# Announcement / Conclude last lecture / Final Exam Review

**Announcements** → MAKE SURE ALL UR ONLINE GRADES ARE CORRECT BY 05/06/05 (THIS FRIDAY), 5:00 pm → NO GRADE CORRECTIONS AFTER THIS

- ↳ H.W issues: put on forums
- ↳ Midterm issues: Bring it to my OH on Thursday.
- ↳ FINISH PROJECT / TURN IN REPORT BY 5:00 pm, 05/06/05 (THIS FRIDAY)
  1 REPORT / GROUP, TURN IN H.W BOX
- ↳ H.W 11 scores in by tomorrow, labs grades are coming in.

**To conclude last lecture:**

↳ What classes can you take after this?

- EE
  - EE105: Transistors etc
  - EE140: Circuit design
  - One caveat: Semiconductor physics, however just go thru few lectures in EE40
- non EE:
  - IF U WANNA GO TO GRAD. SCHOOL

# FINAL EXAM REVIEW

Note:

(1) Final is on Friday the 13th (☹): 12:30 - 3:30 pm in 2050 VLSB

(Note: NO MAKEUP FINAL!)

GRAD. SCHOOL

1) Math 104: Analysis
   Math 110: Linear Algebra

2) Take grad. classes in your major!
   e.g. EE221 → DEATH SENTENCE!

3) GET A RESEARCH PAPER PUBLISHED

(2) Final will have 4 questions, 25 points each:

Mostly 1: Circuit analysis (i.e., node voltage method)

Mostly 2: RC, RL Circuits

Mostly 3/4: op-amps, nonlinear diodes

Mostly 4: zener diodes, non linear, graphical method

Cheatsheet:

(a) Can be 3 pages, 8.5" x 11", both sides, any font, any size.

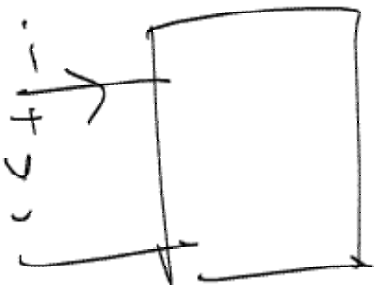
(b) Try to make it "nice numbers", but you may bring a calculator, you won't need it!

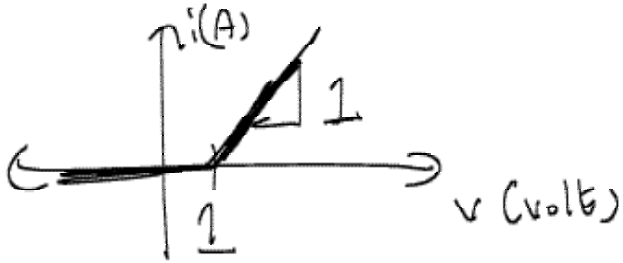
(c) Review problems will be up by tomorrow

O,A session in lecture Monday
Justin's review session next Tuesday.

Sample: I classify this as a very difficult problem:

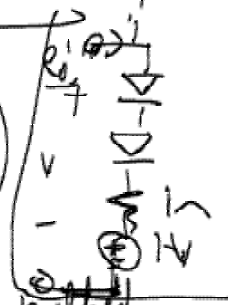
(1)



(a): Design a realistic circuit in the black box that has the i-v characteristics shown. (no negative resistors, i.e., no -1Ω; circuit is realistic)

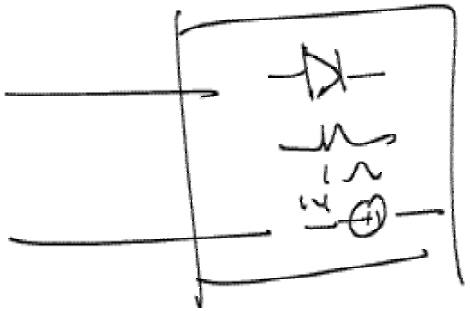
(b) (very, very, difficult): Is this the only circuit which has this i-v characteristic? Justify your answer. ⇒ No!

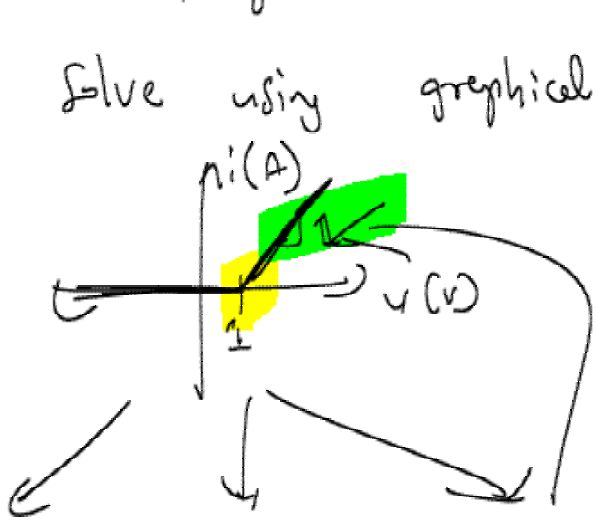


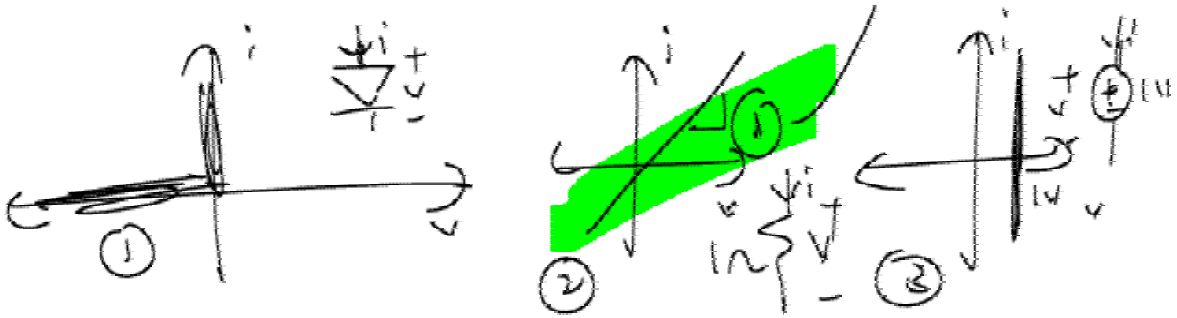

Notice circuit is nonlinear (i-v graph is not one straight line)

⇒ diode is present!

Solve using graphical method.

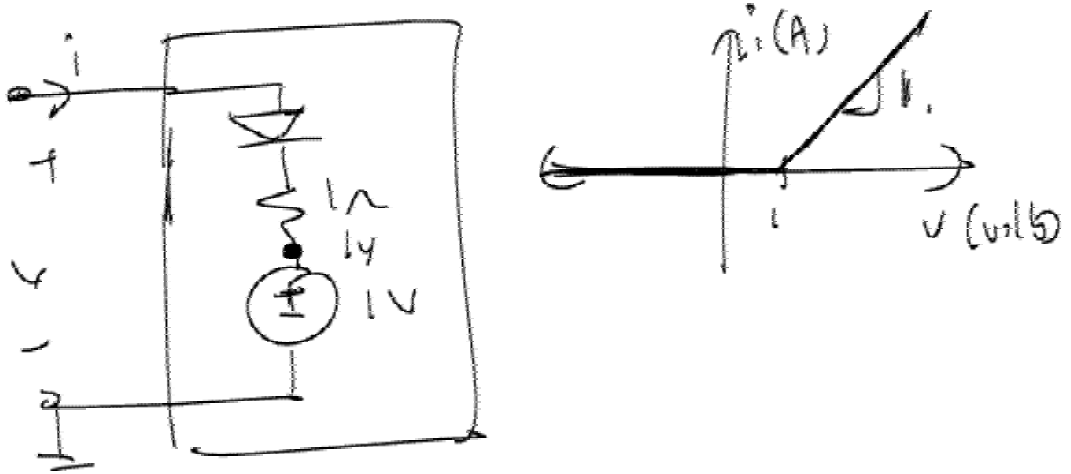


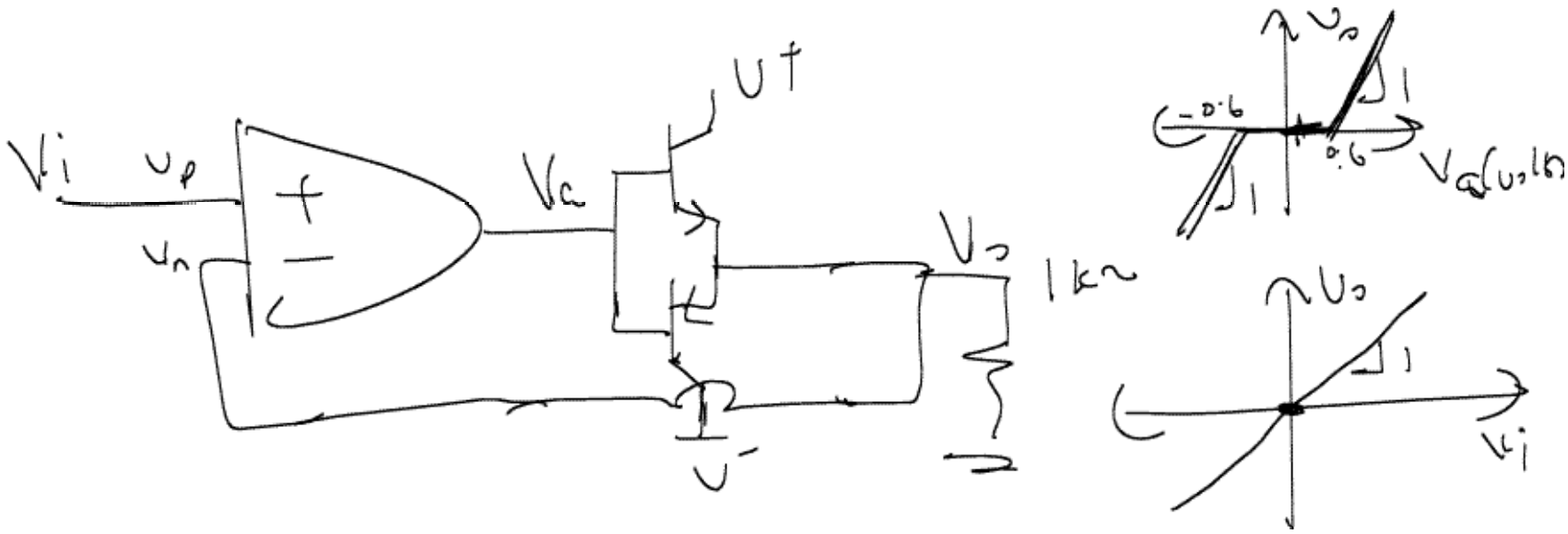



Notice you combine them in series

"because to get the given i-v, you graphically added ①, ②, ③ with equal current."

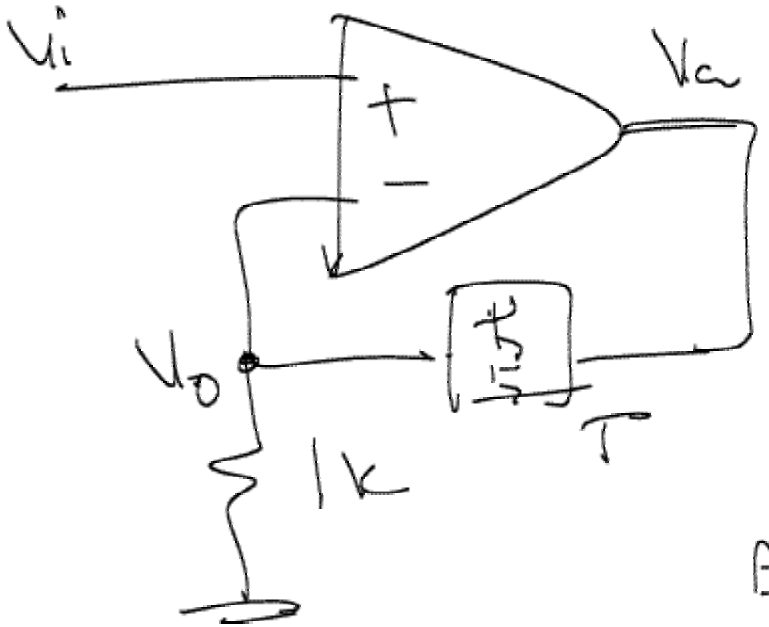


NOTE: DON'T MAKE THE PROBLEM MORE DIFFICULT THAN IT IS! I.E... DON'T THINK TOO MUCH... eg: HW 11, pg 1 HW problem:



Why is $V_i = V_o$? How do you know $V_p \approx V_n$??

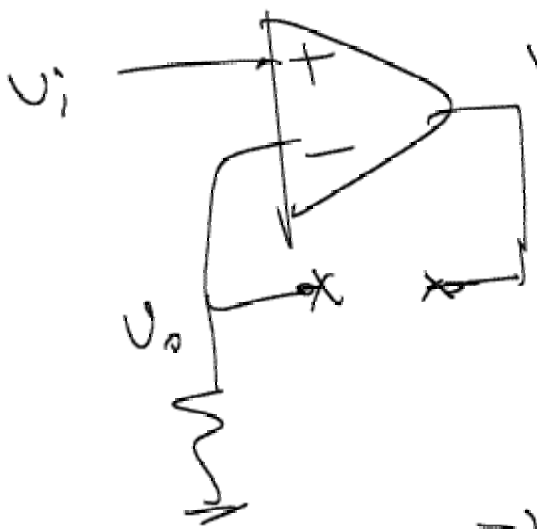
Turns out, problem is very difficult if op-amp is non-ideal:




(Q:) What happens if $V_a \in [-0.6, 0.6]$?

In other words, can you come up with a simple circuit model for T?

A: open-circuit




$v_a$ ⟵ in reality, this what happens if $v_i$ is very small, transistors act open circuited

$\Rightarrow$ $v_a = A(v_i - v_o)$

$\Downarrow$

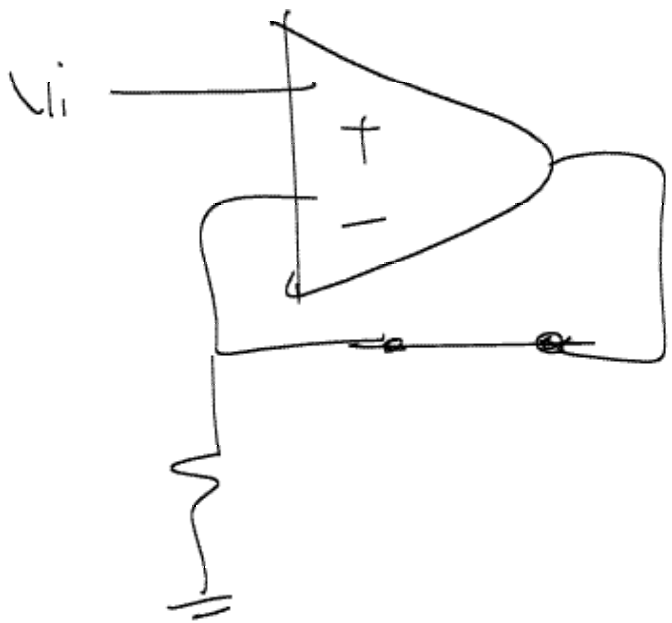
Huge! ($10^6$)

Now $v_o = 0$ V

$\therefore$ $v_a = 10^6 v_i$ if $v_i \approx 0.1\mu$V, $v_a = .1$ V

$\Rightarrow$ SHOT OUT OF NONLINEARITY.

If $V_d > 0.6$ 2 $V_d < -0.6 \Rightarrow V_d = V_o$




} Linear voltage follower

toy

Moto: Don't think too hard ⇒ simple circuits first!

K.I.S.S ⇒ keep It Simple Stupid.