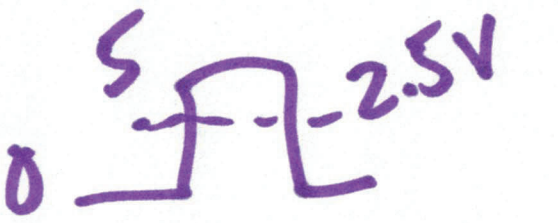
EE 220 Circuits I

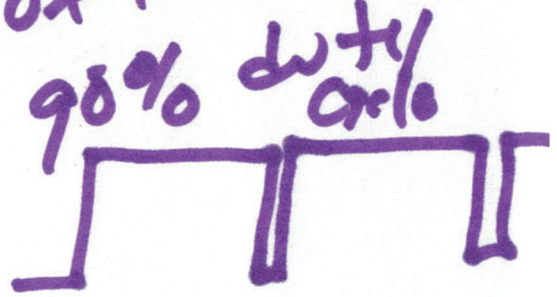
11/9/2022 Lecture. 20

$V_{PP} = 5V$

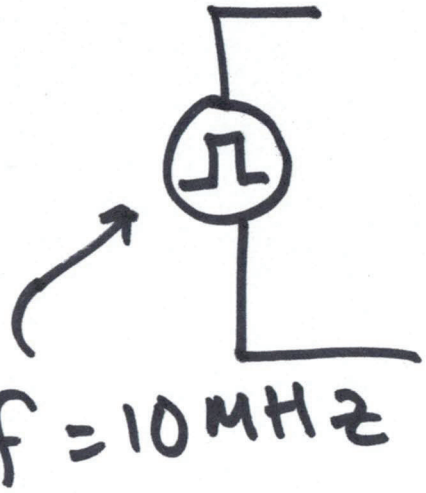


50% high 50% of time

90% duty cycle



duty cycle



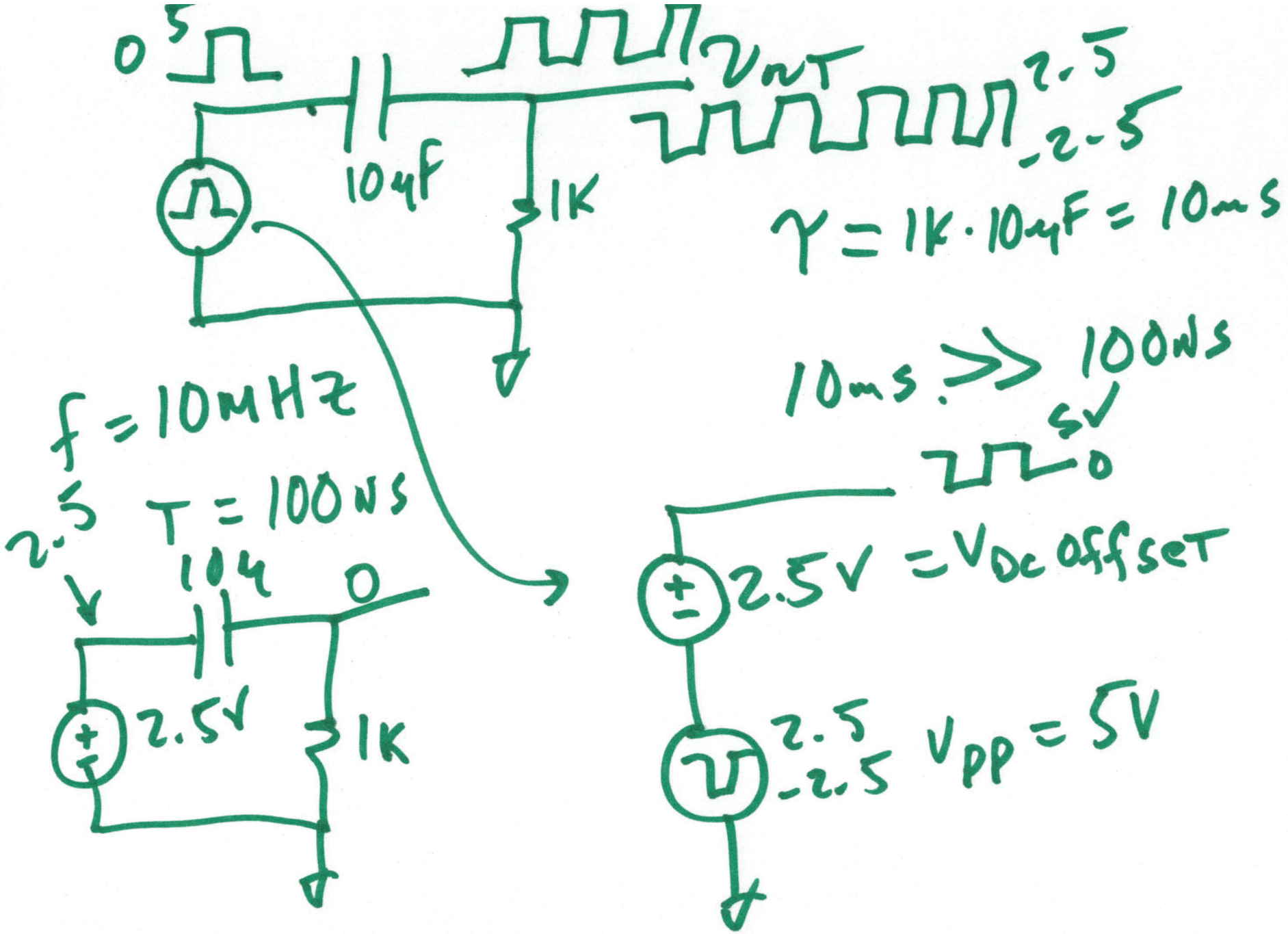
BNC connection

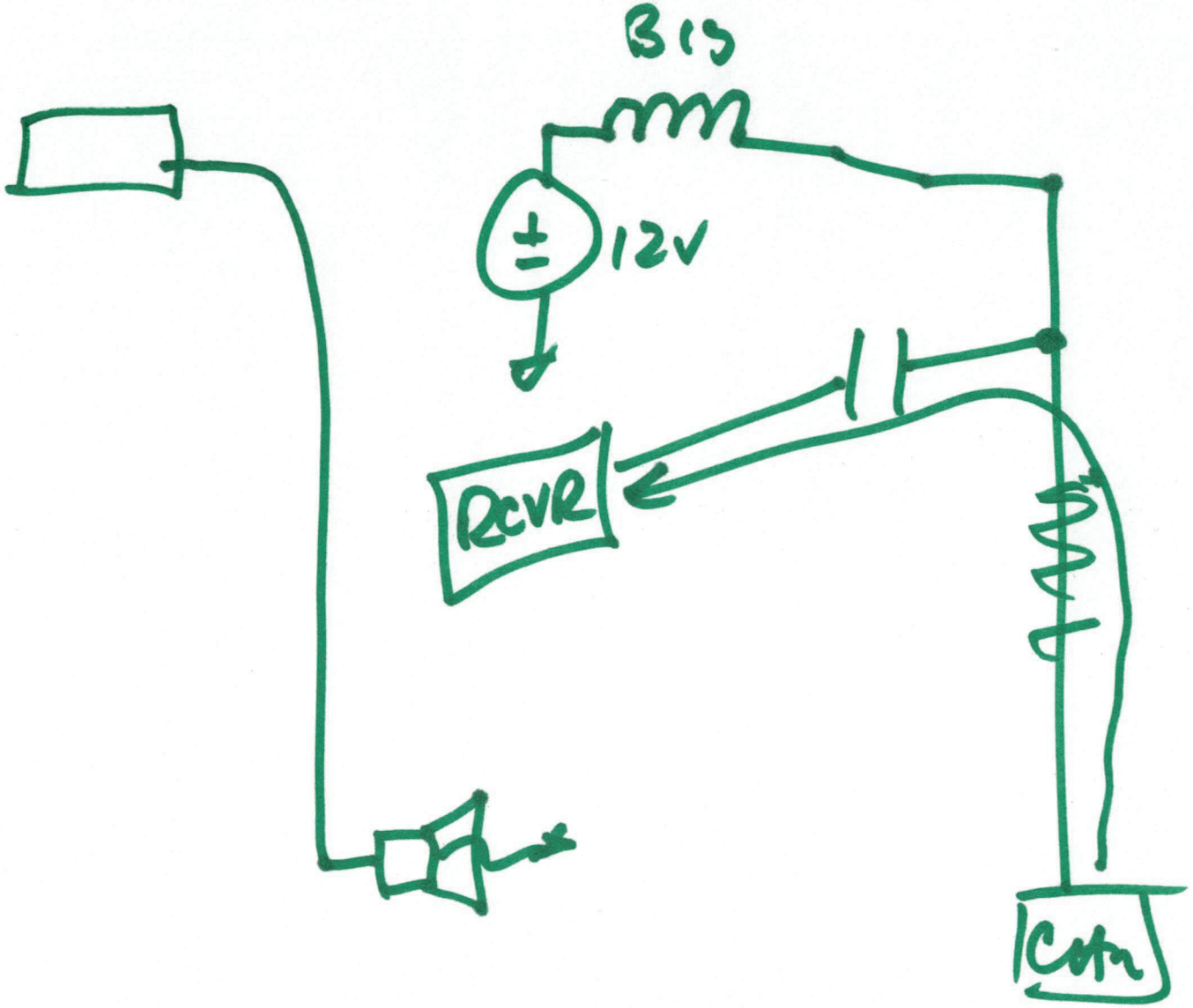
$f = 10MHz$

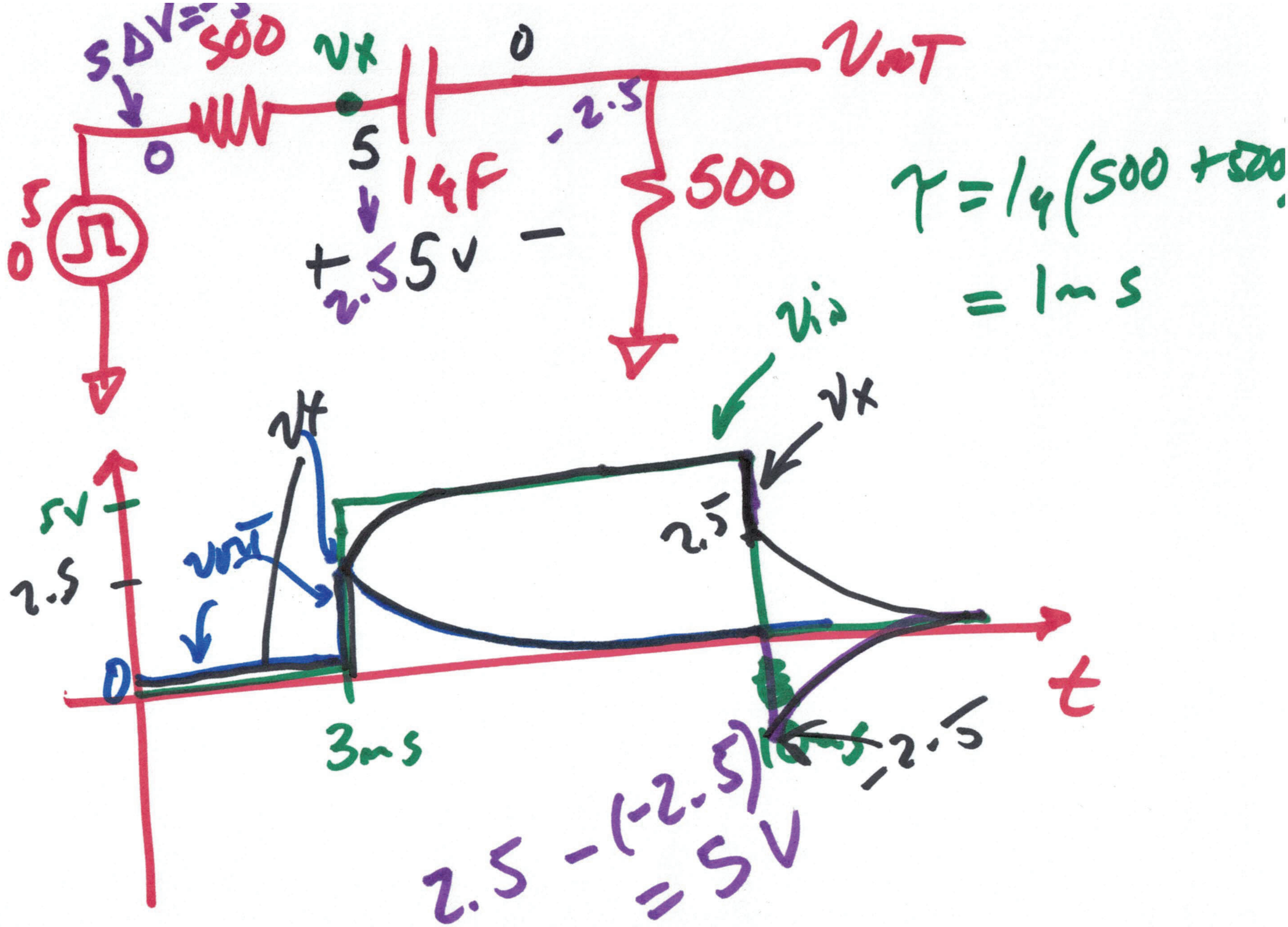
$$f = \frac{1}{T} = 10MHz = 10 \cdot 10^6 = 10^7$$

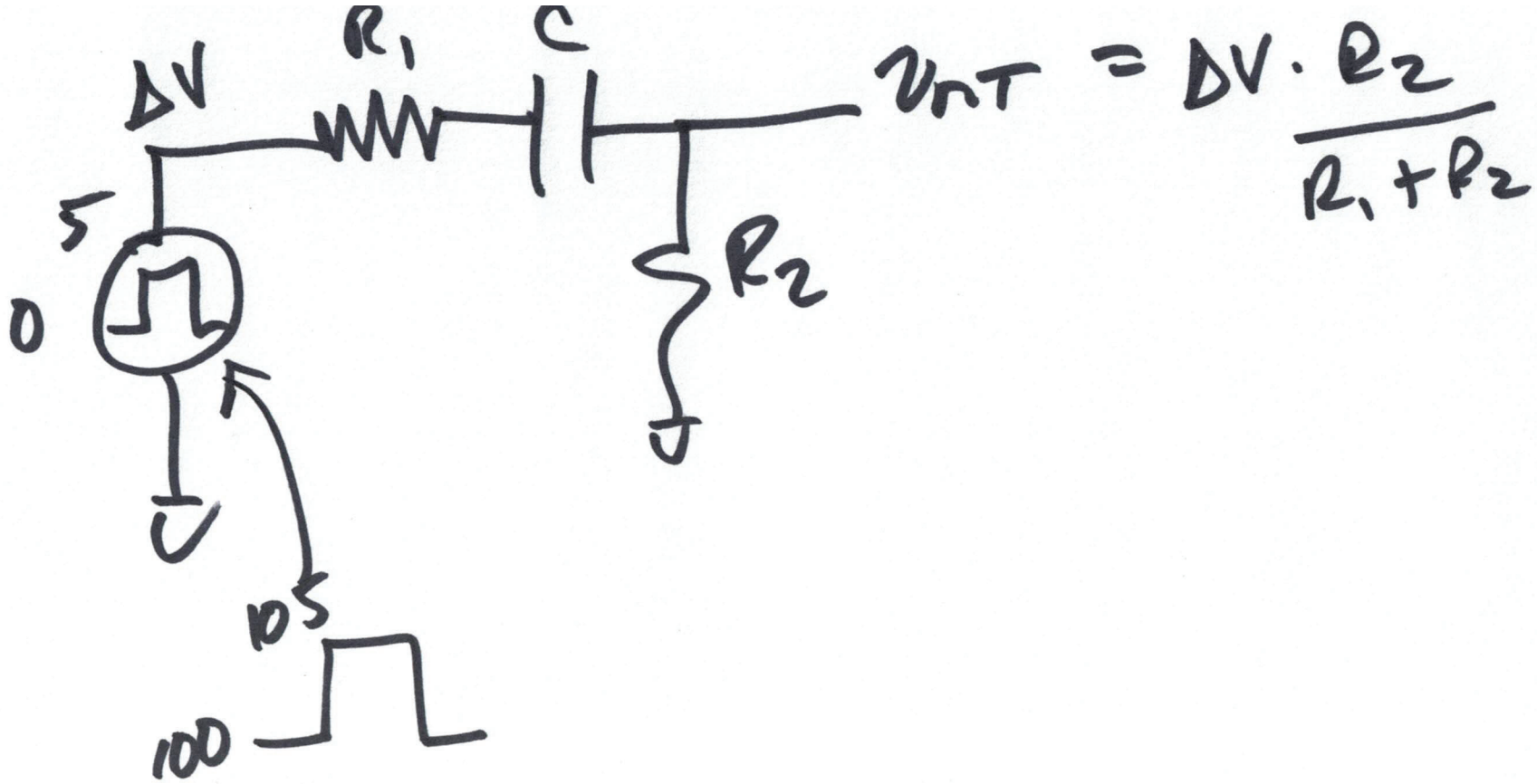
$$T = \frac{1}{10^7} = 0.1 \times 10^{-6} = 100ns$$

$$= 0.1\mu s$$

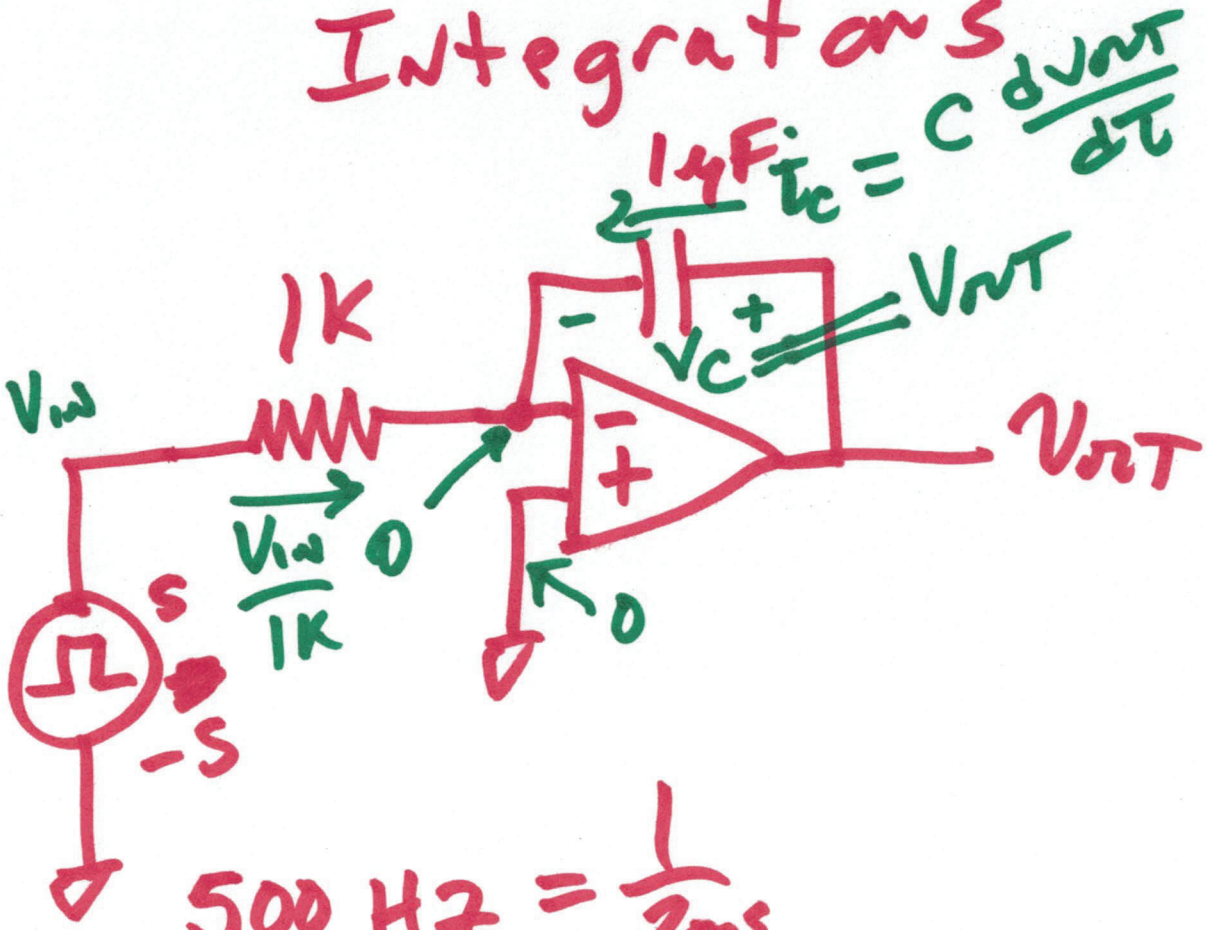

5
0
v_{out}
2.5
-2.5
10μF
1K
τ = 1K · 10μF = 10ms
f = 10MHz
T = 100NS
10ms >> 100NS
5
0
2.5
10μ
0
2.5V
1K
2.5V = V_{DC} offset
2.5
-2.5
V_{PP} = 5V


Bias
±
12V
RcvR
Com


5 ΔV=5
500
vx
0
v_{OUT}
-2.5
5
1μF
500
+ 2.5 5V −
0
$\tau = 1\mu(500+500)$
$= 1ms$
v_{in}
vx
vx
5V
2.5
vout
0
2.5
3ms
t
-2.5
$2.5-(-2.5) = 5V$


ΔV
R1
C
R2
5
0
10S
100
$V_{OUT} = \Delta V \cdot \frac{R_2}{R_1 + R_2}$

Integrators



500 Hz = $\frac{1}{2ms}$

T = 2ms

$$\frac{V_{in}}{R} + C\frac{dV_{out}}{dt} = 0$$

$$\frac{dV_{out}}{dt} = -\frac{1}{RC} V_{in}$$

$$dV_{out} = -\frac{1}{RC} V_{in} \cdot dt$$

$$V_{out} = -\frac{1}{RC}\int_{t_1}^{t_2} V_{in} \cdot dT$$

$$V_{out} = -\frac{1}{1ms}\int_{0}^{1ms} \frac{-5}{5} \cdot dT = \frac{-5t}{1ms}\Big|_{0}^{1ms}$$