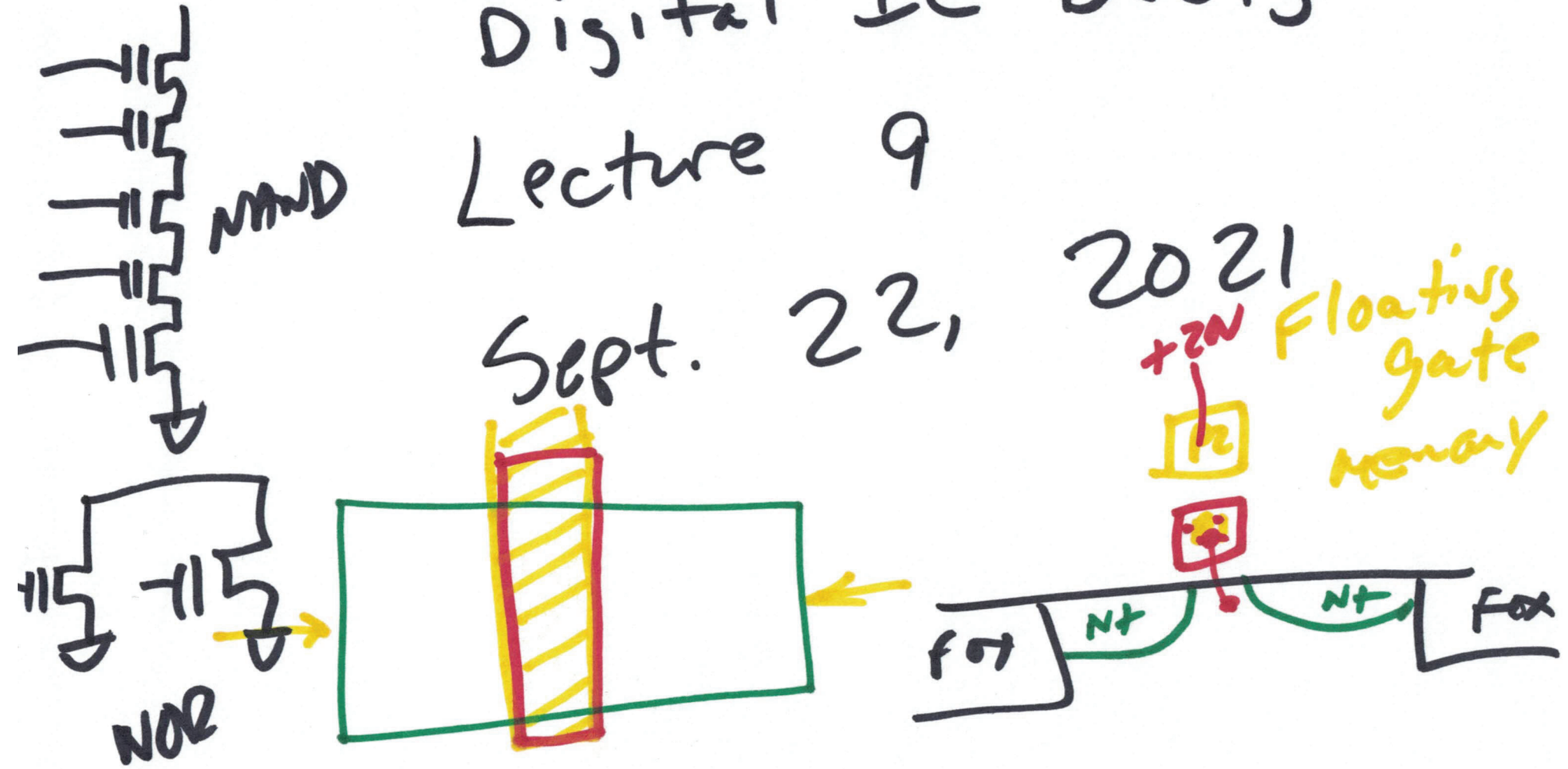


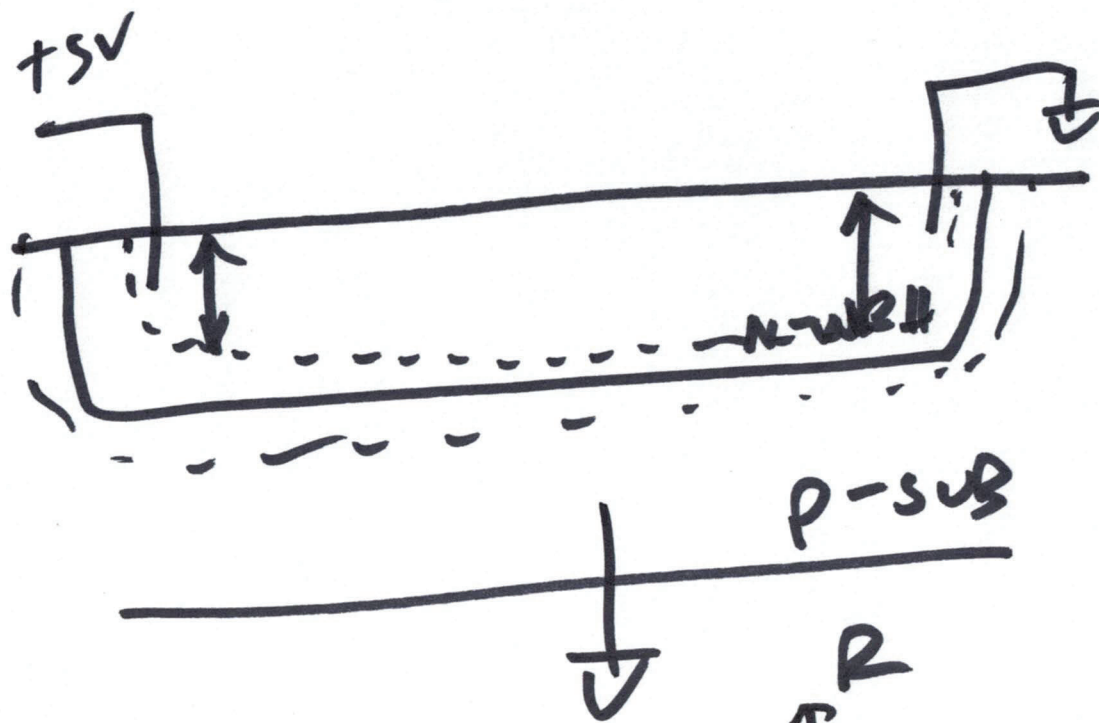
EE 421 / ELG 621 Digital IC Design

Lecture 9

Sept. 22,

2021
Floating
gate
memory





N-well Resistors
have a bad
voltage
coefficient

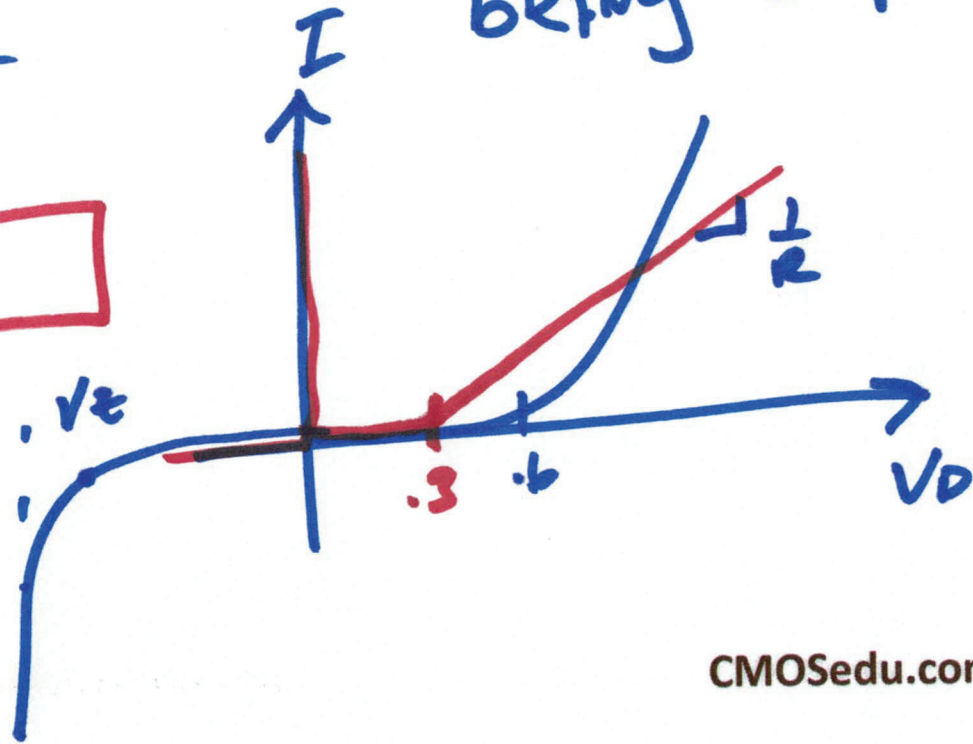


2)

↓ ↓ ↓ ↓ ↓ N+ ↓ ↓ ↓ ↓

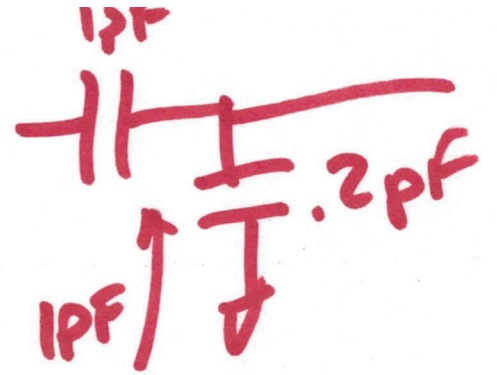


doping in-situ → doped while being deposited

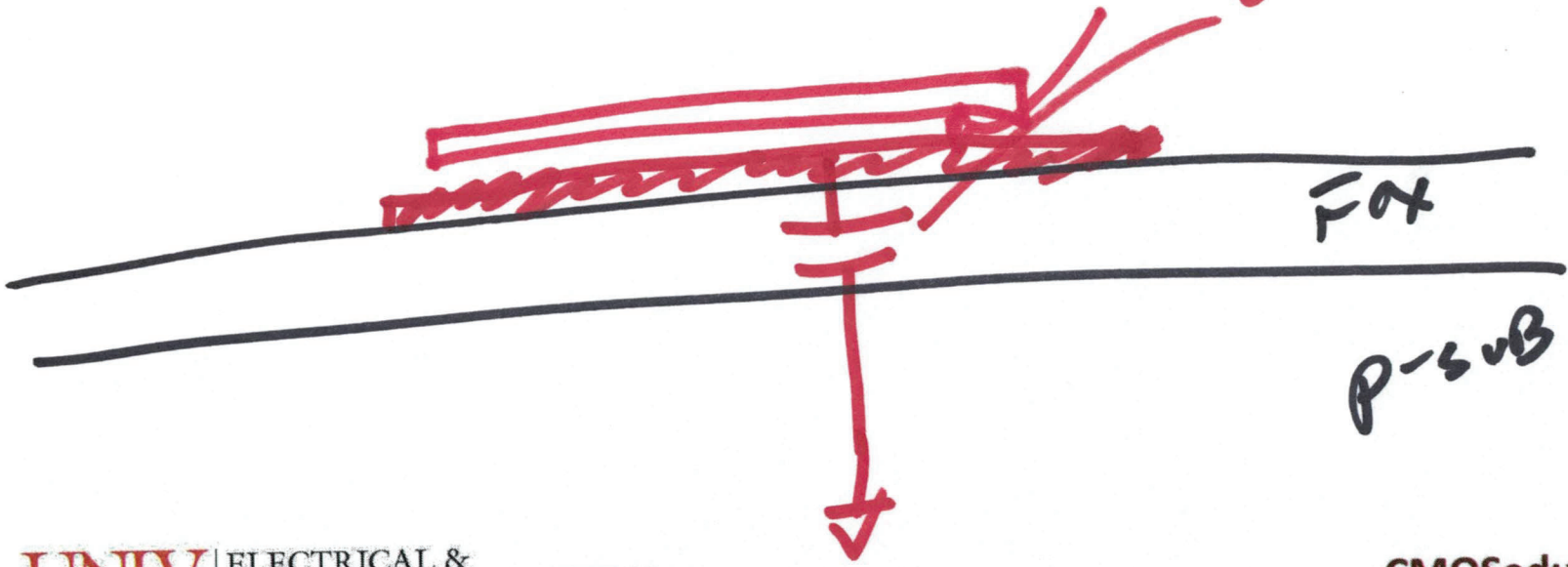


3)

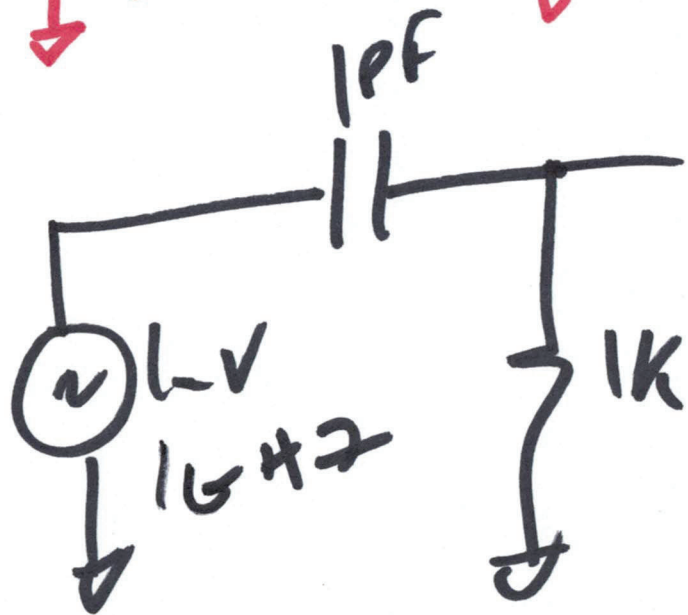
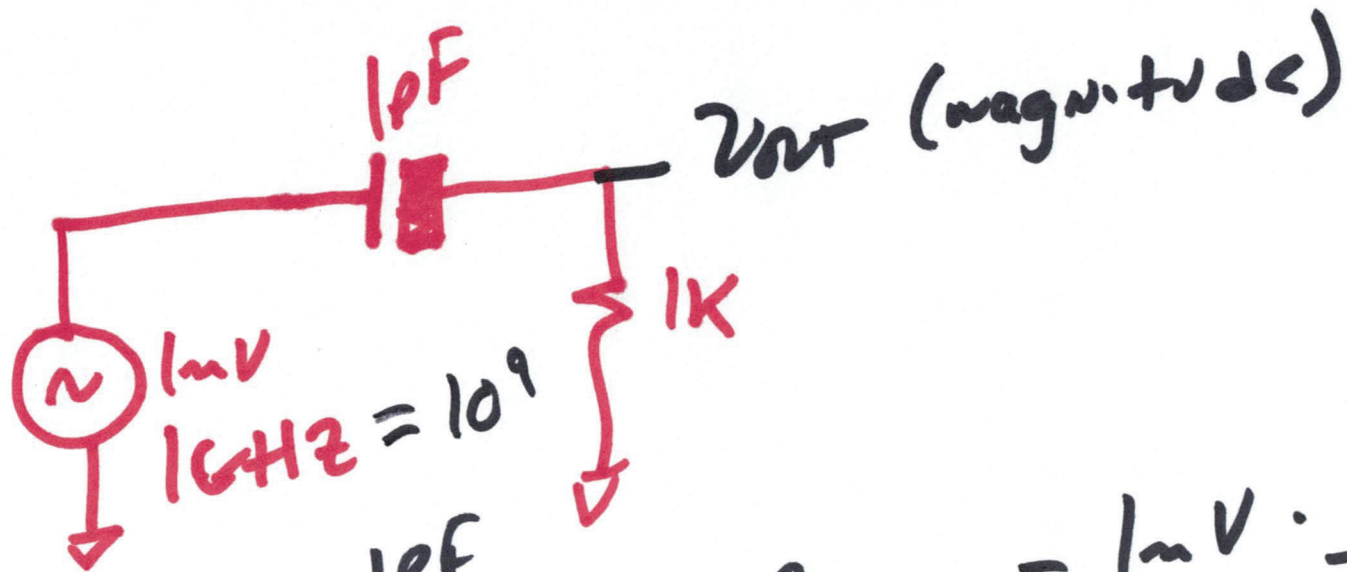
$$0.9 \text{ fF}/4\mu\text{m}^2 = \frac{\epsilon_{ox} \cdot t_{ox}}{tox} = \text{poly}$$



14μm
140Å
20%
Bottom plate



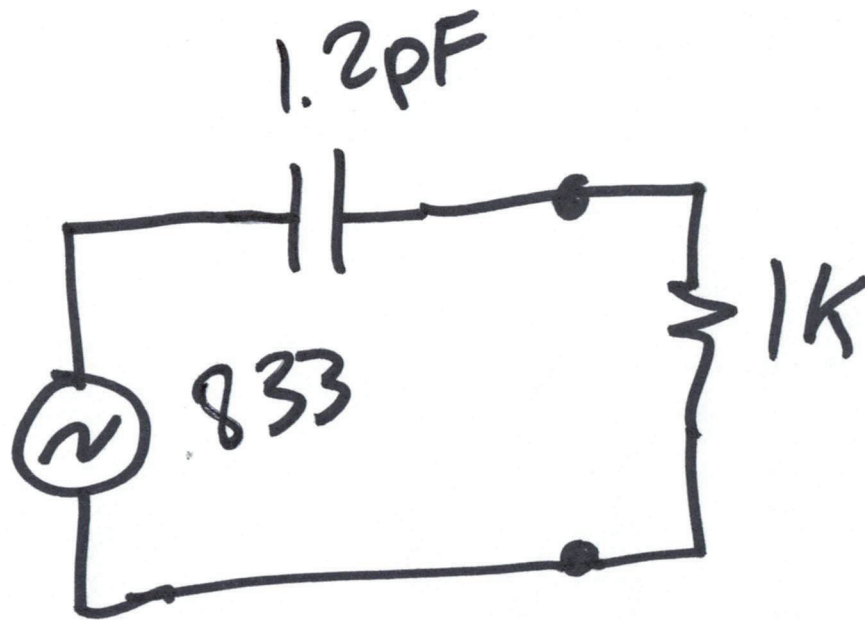
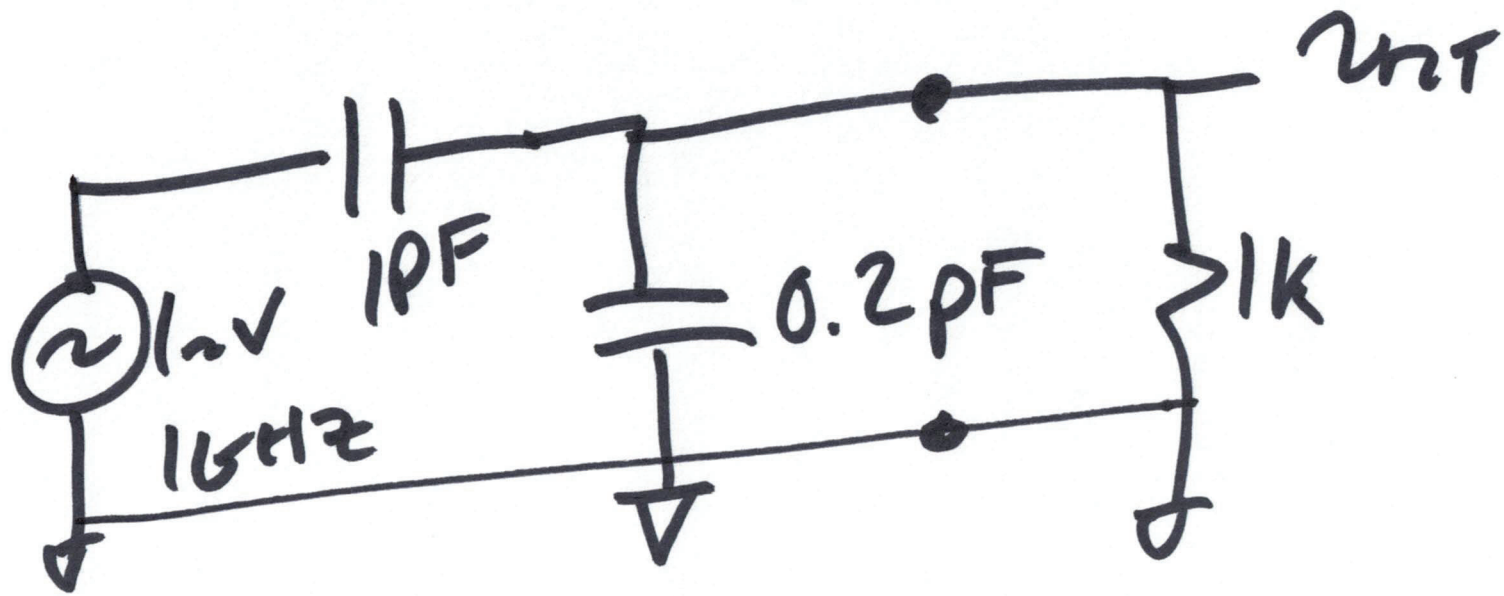
4)



$$V_{out} = 1mV \cdot \frac{1k}{1k + \frac{1}{j \cdot 2\pi \cdot 10^9 \cdot 10^{-12}}}$$

$$= \frac{j \cdot 2\pi \cdot 10^{-3}}{1 + j \cdot 2\pi \cdot 10^{-3}}$$

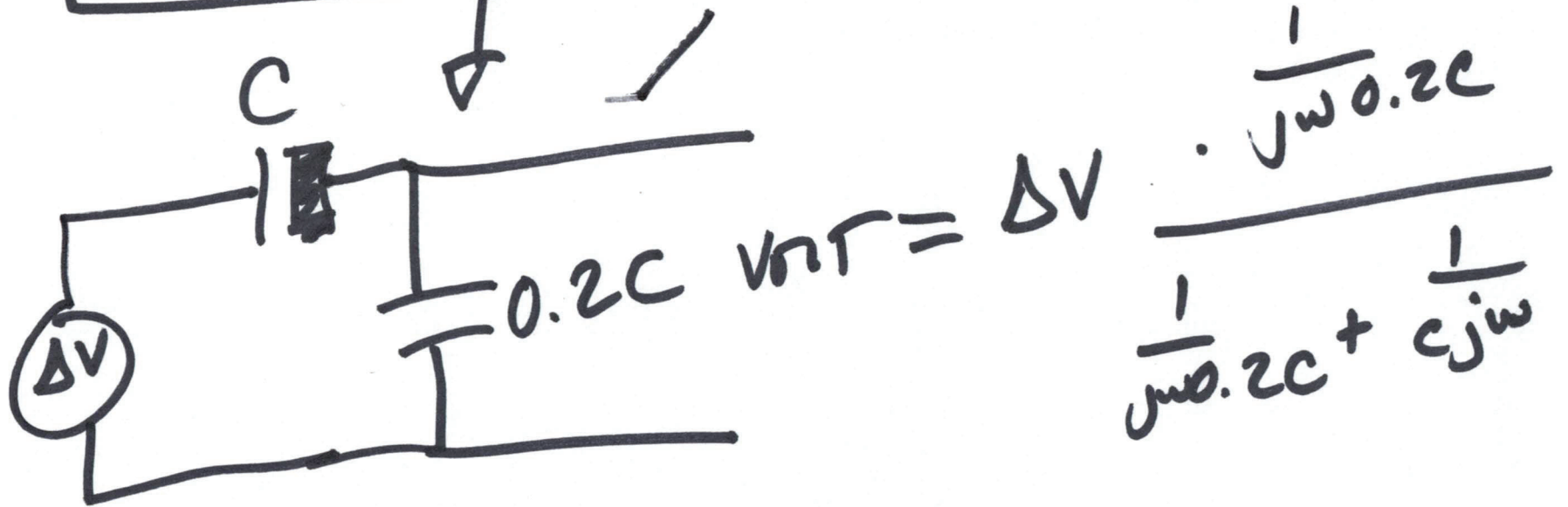
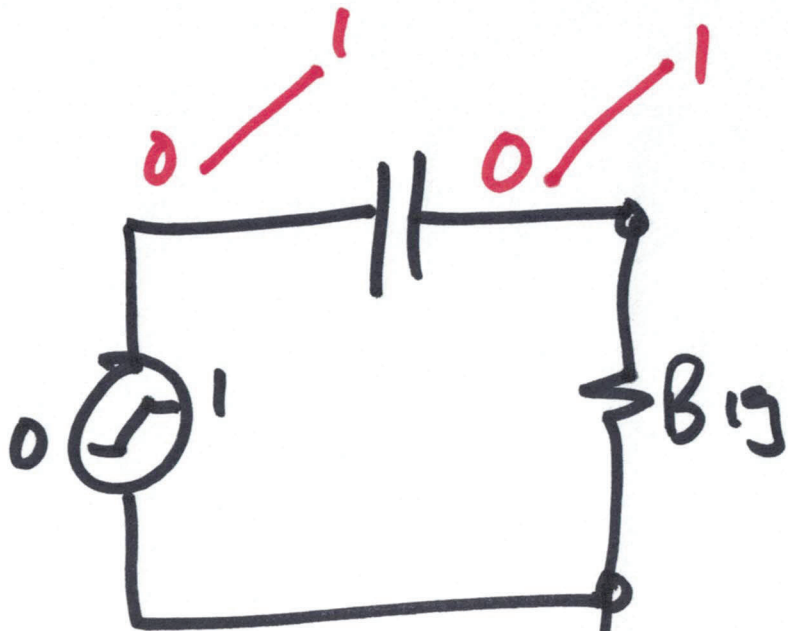
$$V_{out} = \frac{2\pi \cdot 10^{-3}}{\sqrt{1 + (2\pi)^2}} = \frac{2\pi \cdot 10^{-3}}{6.36} = 987\mu V$$



$$v_{\text{TH}} = 1 \mu\text{V} \cdot \frac{\frac{1}{j\omega 0.2}}{\frac{1}{j\omega 0.2} + \frac{1}{j\omega 1}}$$

$$1 \mu\text{V} \cdot \frac{1}{1 + \frac{0.2}{1}}$$

$$\frac{1 \mu\text{V}}{1.2}$$



77

