Lecture 1: Admin & Overview

- Announcements:
  - EE 140/240A: Analog Integrated Circuits
  - Instructor: Prof. Clark T.-C. Nguyen
  - Go through
    - Course information sheet
    - Syllabus
    - Grading Information and Policy
  - Hand out class account sheets
  - For the course website, just google ee140
    - The website should be up and running in a couple of days
  - EE 140 screencast previously
    - If you miss a lecture …
    - Can view previous year lectures at either
      - http://itunes.berkeley.edu/
      - http://www.youtube.com/ucberkeley
  - But that there’ll be some differences this semester
    - This course now “contains” EE 240A
    - EE 240A same as 140, but with additional material for graduate students, mainly MEng
    - Additional homework problems
    - Additional project specs, or different project altogether
  - This course also supports the new MAS-IC program
    - MAS-IC: a new “remote” degree
    - Pro: more professional recording
    - Con: need to put up with “hollywood-like” logistics

- Office Hour Changes?: Nguyen Wed → 1-2 p.m.
- Discussion sections start next week

- Last Time:
  - Review of bipolar transistors by your TA
  - I’m here today, of course
  - But I will be traveling again next Tuesday, so another of your TA’s will lecture on MOS transistor design

- Lecture Topics:
  - Review
    - Ideal Op Amps
    - Non-Ideal Op Amps
    - Op Amp Examples

Review of OpAmp

Ideal Op Amp:
Properties of Op Amps:
1. $A \to \infty \Rightarrow N_+ = N_-$
2. $R_+ \to \infty \Rightarrow i_+ = 0$
3. $R_- = 0$
4. Infinite Bandwidth:
   \[ N_0 = A(N_+ - N_-) \]

Inverting Amplifier:
1. Verify that we have (-) FB.
2. $N_0 = \text{finite} \Rightarrow N_+ : N_-
\[ i_i = \frac{N_i - 0}{R_1} = \frac{V_i}{R_1} \quad N_0 = 0 - i_i R_2 \]

**Par. FB Example:**
\[ N_0 = -\frac{N_i}{R_2} \]

\[ N_0 = -\frac{R_2}{R_1} \]