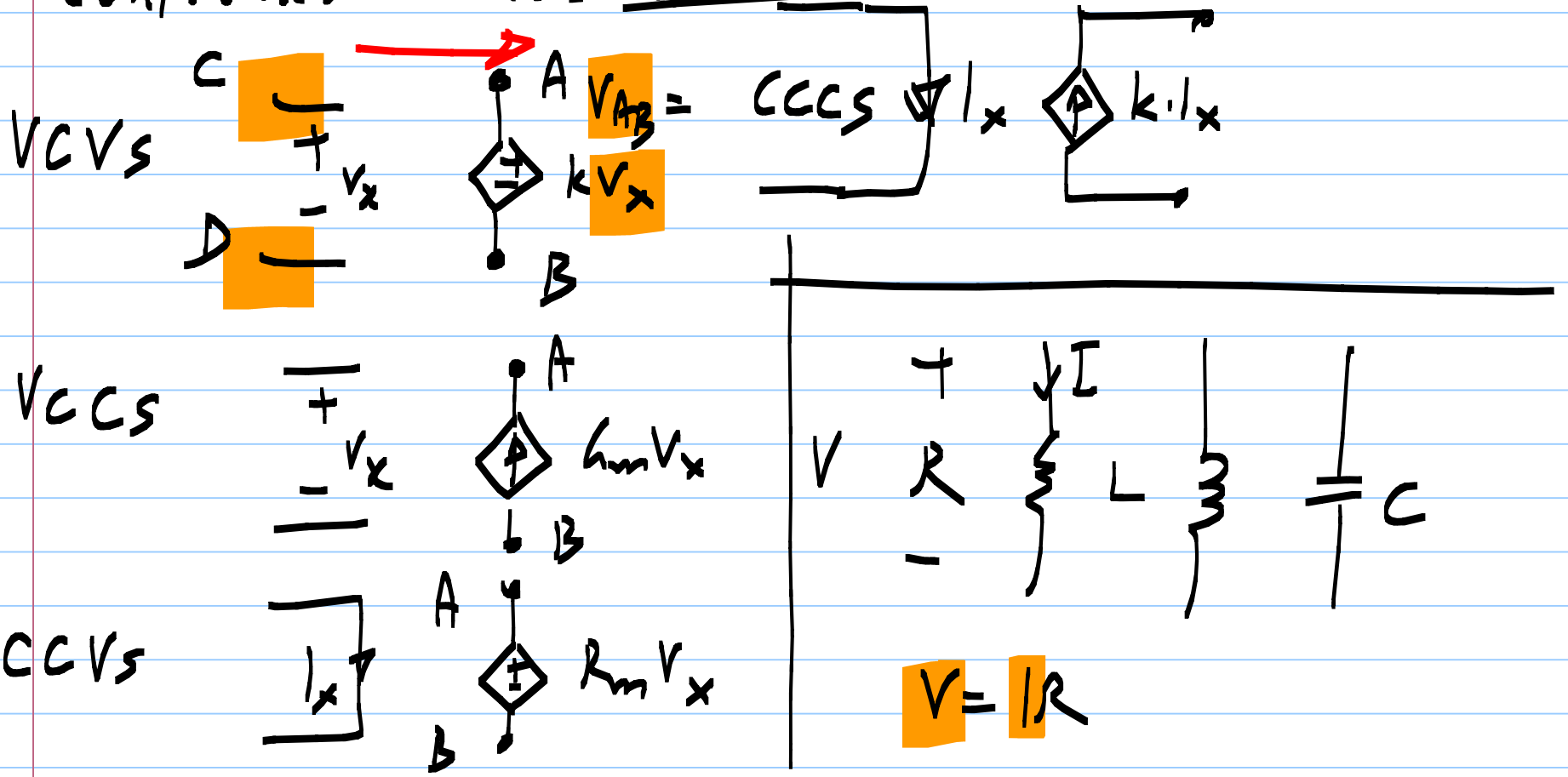
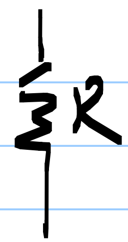
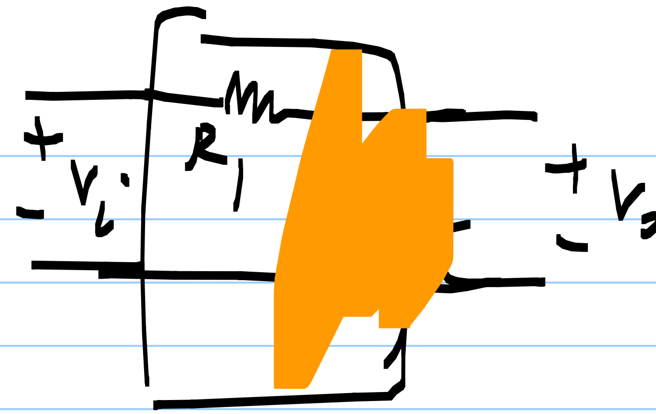
EE 2019 Analog circuits and lab 17/1/2018

Note Title 1/17/2018

Controlled sources (Unidirectional)



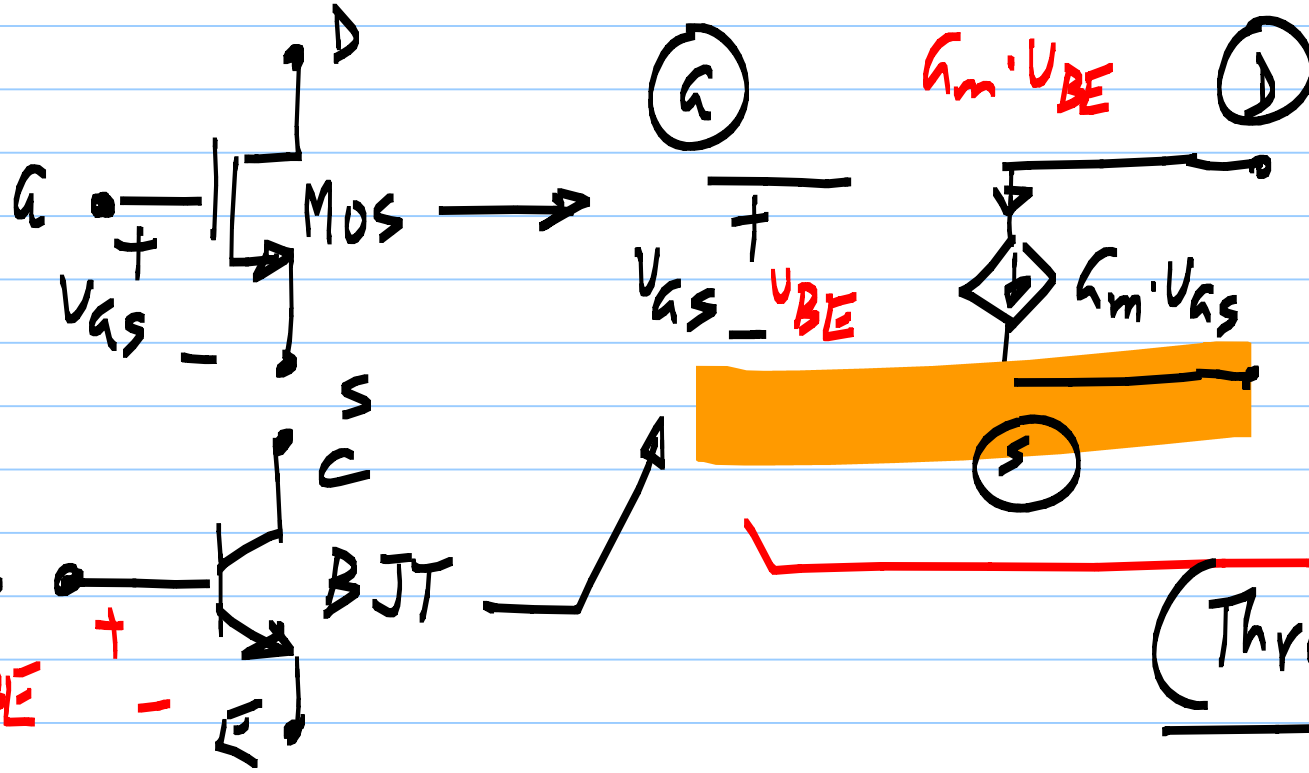




$$\frac{-R_2}{R_1 - R_2}$$

Controlled sources: Unilateral

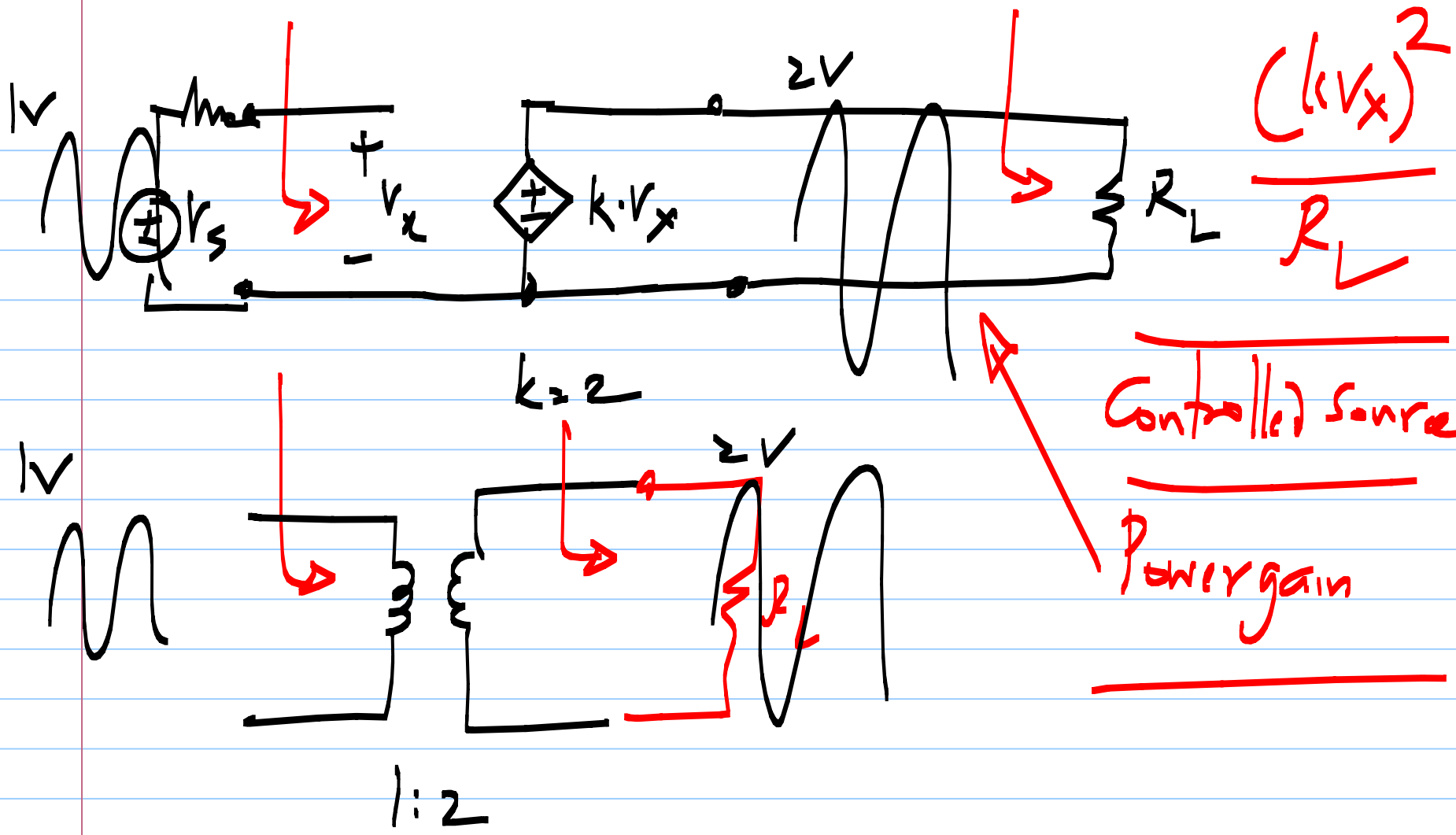
Amplifiers



Physical devices (MOS, BJT)

VCCS

(Three terminals)

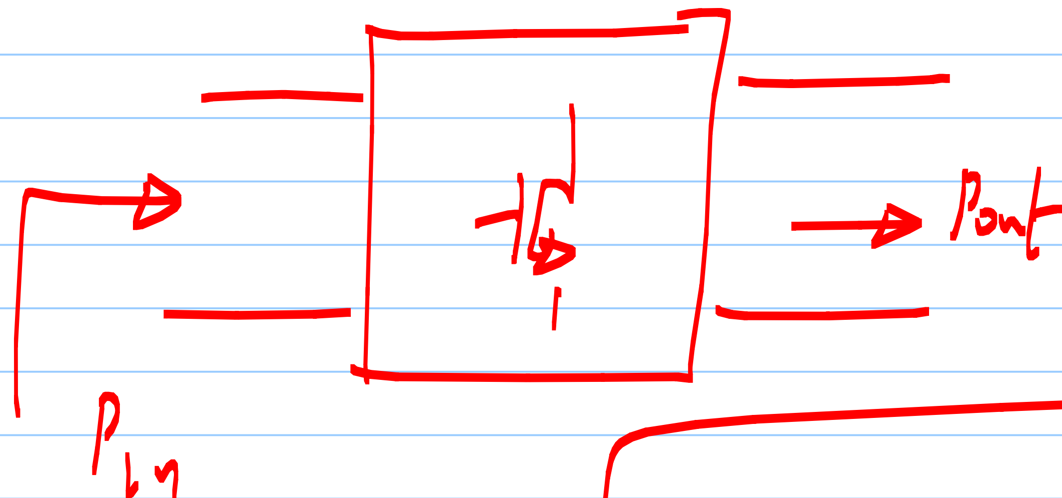


$\frac{(k V_x)^2}{R_L}$

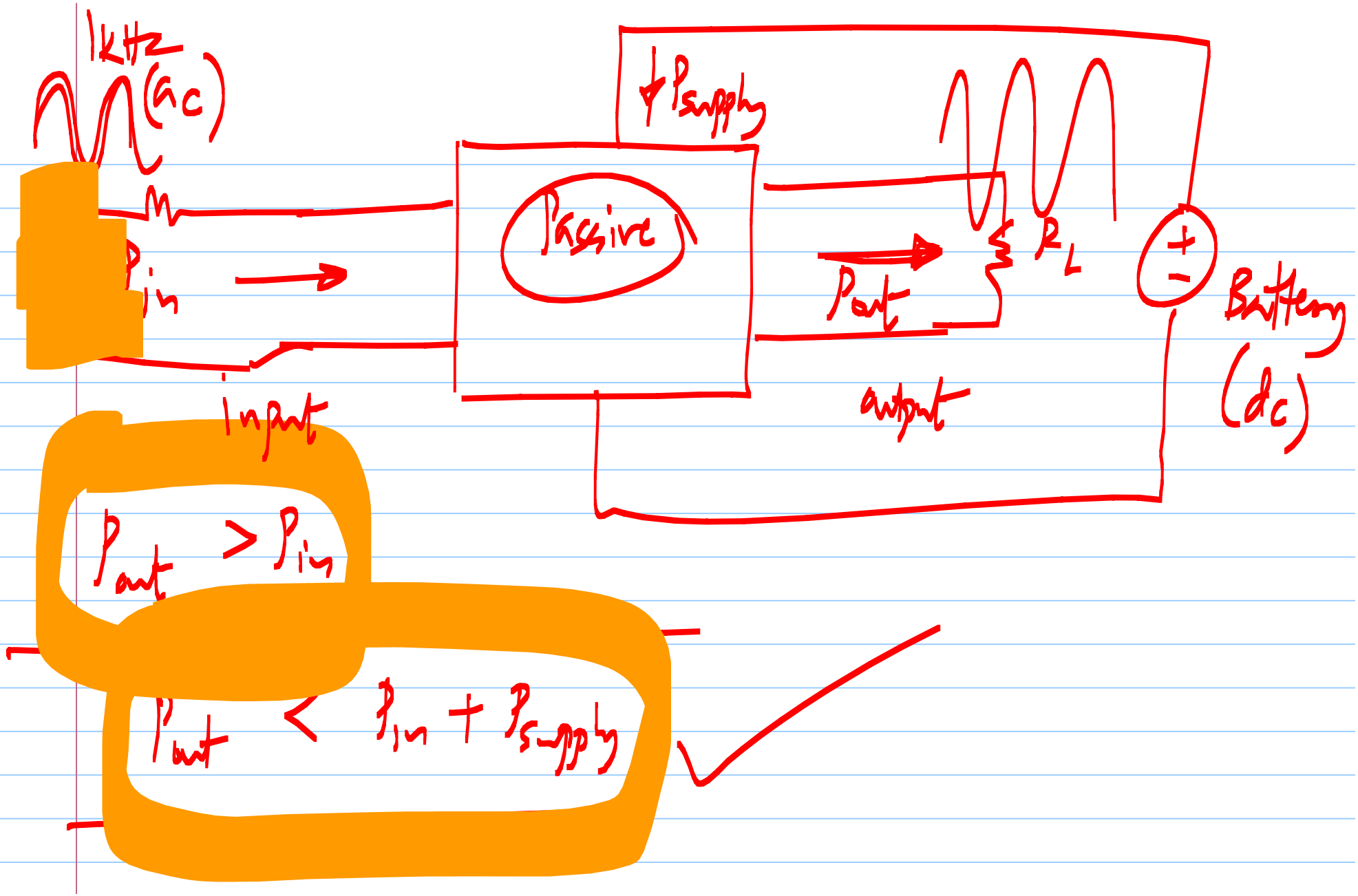
Controlled source

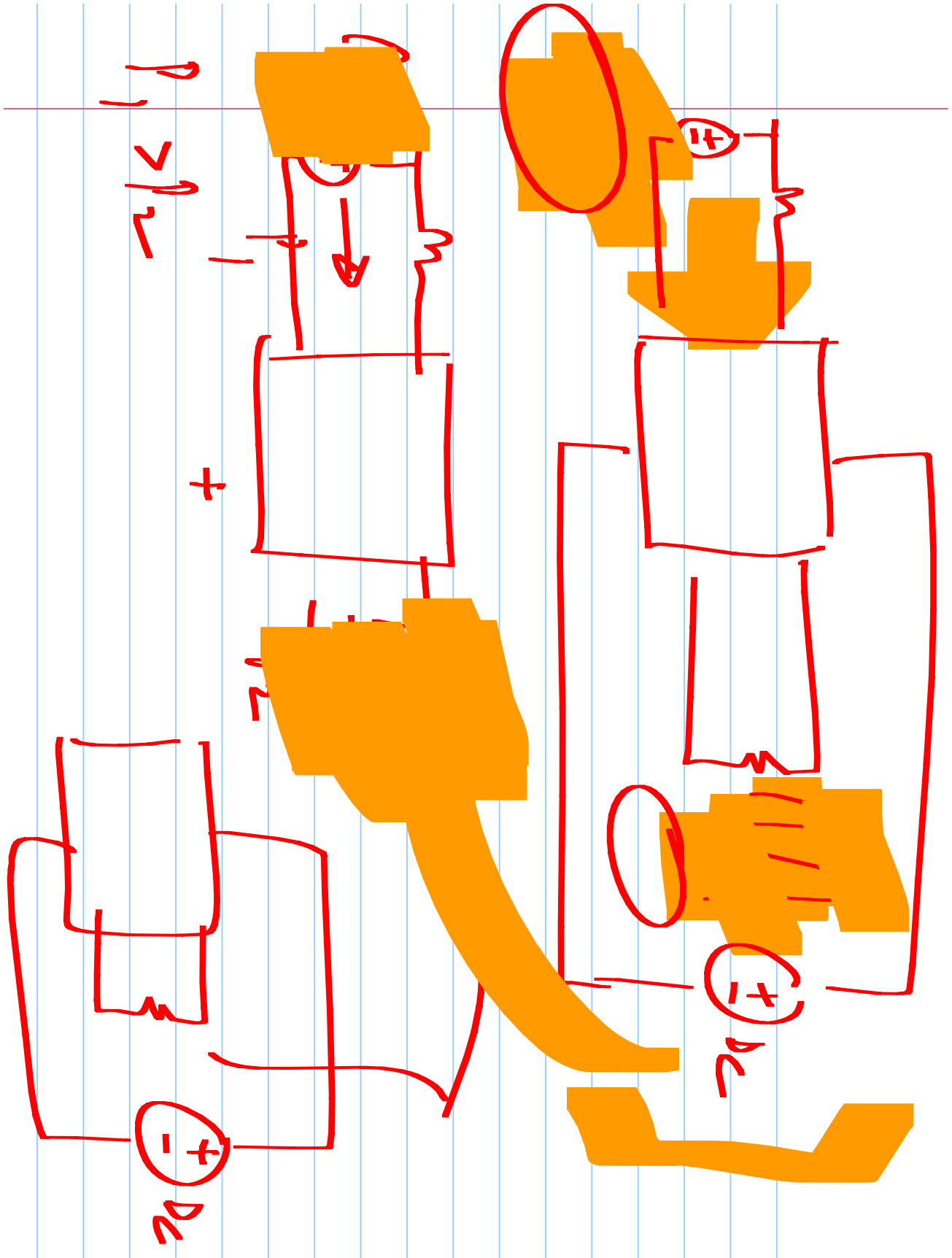
Power gain

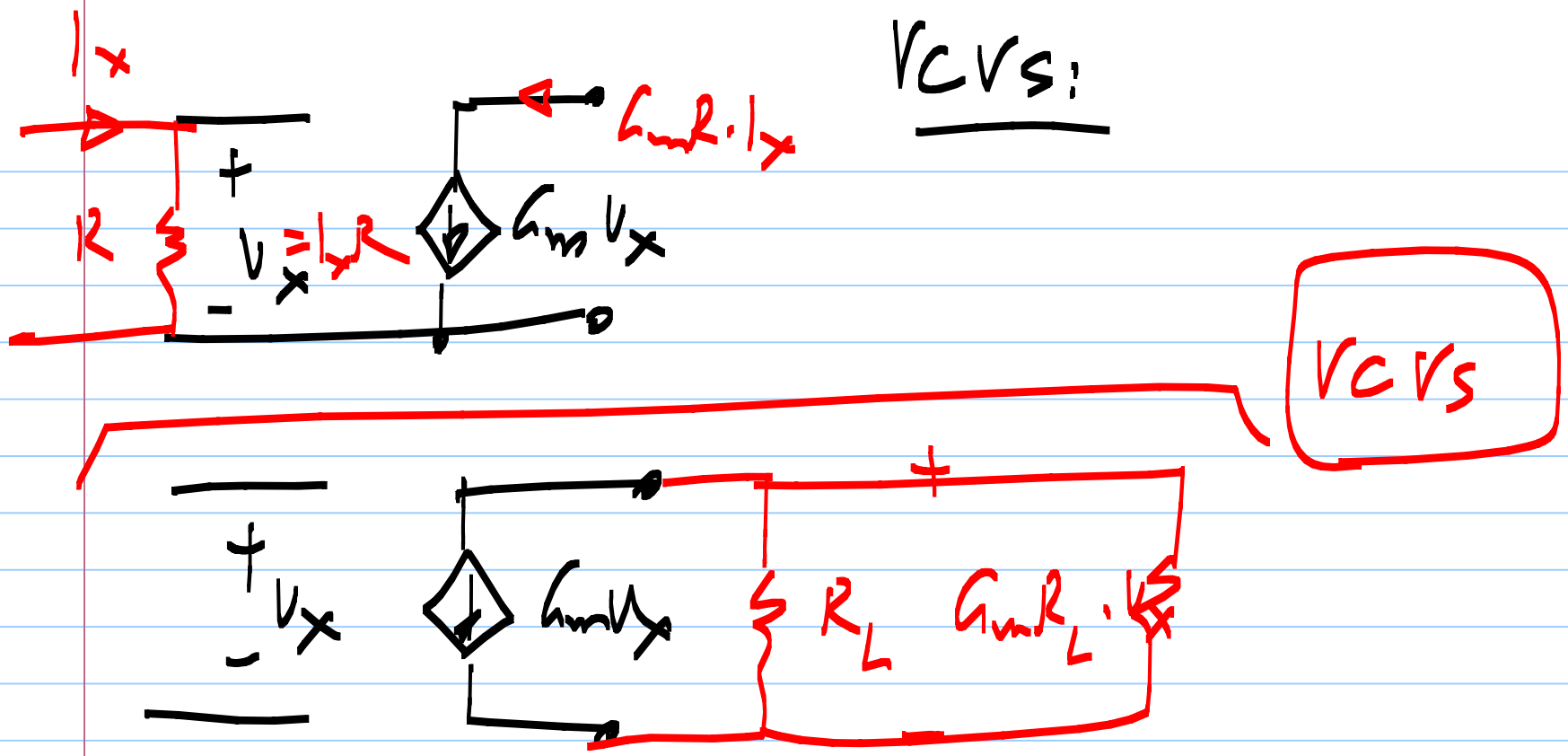
<u>Power gain</u>

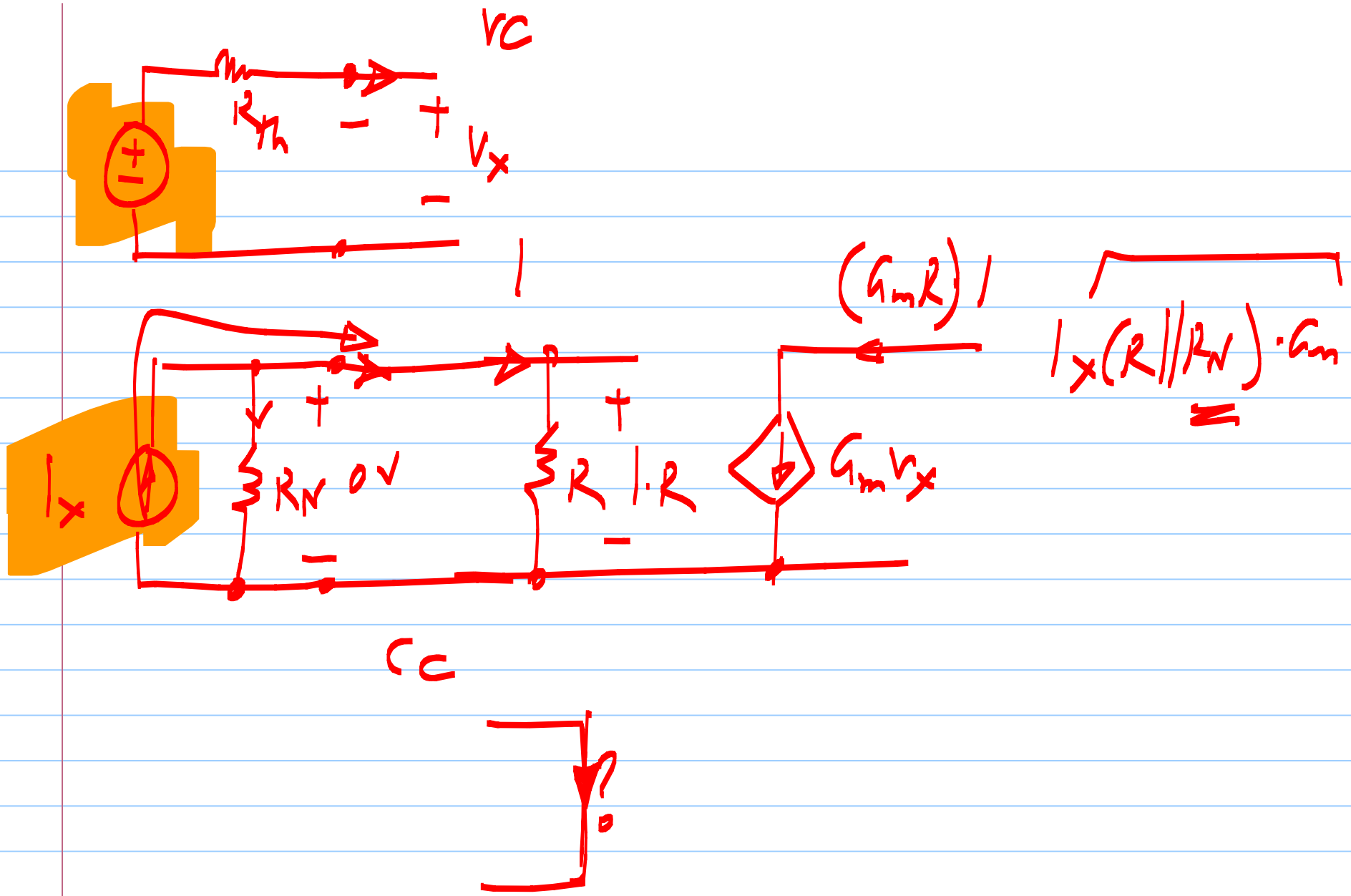


$P_{out} > P_{in}$?


1kHz
(ac)
P_{supply}
Passive
P_{in}
P_{out}
R_L
Battery
(dc)
input
output
$P_{out} > P_{in}$
$P_{out} < P_{in} + P_{supply}$




VCVS:
I_x
R
+
$V_x = I_x R$
-
$G_m V_x$
$G_m R \cdot I_x$
VCVS
+
V_x
-
$G_m V_x$
R_L
$G_m R_L \cdot V_x$
CCCS


VC
R_m
+
V_x
−
1
$(G_mR)\,1$
$1_x(R\|R_N)\cdot G_m$
1_x
V
R_N
0V
R
1·R
G_mV_x
CC
?