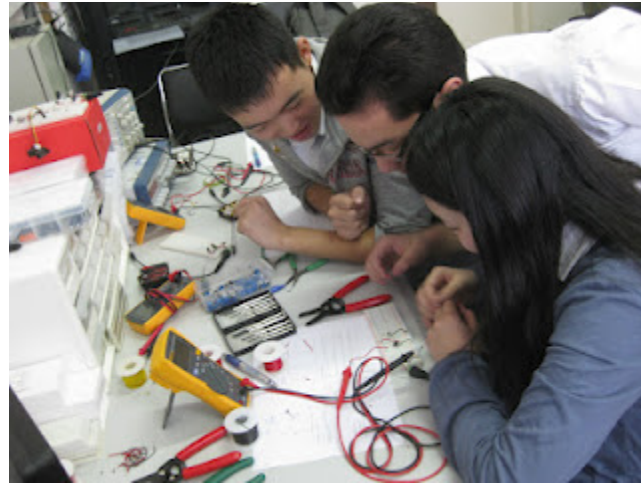


6002x.blogspot.com – the new classroom



*Where is this?*



Courseware - MITx 6.002x

https://6002x.mitx.mit.edu/courseware/6.002\_Spring\_2012/Week\_9/Undamped\_Second-Order\_Systems/#

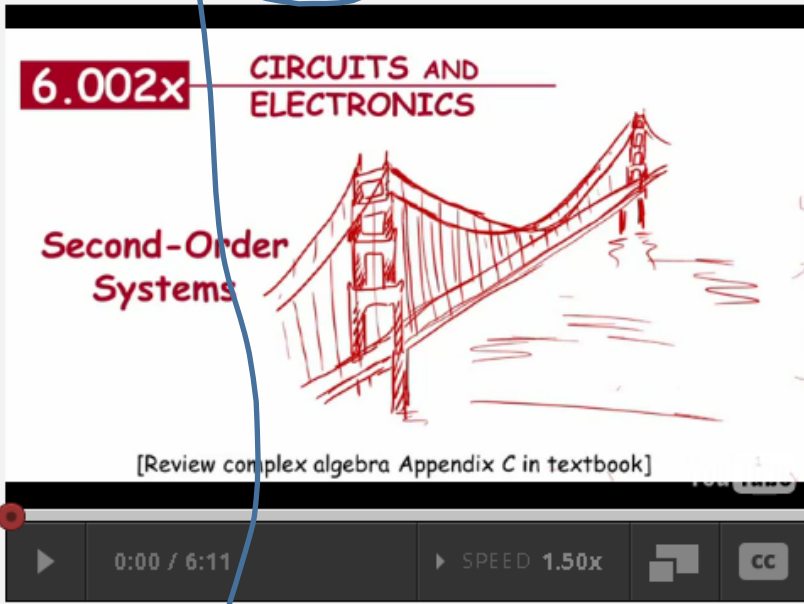
Getting Started neso Google csail Carbon aganwal-public Imported From Firef... MITX aa MITx-int

MITx - Circuits and Electronics Courseware Course Info Textbook Discussion Wiki Profile

Courseware Index

- Overview
- Week 1
- Week 2
- Week 3
- Week 4
- Week 5**
  - MOSFETs: Large Signals Lecture Sequence
  - MOSFET Amplifiers: Small signal model Lecture Sequence
  - MOSFETs Homework due April 15
  - Mosfet Amplifier Lab due April 15
  - Mosfet Amplifier Experiment Lab due April 15
  - Week 5 Tutorials Tutorial Index
- Week 6

### S17V1: Motivating Example



**6.002x** CIRCUITS AND ELECTRONICS

Second-Order Systems

[Review complex algebra Appendix C in textbook]

0:00 / 6:11 SPEED 1.50x

**SPEAKER :** Now let's move on to second-order systems.

So far you looked at first-order systems that contained a single energy storage element such as a capacitor.

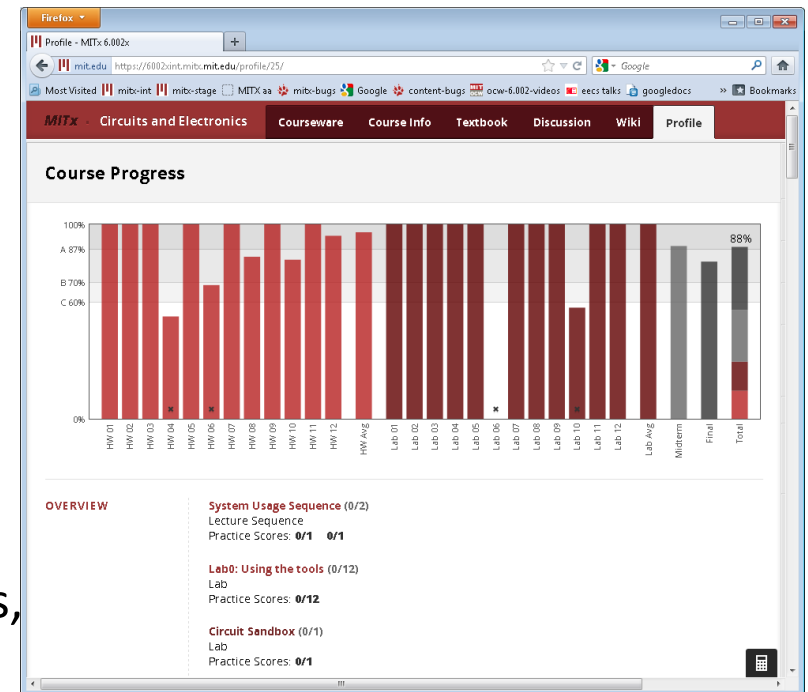
So a circuit containing a voltage source, a capacitor, and a resistor was a first-order circuit.

these circuits, you will have two independent

Textbook Discussion

## Some Stats

- On campus beta-tester class
  - 20 volunteer students
  - 19 completed final exam; 1 dropped class
- Worldwide class
  - 120K+ enrolled
  - Top four countries represented USA, India, UK, ????
  - ~20K took first set of tests
  - ~10K completed midterm
    - many do not care about taking tests, too hard, need more time



# What we learned/Surprises

- Discussion forum scales, and is huge learning tool
  - Learning by teaching
  - Forming communities
  - Students want to continue in the same community (students want 6.004x next, which is natural follow-on to 6.002x)
  - Students value education highly and extraordinarily grateful
- Researchers conducting education experiments on edX
  - Handwritten slides voted above powerpoint slides
- Being able to point to objects in slides is very useful
- Immediate feedback in assessments is good
  - Students keep trying problems till they get them right
- Book publisher wants to give us more free online textbooks for future courses
- How to manage TAs for online courses
- Most MIT students watch lectures at 1.5X speed, and read transcription

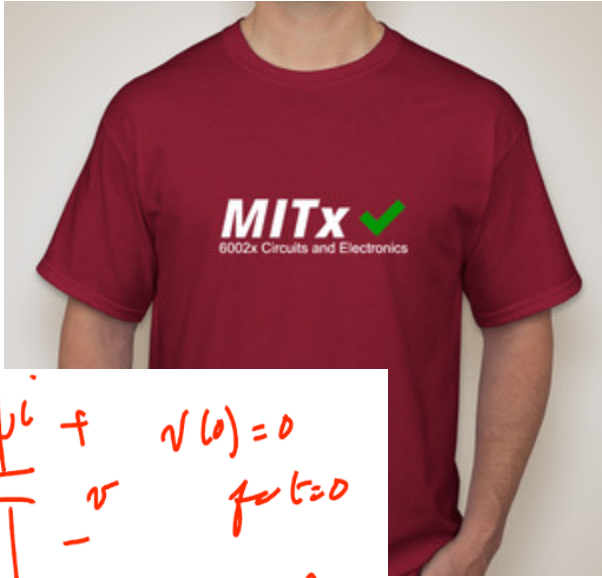


This has become cult symbol in 6.002x

# What does it take to do an online class

- Staffing
  - 2 instructors – 1 for video lectures and 1 for exercises/labs
  - 4 TAs – solutions, discussion forum, problem solving tutorials
- Start at least 1 month before online launch of course – ideally 3 months before
- Video
  - Can start with existing powerpoint or blackboard notes
  - About 4 hours of video a week (lecture+recitation content)
  - Takes about 5 hours per hour of video
  - Get rid of any copyrighted material (hand-draw, take own pictures)
- Exercises/Problems/Exams
  - Congruence between making problems easy to grade and making problems for automatic grading
  - Break long multi-step problems into smaller chunks – remember, there is no partial credit in automatic grading
  - Having existing problems in electronic form (text+figures) helps

# On the lighter side...



**Aha!**

$\sqrt{I}$

$v_i \cos \omega t$

$v_i \cos \omega t$  for  $t > 0$

$v_i$  is real for  $t < 0$

$v_i \cos \omega t$

$v_i$

$v(t) = 0$  for  $t = 0$

$R$

$C$

$v_o$

$V_{Bi}$

$I$

$I_{Fu}$