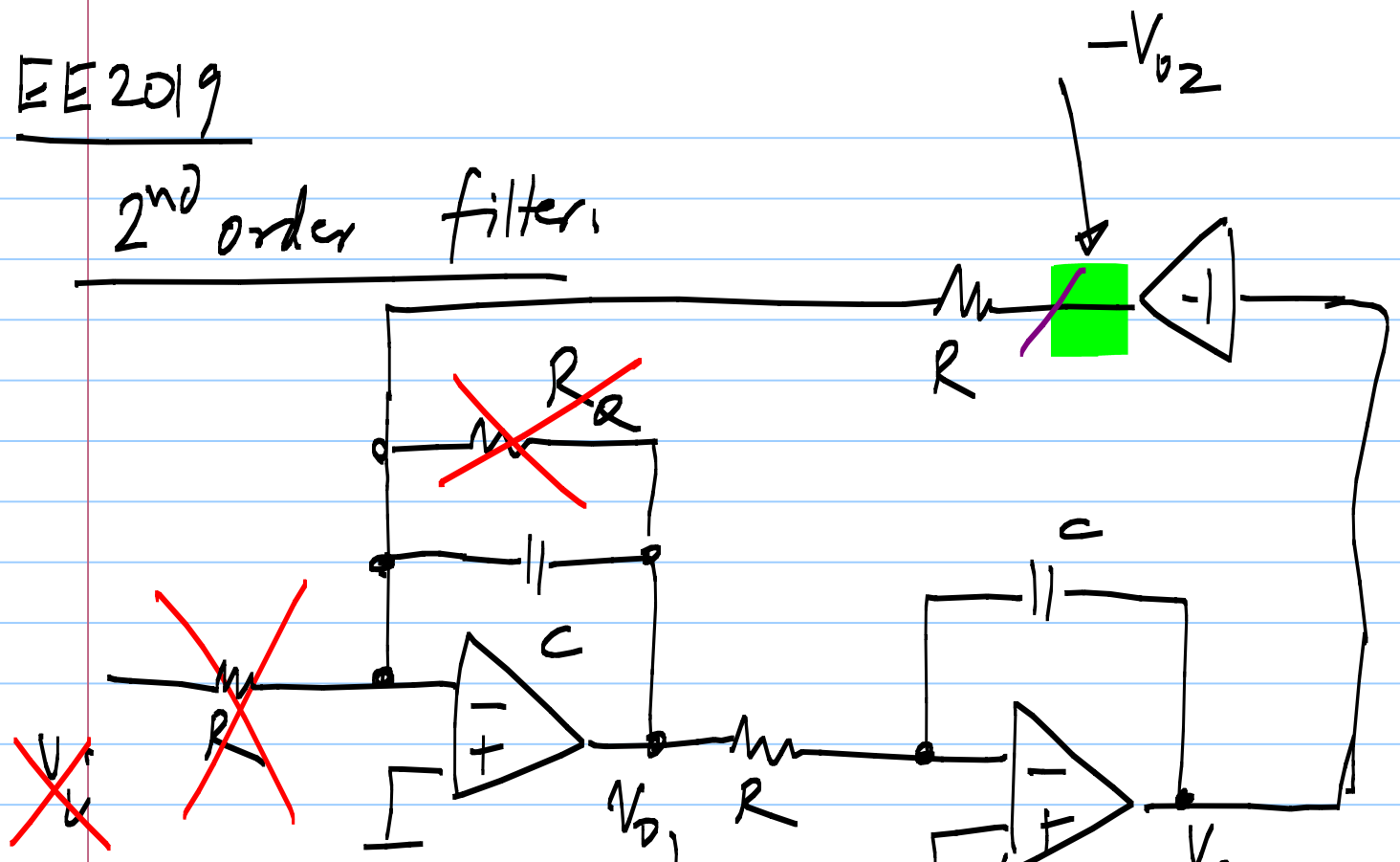
EE 2019

7/4/2017

2nd order filter



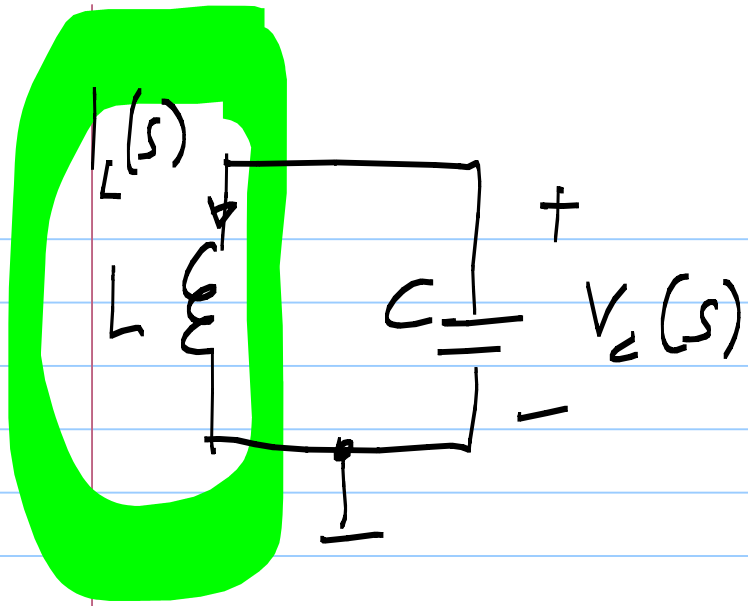
$$Q = \frac{R_Q}{R}$$

Oscillator

$R_Q = \infty$

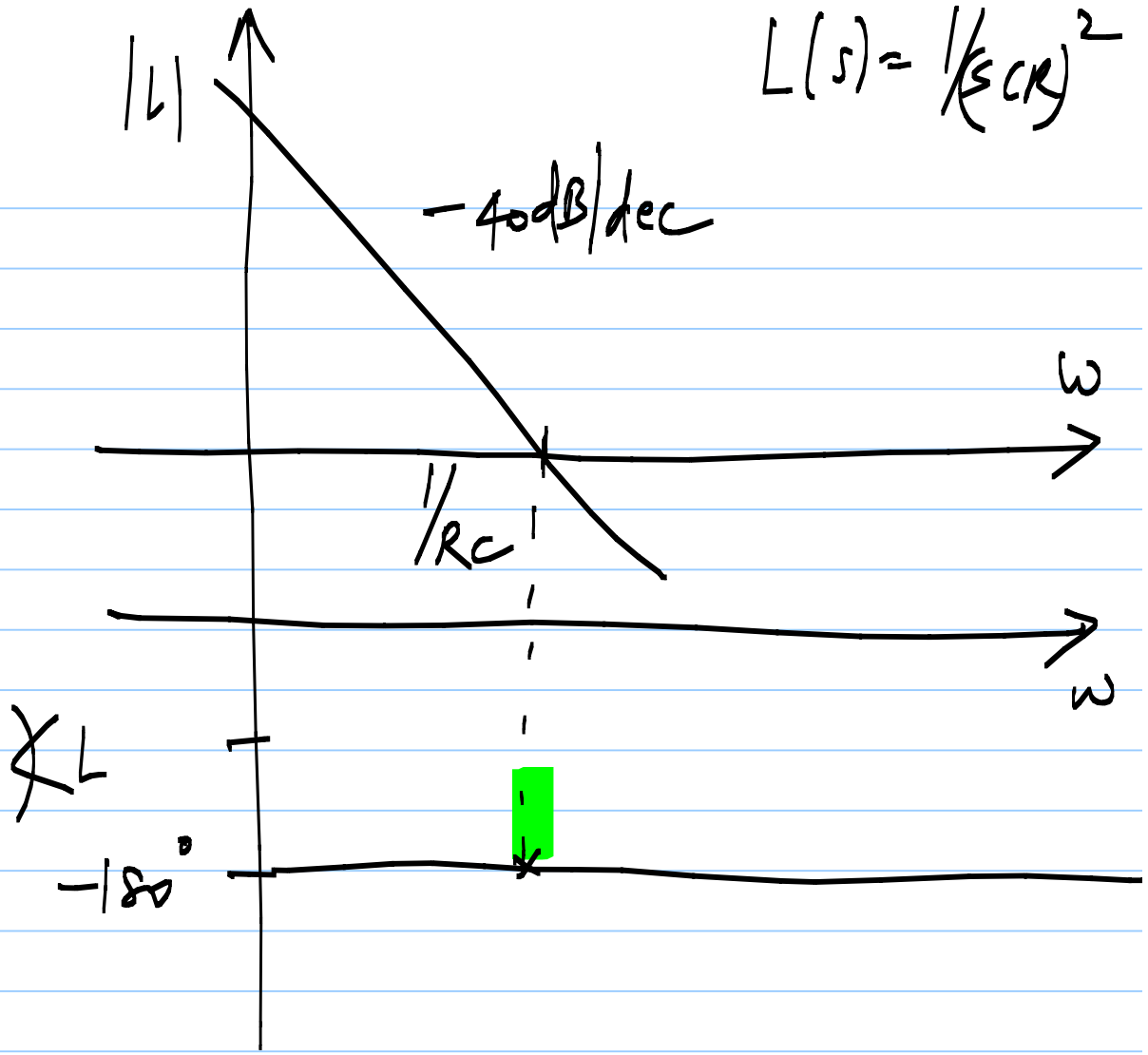
No input

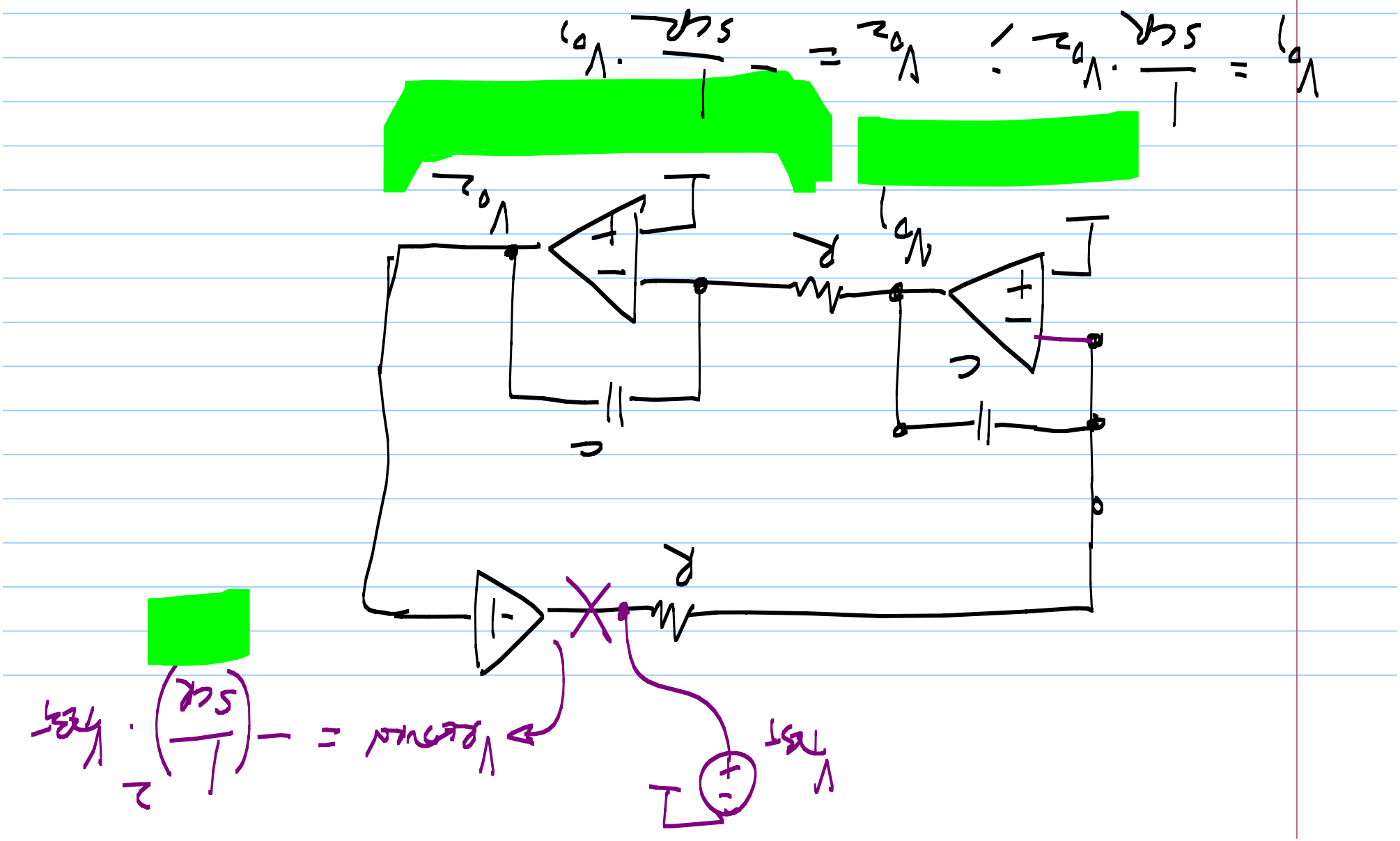
$$V_{o1} = \frac{1}{sCR} \cdot V_{o2} \; ; \quad V_{o2} = -\frac{1}{sCR} \cdot V_{o1}$$

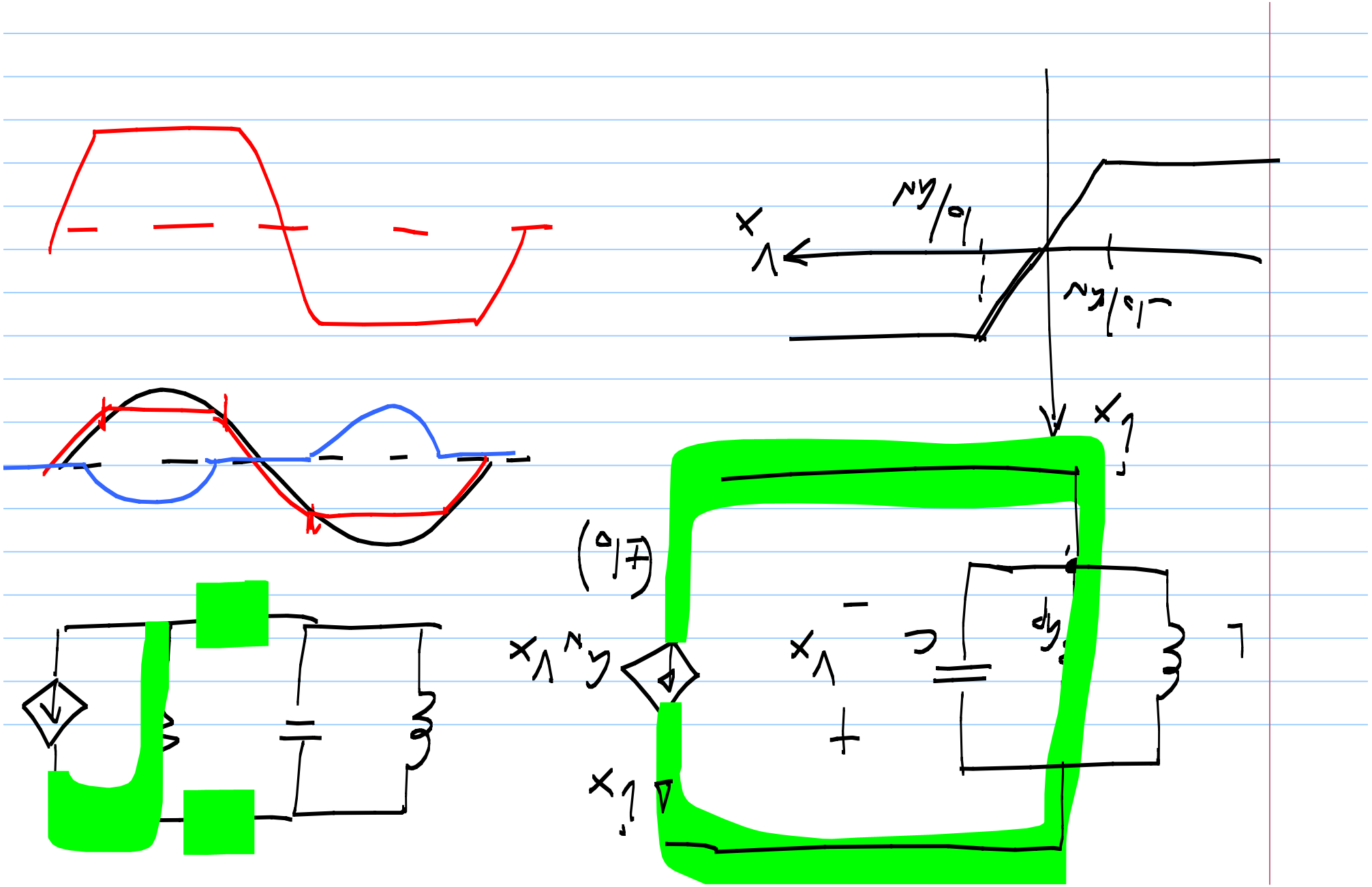


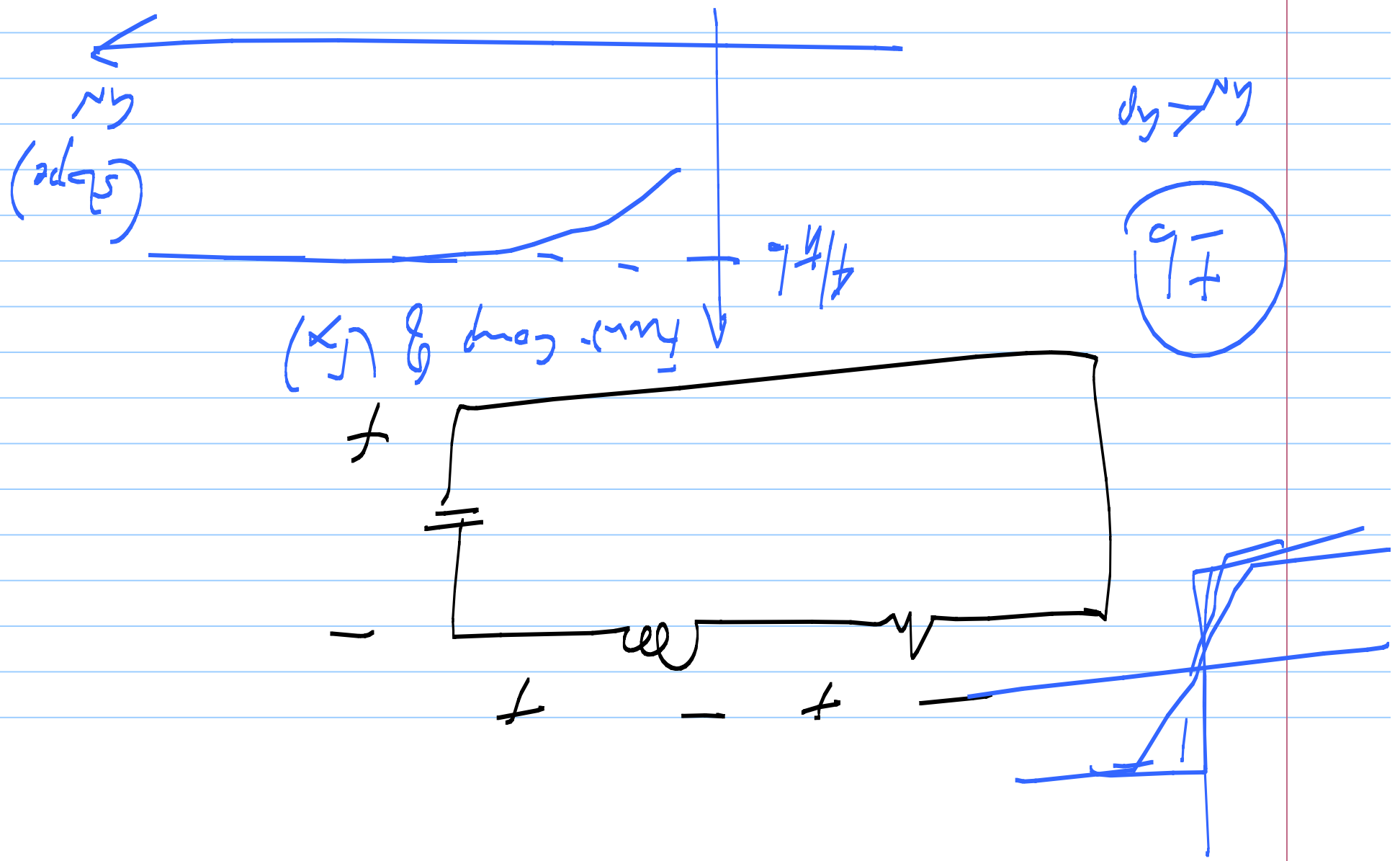
$$I_L(s) = \frac{1}{sL} \cdot V_L(s)$$

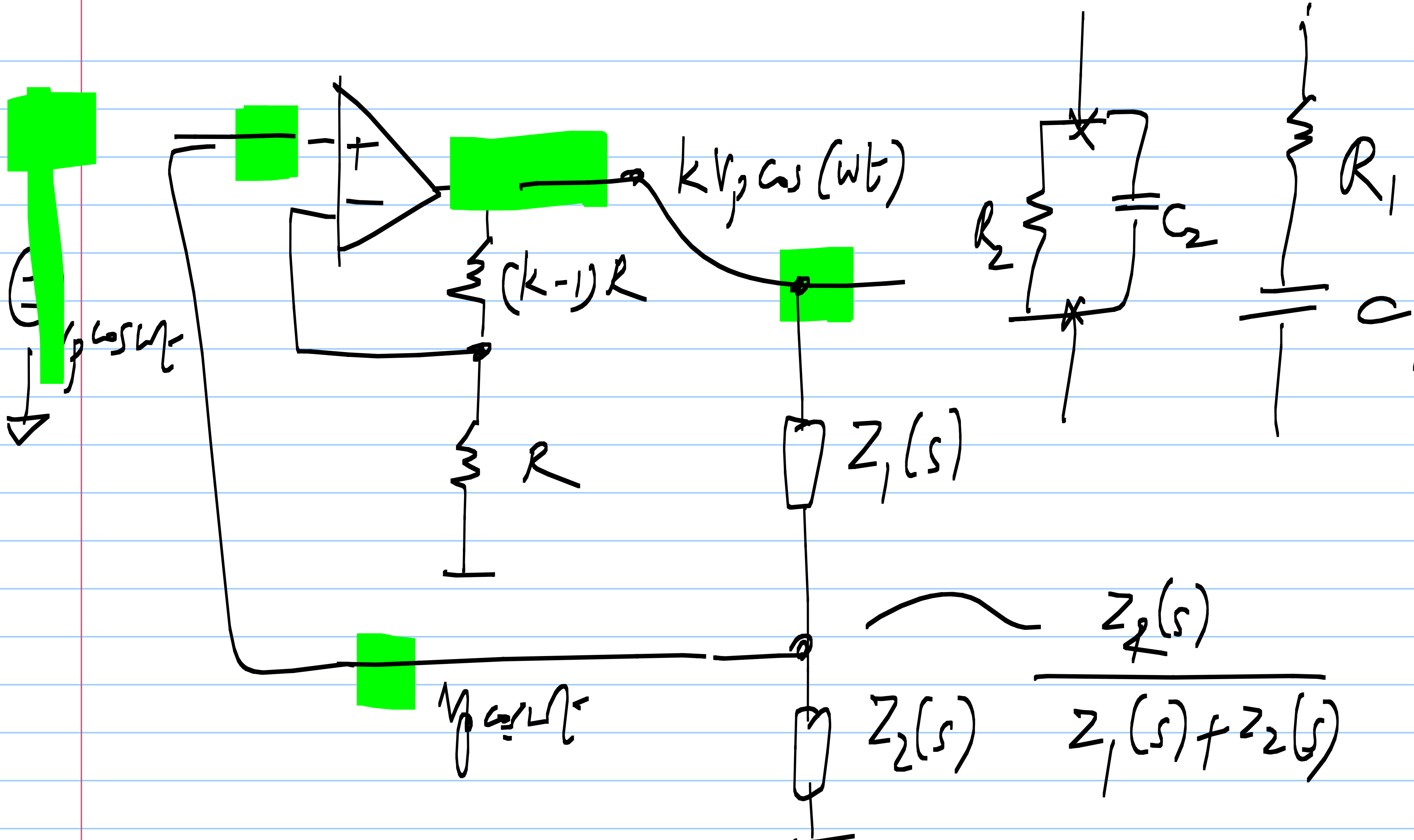
$$V_L(s) = -\frac{1}{sC} \cdot I_L(s)$$



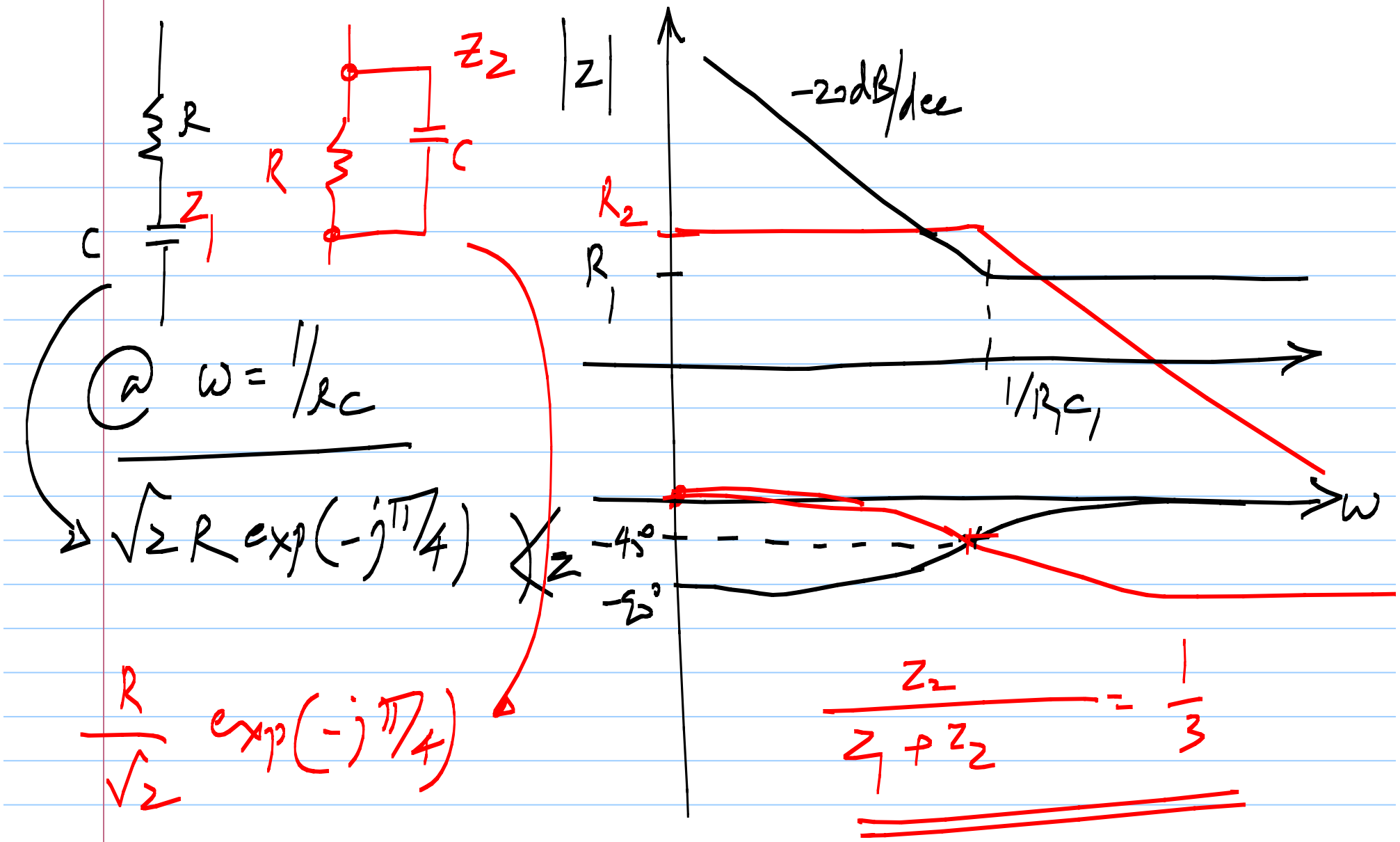




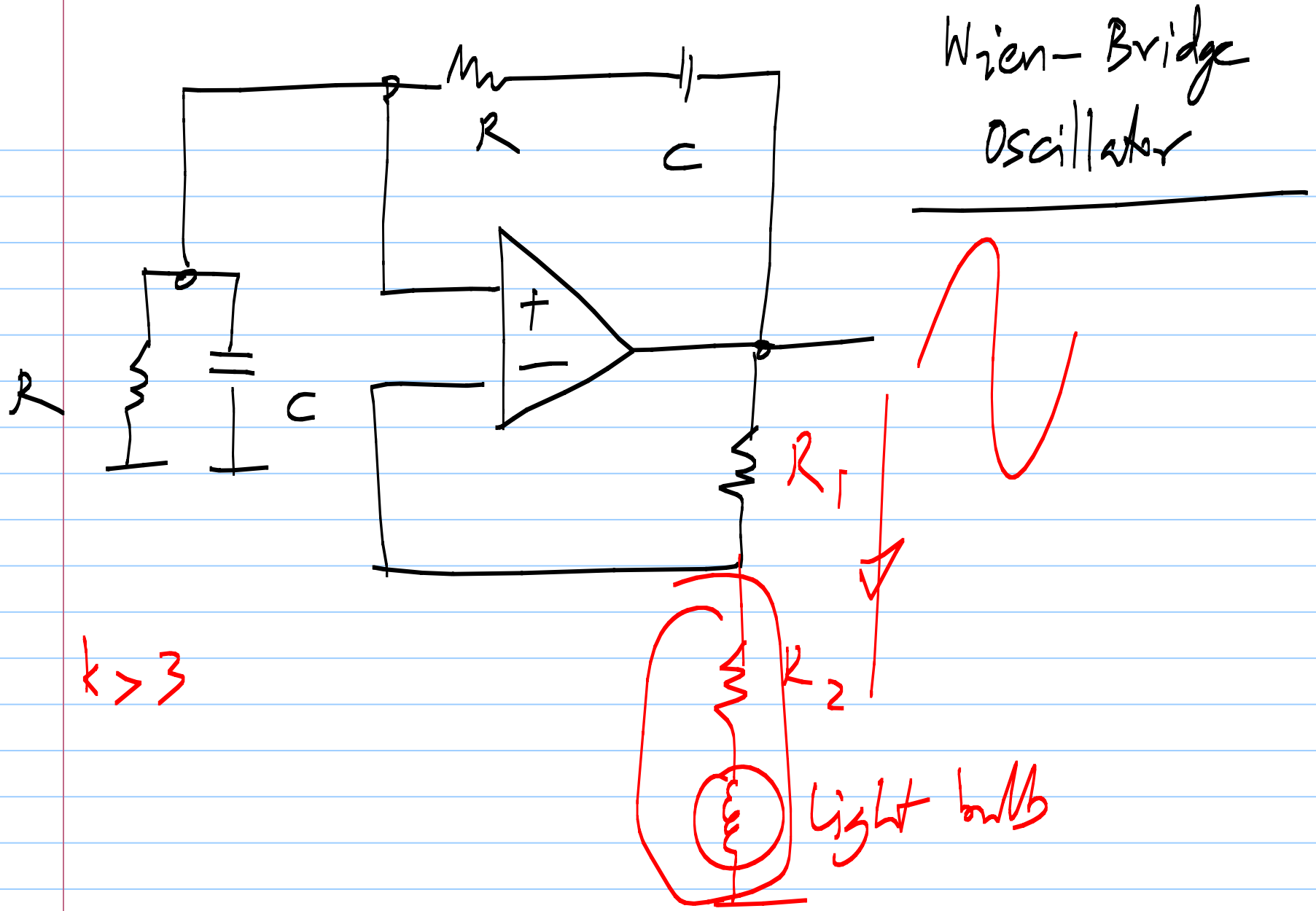




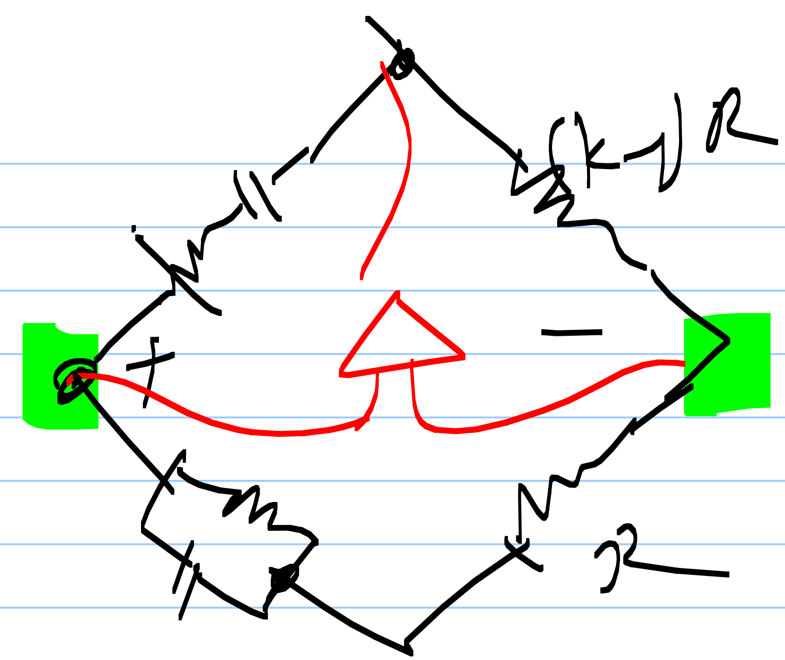
$$\sim \frac{Z_2(s)}{Z_1(s)+Z_2(s)}$$


R
C
Z_1
Z_2
R
C
|Z|
-20dB/dec
R_2
R_1
$1/R_2C_1$
ω
-45°
-90°
∠Z
@ $\omega = 1/RC$
$\sqrt{2}R\exp(-j\pi/4)$
$\frac{R}{\sqrt{2}}\exp(-j\pi/4)$
$\frac{Z_2}{Z_1+Z_2} = \frac{1}{3}$

Wien-Bridge Oscillator



$k > 3$



Analog Circuit Design – Art, Science & Personalities

Jim Williams