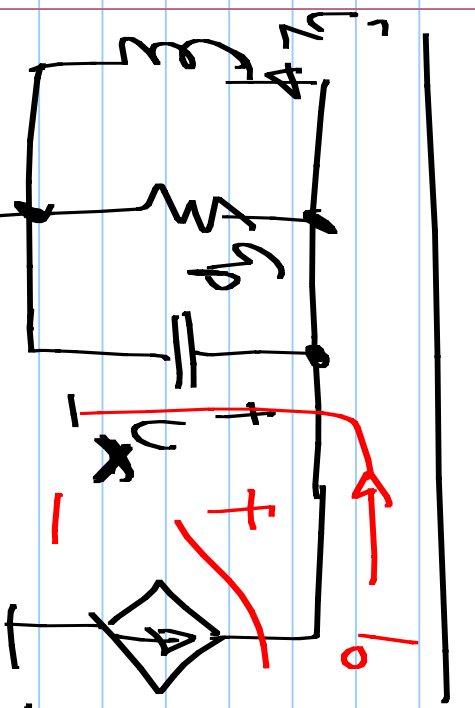
$$G_M \cdot U_x$$



$$G_M > G_p$$



$i_L(0) = 0 ; U_X(0) = V$



$g_p = g_N$

