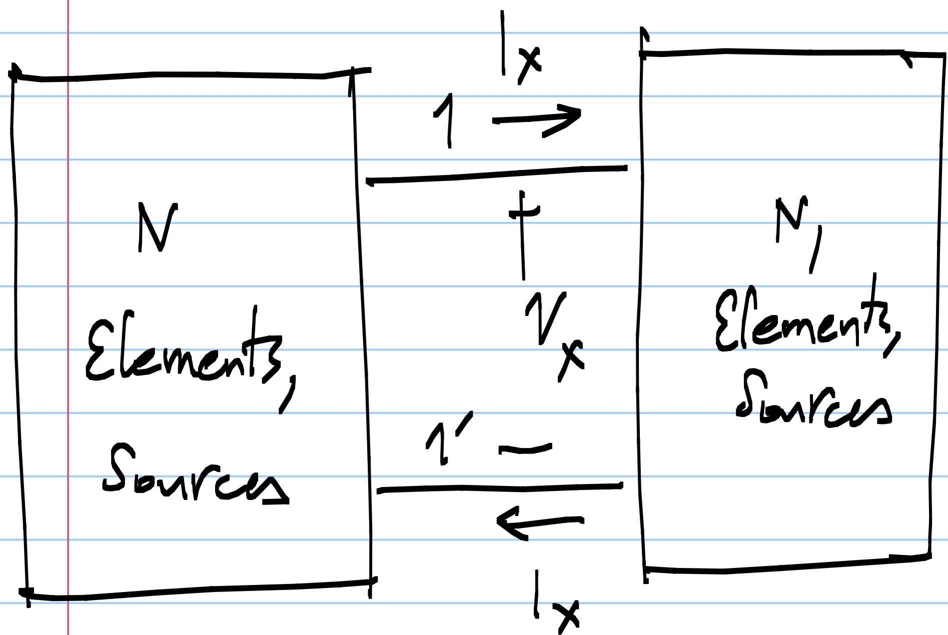
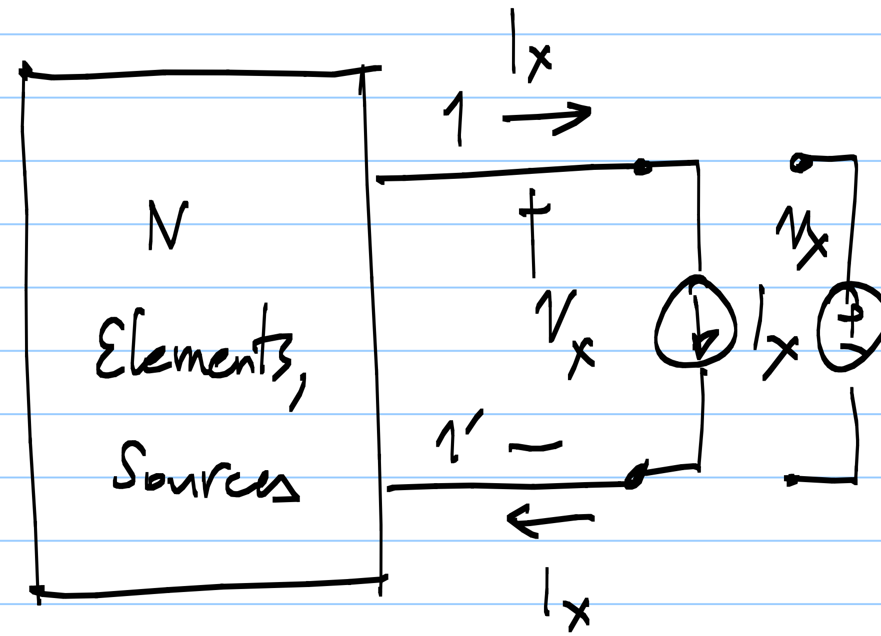
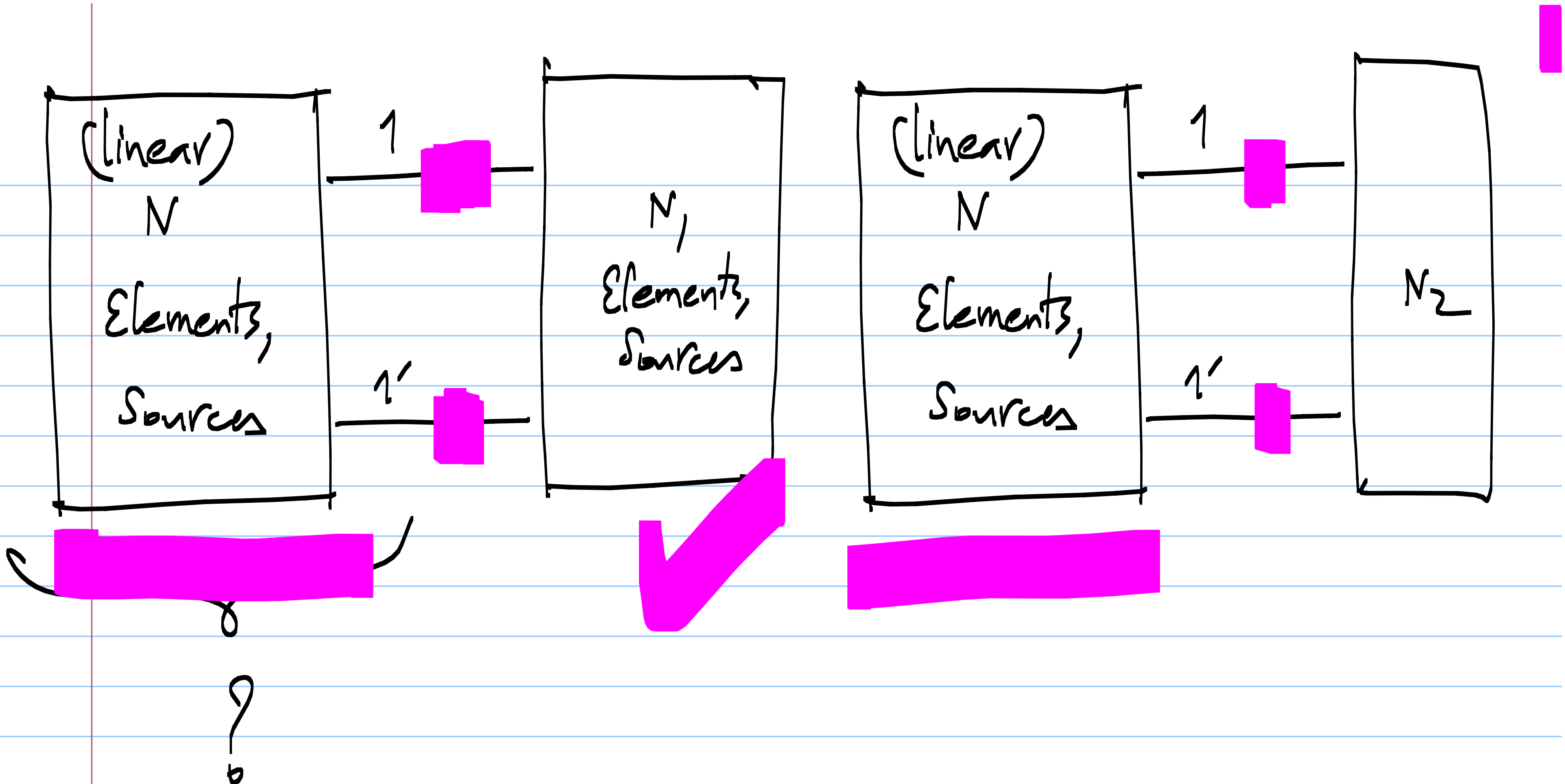
Lecture 10 .

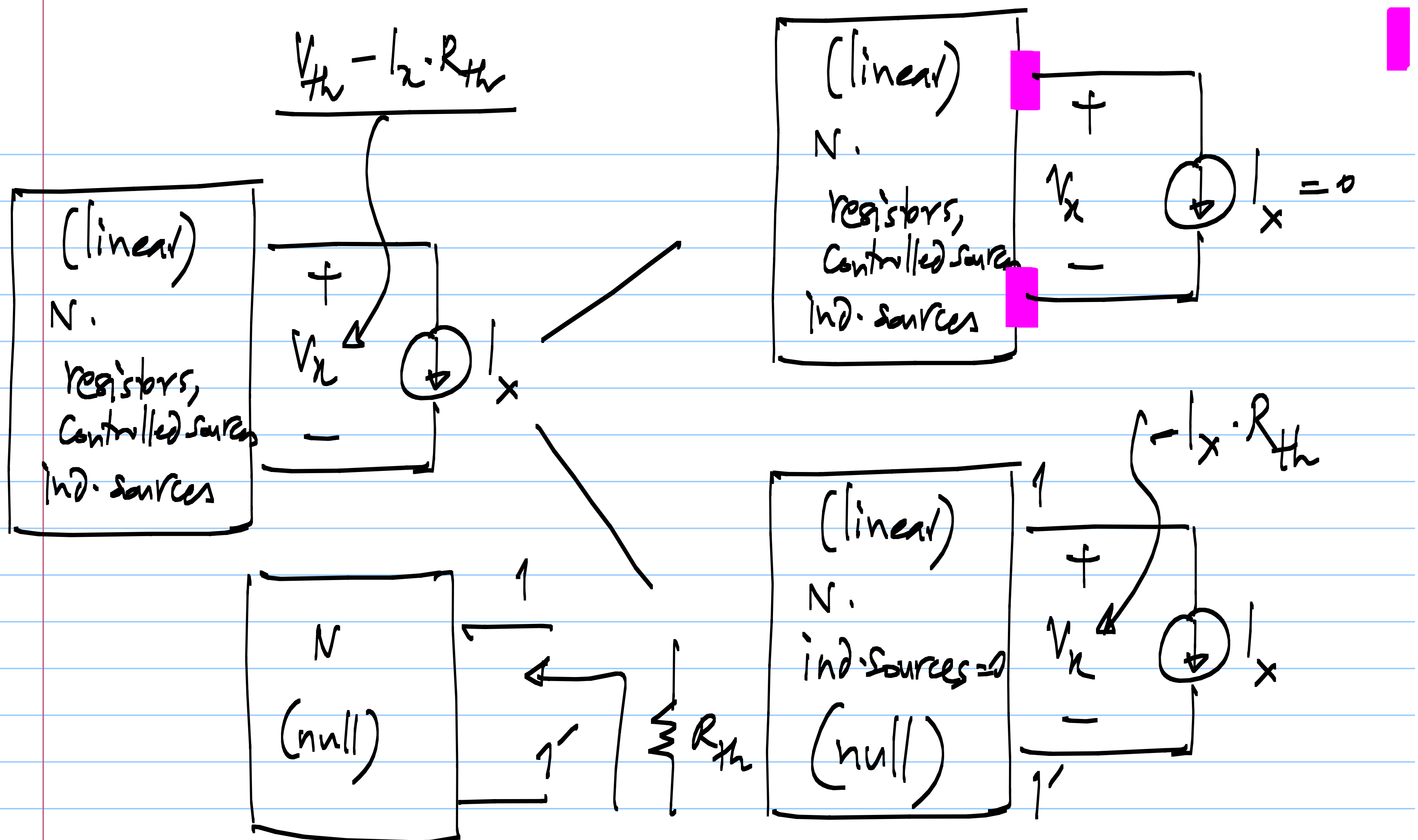


N
Elements,
Sources
1
1'
+
−
V_x
I_x
N_1
Elements,
Sources

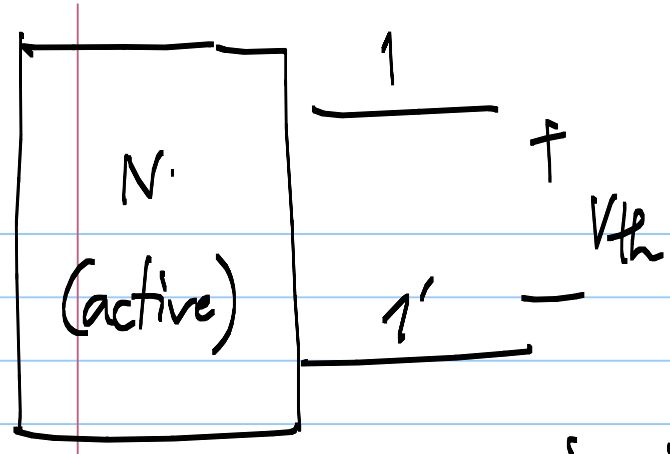


N
Elements,
Sources
1
1'
+
−
V_x
I_x
V_x
I_x


(linear)
N
Elements,
Sources
1
1'
N1
Elements,
Sources
(linear)
N
Elements,
Sources
1
1'
N2
?



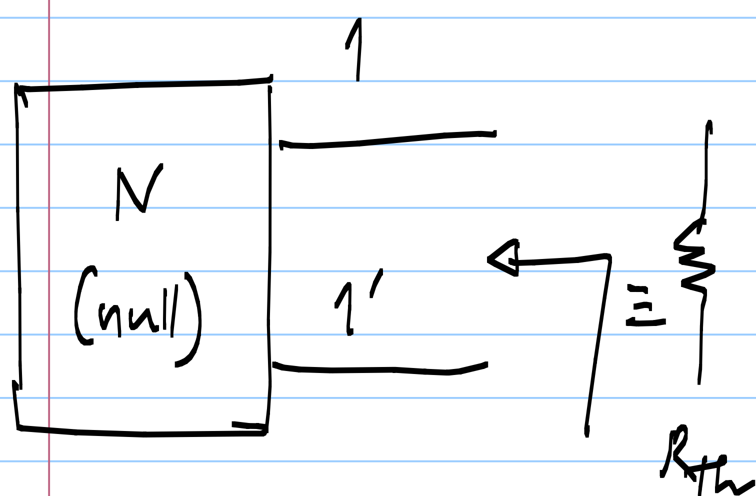
$V_{th} - I_x \cdot R_{th}$
(linear)
N.
resistors,
controlled sources
ind. sources
V_x
+
−
I_x
$I_x = 0$
$-I_x \cdot R_{th}$
ind. sources = 0
(null)
N
1
1'
R_{th}



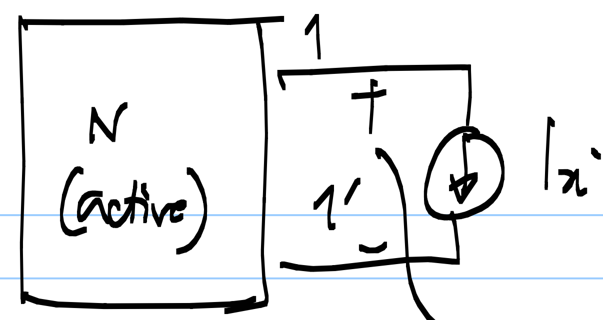
open ckt. voltage

Thevenin voltage

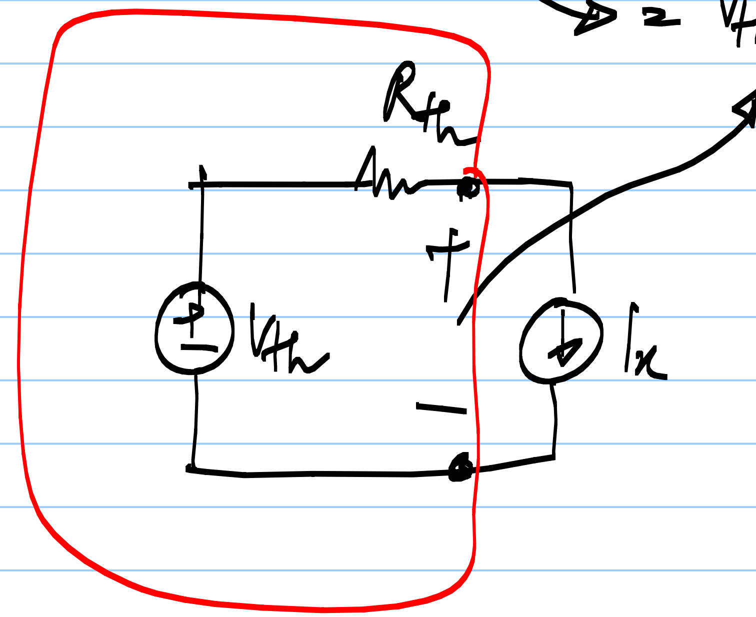
(open circuited)



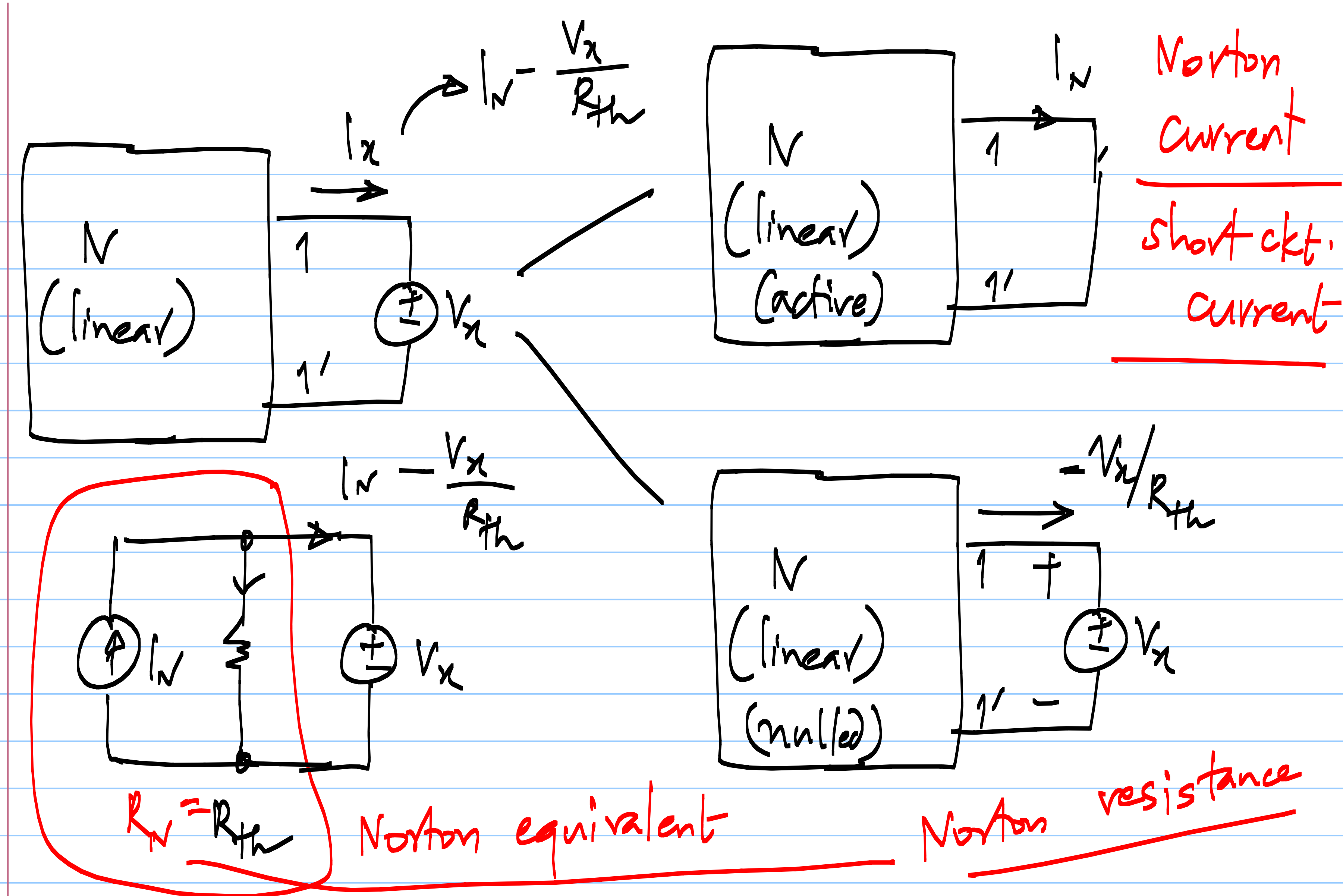
Thevenin resistance



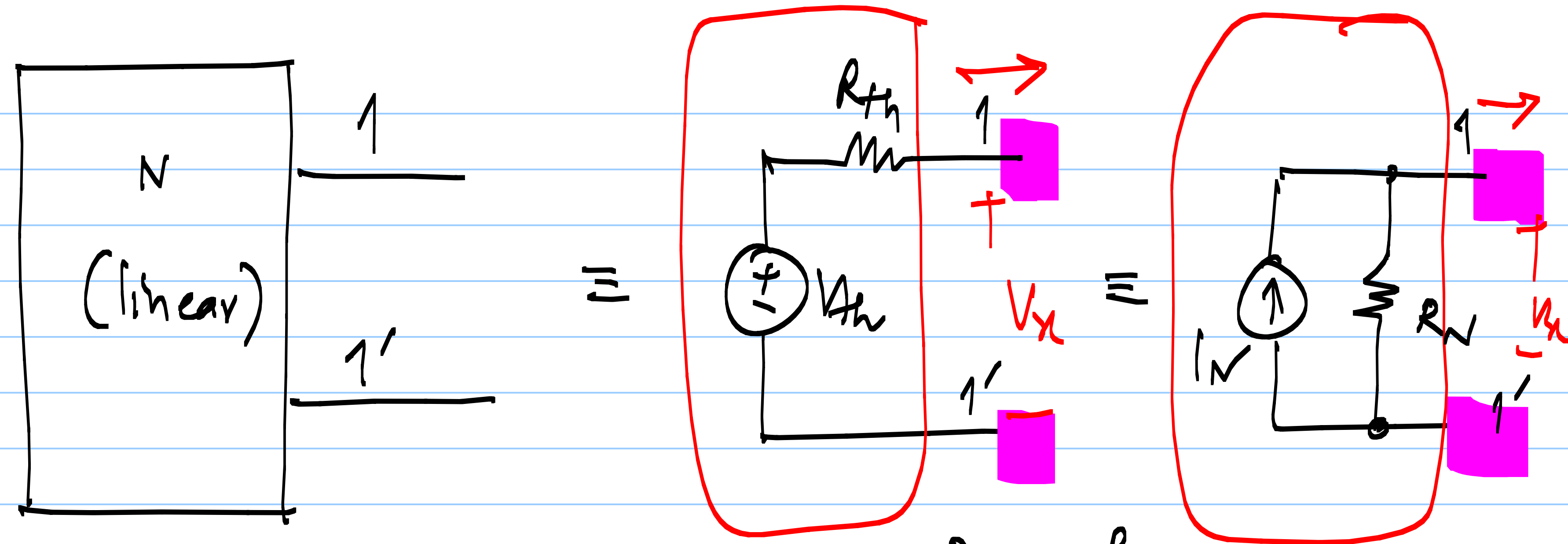
$= V_{th} - I_x \cdot R_{th}$



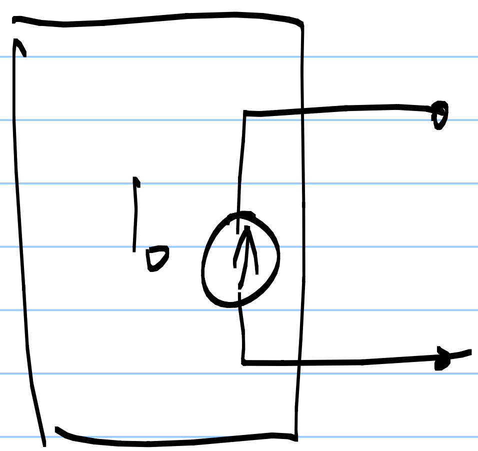
Thevenin equivalent



N
(linear)
1
1'
I_x
V_x
$I_N - \frac{V_x}{R_{th}}$
N
(linear)
(active)
1
1'
I_N
Norton current
short ckt. current
N
(linear)
(nulled)
1
1'
+
−
V_x
$-V_x/R_{th}$
Norton resistance
$I_N - \frac{V_x}{R_{th}}$
I_N
V_x
$R_N = R_{th}$
Norton equivalent

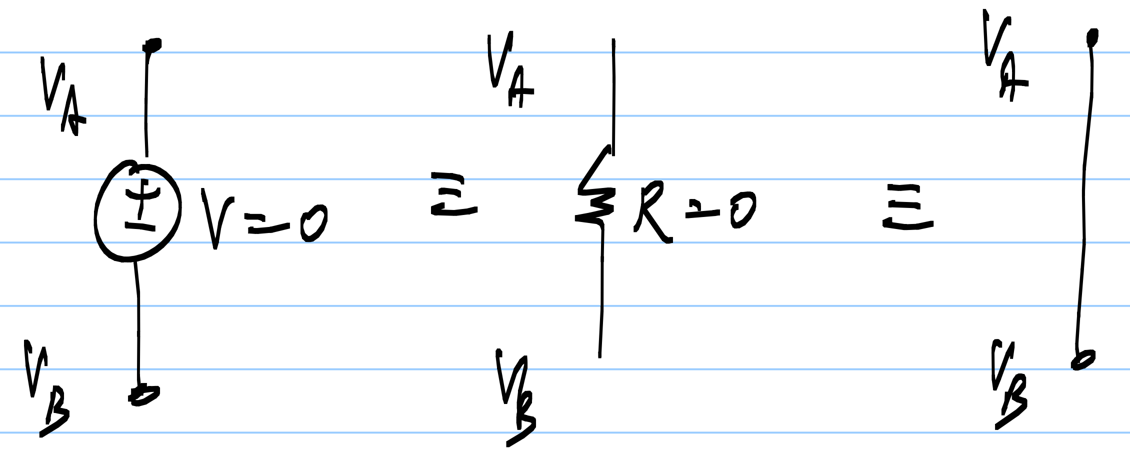


$R_{th} = R_N$

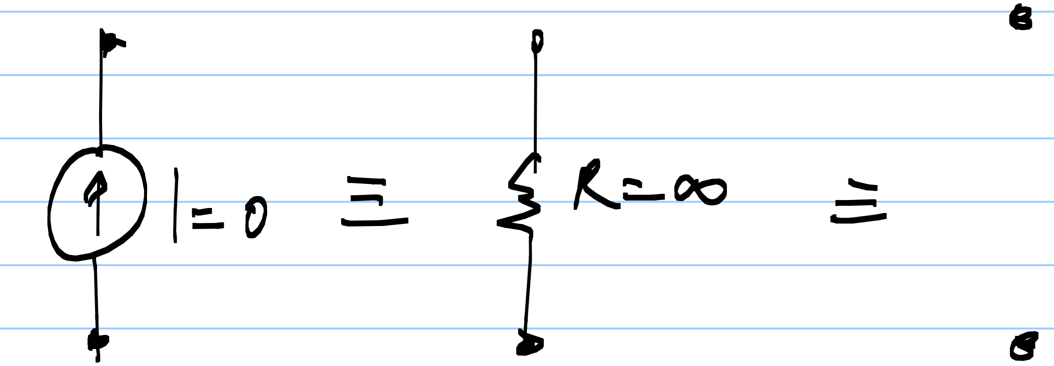


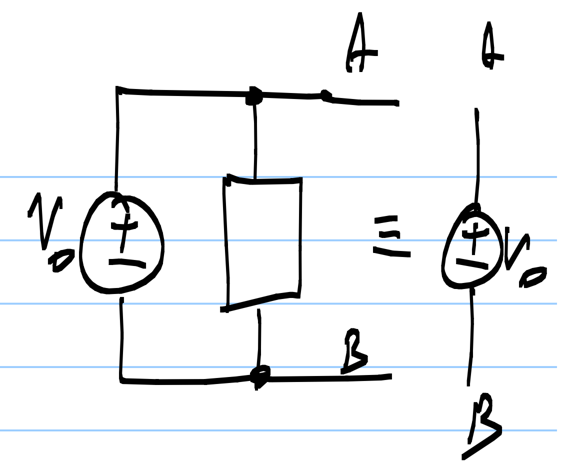
$$V_{th} = I_N \cdot R_{th}$$

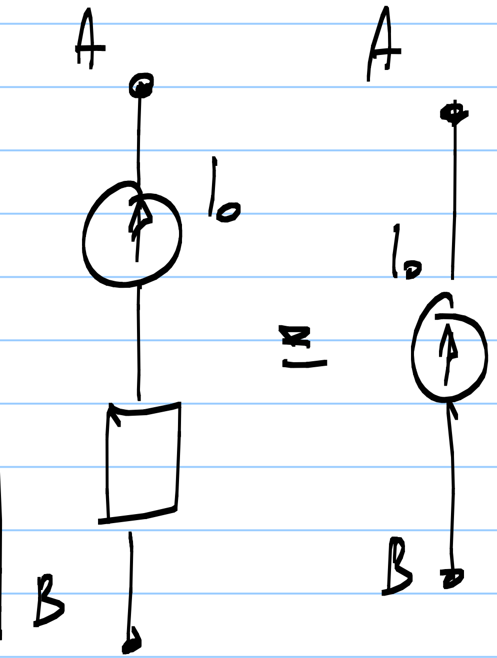
Short circuit:

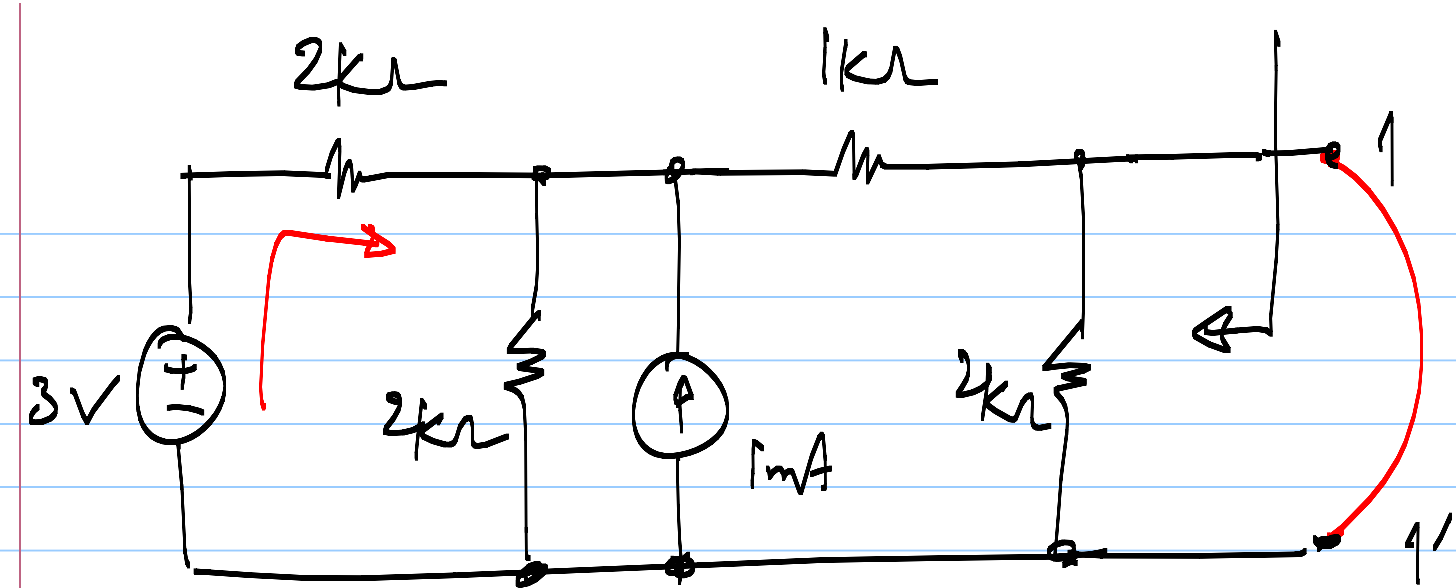


Open circuit:





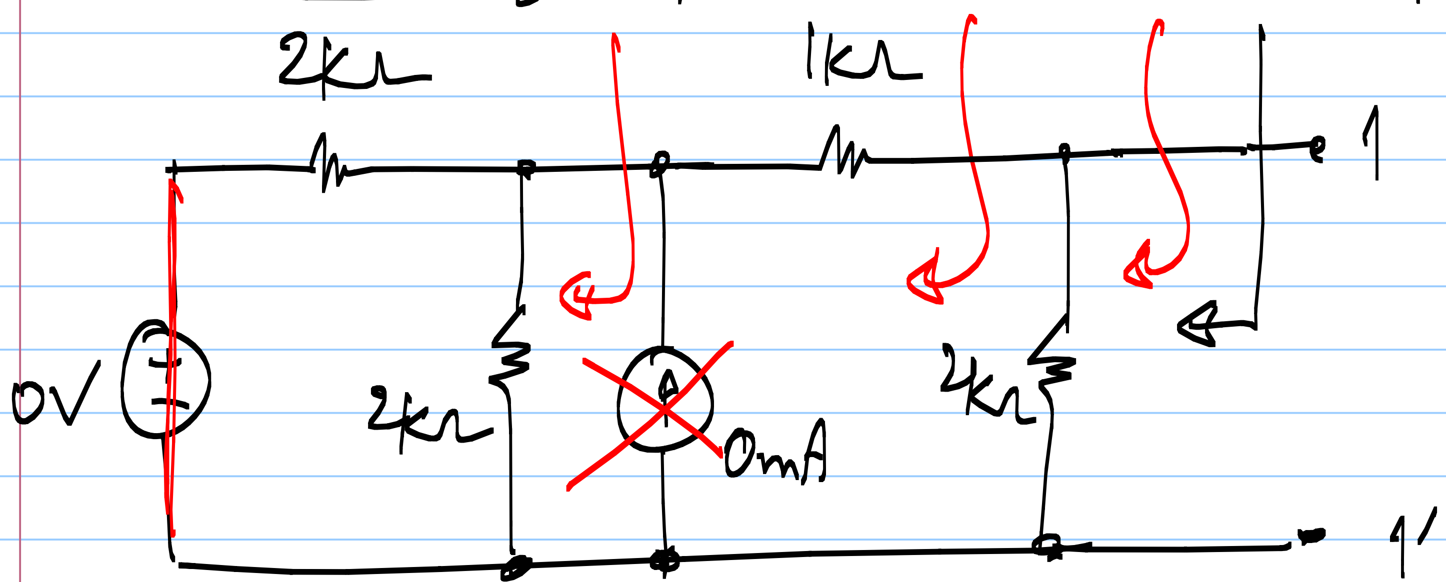




$\frac{8}{3}k\Omega$

$\frac{8V}{8/3\,k\Omega} \times \frac{2}{3}$

$\frac{3}{4}mA \quad \frac{1}{2}mA$



$R_N = R_{Th} = 1k\Omega$