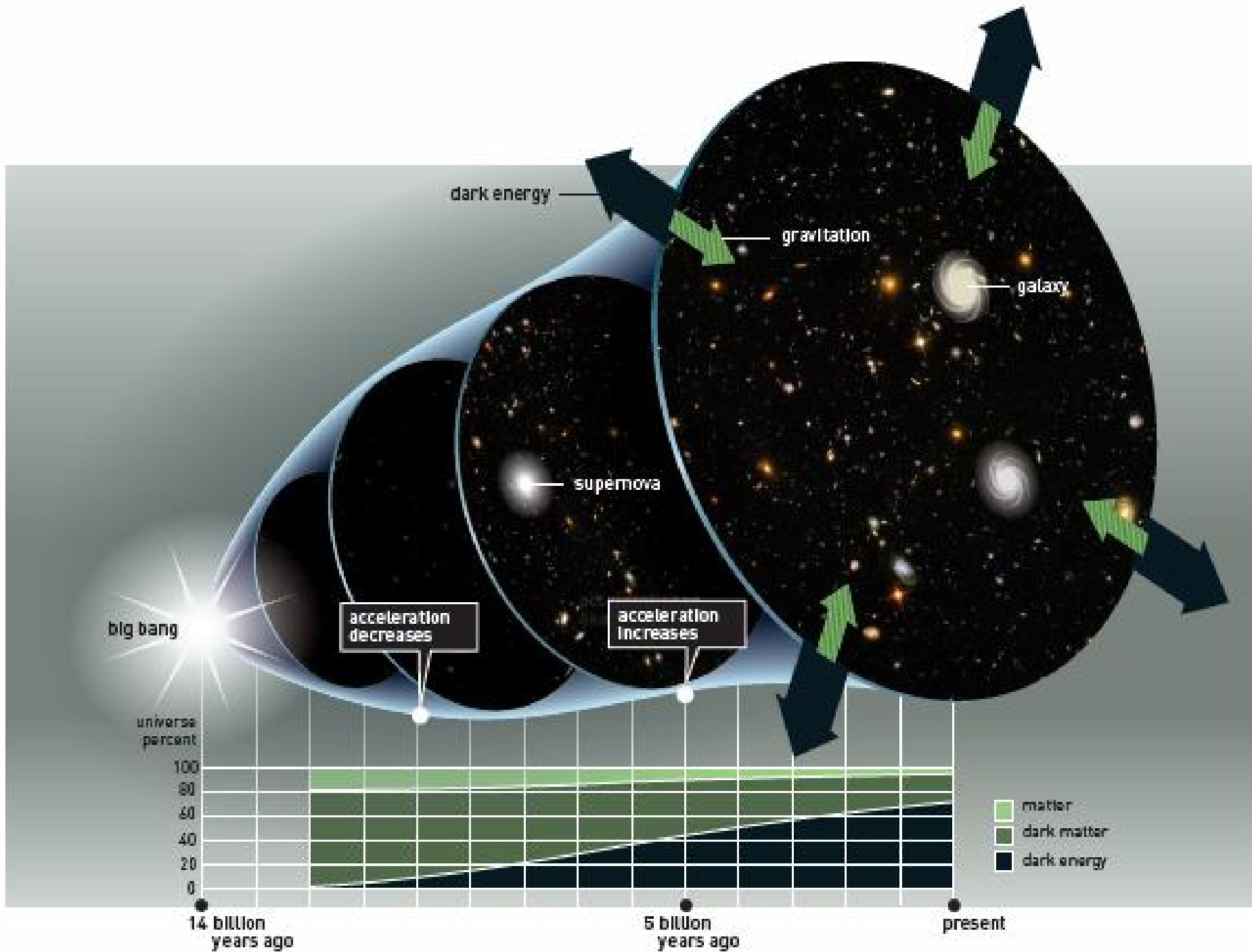


**Тернопільський національний технічний університет імені Івана Пулюя  
Семінар «Практичні аспекти використання елементів дистанційного  
навчання в рамках впровадження кредитно-модульної системи»  
4 квітня 2013 року**

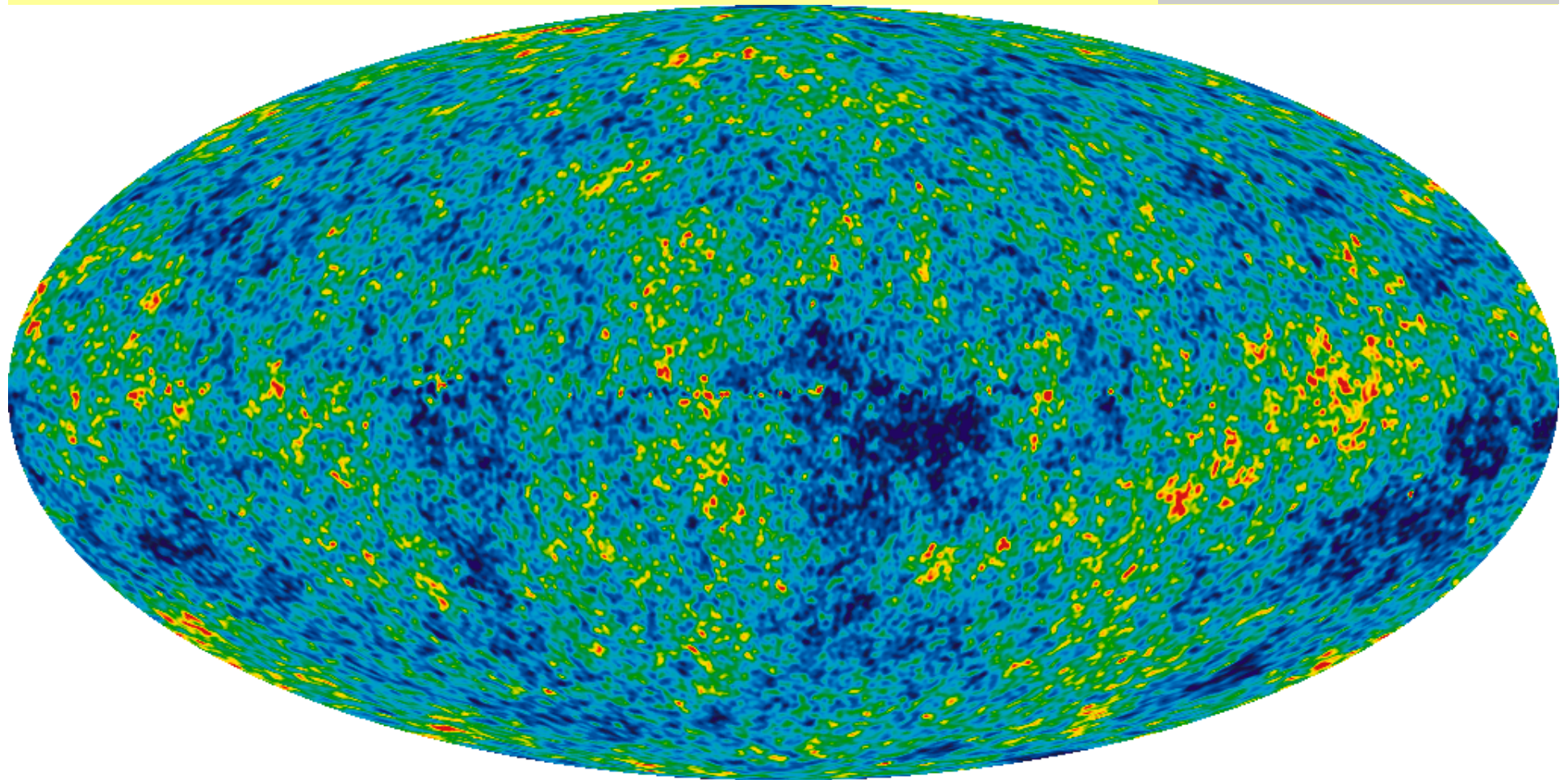
# **Масові дистанційні online-курси: способи ефективного використання**

**Ю.Л.Скоренький  
кафедра фізики ТНТУ  
skorenkyu@tstu.edu.ua**





National Aeronautics  
and Space Administration



Карта анізотропії мікрохвильового реліктового випромінювання  
Wilkinson Microwave Anisotropy Probe, 2001-2012  
<http://map.gsfc.nasa.gov/>

# *The Shawshank Redemption, 1994*

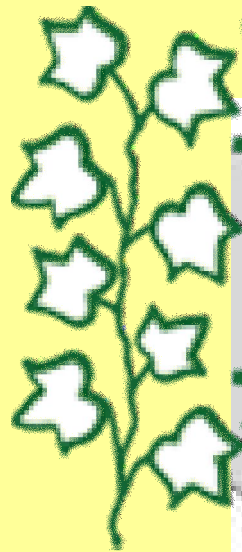


FEAR CAN HOLD YOU PRISONER.  
HOPE CAN SET YOU FREE.



**"Mr. Dekins, do you want your sons to go to Harvard... or Yale?"**















# THE IVY LEAGUE

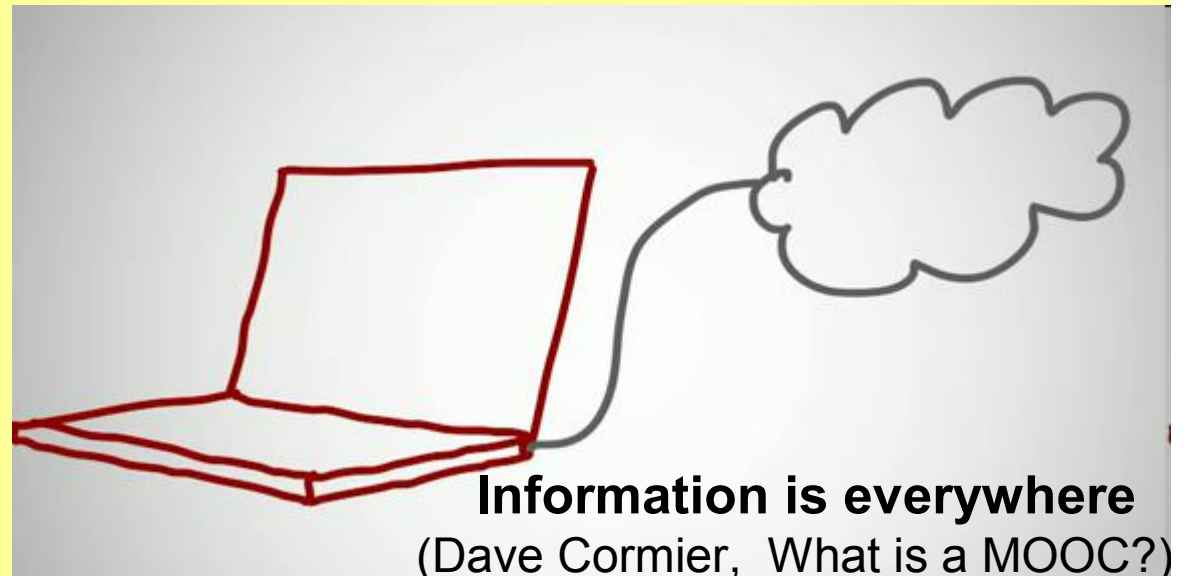


*Atlantic Ocean*

# Massive Online Open Course

World Top 500 Universities					
1	Harvard U.		6	Caltech	
2	Stanford U.		7	Princeton U.	
3	MIT		8	Columbia U.	
4	UC Berkeley		9	U.Chicago	
5	U.Cambridge		10	U.Oxford	

<http://www.shanghairanking.com/>



<http://www.youtube.com/watch?v=eW3gMGqcZQc>

a MOOC  
is one way of  
learning

<http://www.youtube.com/watch?v=eW3gMGqcZQc>



# Кому це потрібно?

→ ↻ [ www.bootstup.org ☆

Every 26 seconds  
a student drops  
out of school.

A simple message of  
encouragement can help change  
that.

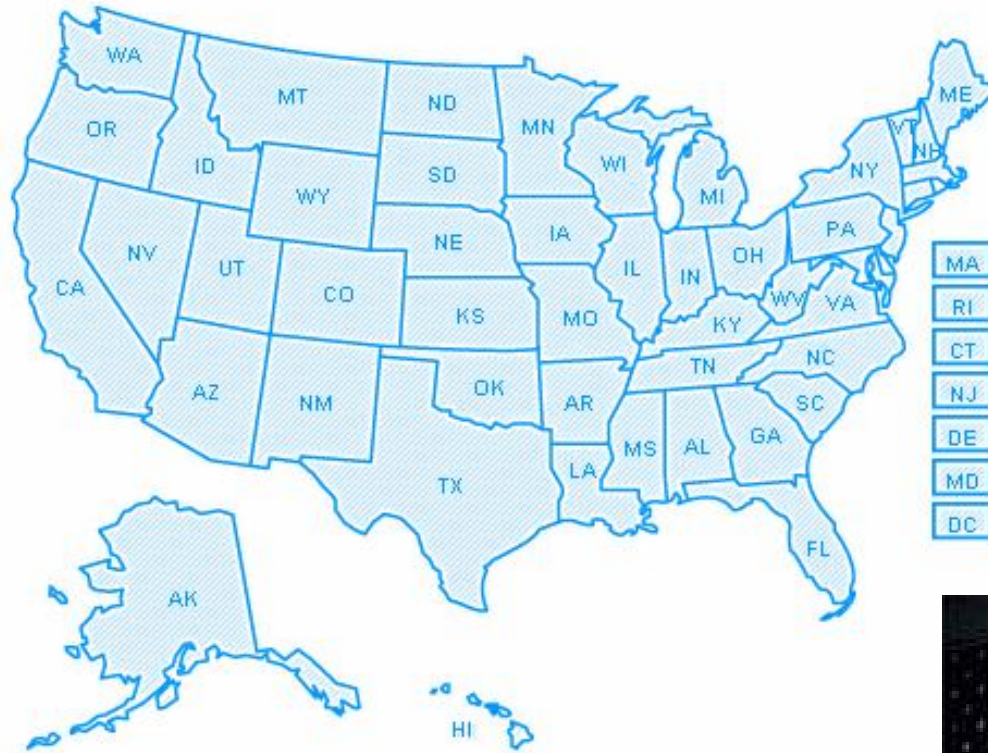
▶ Watch LeBron's message to students



Click a state to see detailed statistics.

NATIONAL STATISTICS

www.bootstap.org



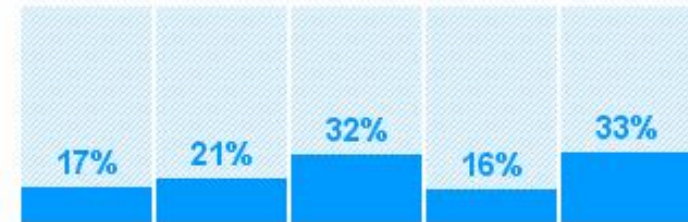
Map Data Courtesy of Everyone Graduates Center

### Dropout Rate

22%



### Dropout Statistics



## No Child Left Behind Act, 2001

[http://en.wikipedia.org/wiki/No\\_Child\\_Left\\_Behind\\_Act](http://en.wikipedia.org/wiki/No_Child_Left_Behind_Act)



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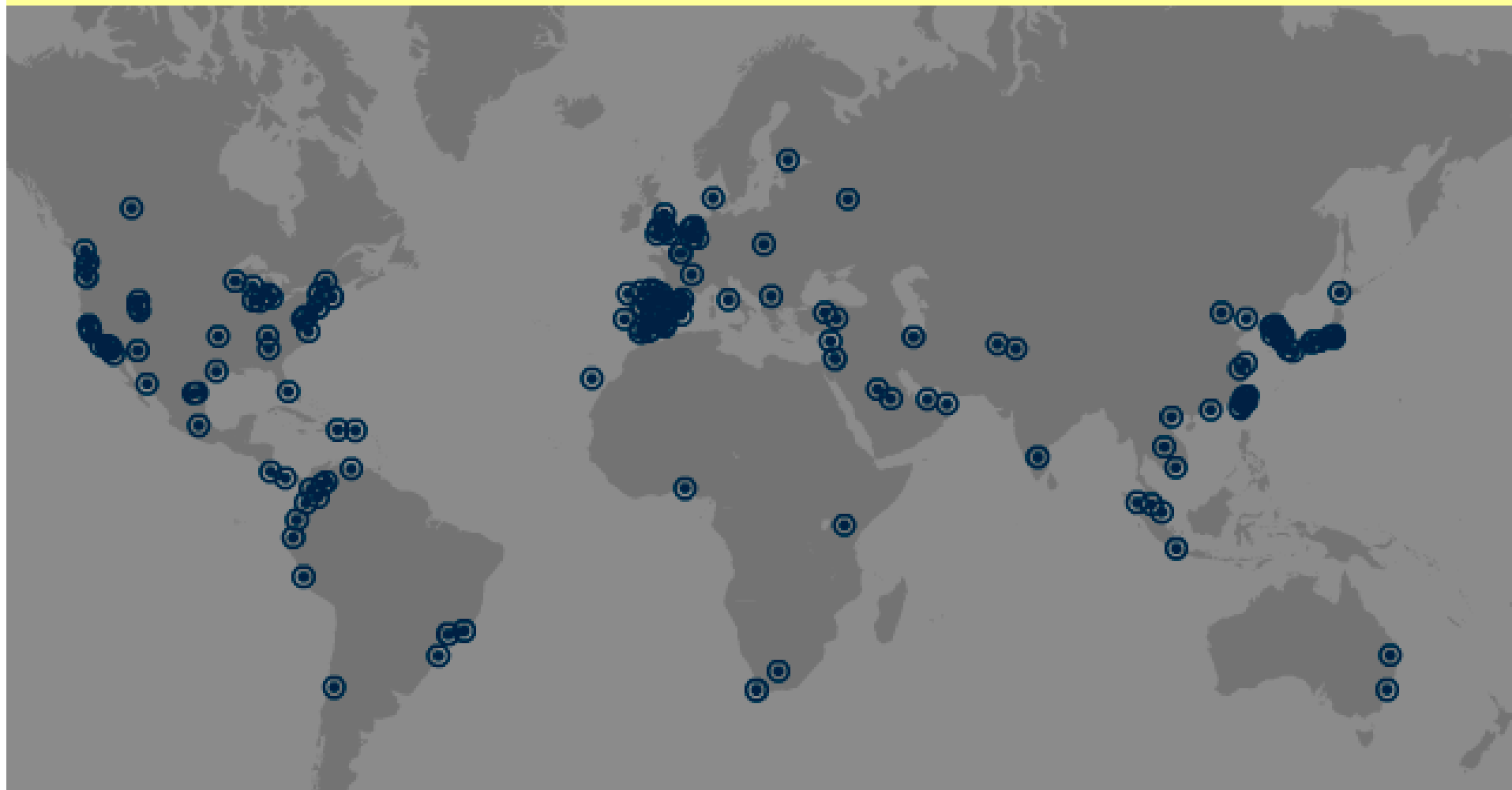
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← → ↻

## Course Finder

Topic	MIT Course Number	Department
<b>TOPIC</b>	<b>SUB-TOPIC</b>	<b>SPECIALTY</b>
Business	Aerospace Engineering	Algorithms and Data Structures
Energy	Biological Engineering	Artificial Intelligence
<b>Engineering</b>	Chemical Engineering	Computer Design and Engineering
Fine Arts	Civil Engineering	Computer Networks
Health and Medicine	<b>Computer Science</b>	Cryptography
Humanities	Electrical Engineering	Data Mining
Mathematics	Environmental Engineering	Graphics and Visualization





<http://www.ocwconsortium.org/>



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DATE

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[History](#)

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Spring 2010

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[Sociology](#)

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[Molecular, Cellular & Developmental Biology](#)

[Spanish & Portuguese](#)

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ASTR 160

[Frontiers and Controversies in Astrophysics](#)

Bailyn, Charles

[Biomedical Engineering](#)

BENG 100

[Frontiers of Biomedical Engineering](#)

Saltzman, W. Mark

[Chemistry](#)

CHEM 125a

[Freshman Organic Chemistry I](#)

McBride, J. Michael

[Chemistry](#)

CHEM 125b

[Freshman Organic Chemistry II](#)

McBride, J. Michael

# Stanford | ONLINE

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## PROGRAMS



### Stanford Online High School

The Online High School is a fully accredited, di- independent school situated at Stanford Univ OHS prepares students from around the world their future intellectual pursuits.



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### Stanford Center for Professional Development

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### Stanford Engineering Everywhere

SEE provides some of the school's most popu



### Stanford on YouTube

The Stanford Channel on YouTube is an archive of videos from departments, and programs across the university highlighting and research highlights.



### Stanford on iTunes U

Over 3,000 Stanford audio and video programs are available o



itunes.stanford.edu



[Overview](#)

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[Open Stanford on iTunes U](#)

# Coding Together: Apps for iPhone and iPad

Updated for iOS 6. Starts January 2013.

Звичайно ж, можна і самотійно



The screenshot shows the LibriVox website interface. At the top left, the LibriVox logo is displayed in green, with the tagline "acoustical liberation of books in the public domain" below it. The background of the header is a dark image of book spines. Below the logo is a browser window showing the URL "www.gutenberg.org". The main content area is divided into two columns. The left column contains the Project Gutenberg logo in a gothic font, a search bar for the book catalog, and a list of navigation links: Search Catalog, Book Categories, Main Page, Categories, News, and Contact Info. The right column features the heading "Free ebooks - Project Gutenberg" and a sub-heading "From Project Gutenberg, the first producer of free ebooks." Below this is a navigation menu with links for Book search, Book categories, Browse catalog, Mobile site, Report errors, and Terms of use. Further down, there is a section titled "New Kindle Fire Review" with a link to "Read our Webmaster's review of the new Kindle Fire." and another section titled "Some of Our Latest Books" which displays a row of book covers including "SANTA FE TRAIL", "ORLEANS CALANI", "F. D. GUERRAZZI", "MONT JIMMY'S WILL", "ALCOHOL AND HUMAN BRAIN", "THE RELIGIOUS PERSECUTION IN FRANCE 1900-1906", and "The Story of the World".

Але в товаристві – веселіше і ефективніше.

# Що в цьому доброго?

Безкоштовний відкритий доступ до знань  
звідки завгодно

Можливість використовувати прогресивні  
навчальні моделі та засоби

Можливість долучитися до розробки  
навчального контенту (wiki)

Можливість співпрацювати/спілкуватися з  
представниками іншої культури/галузі знань  
і формувати професійну мережу

Розвиток цифрової економіки

# TED

Ideas worth spreading

*Salman Khan:*

Let's use video to reinvent education

Березень 2011 р.



**2,305,631 Views**

[http://www.ted.com/talks/salman\\_khan\\_let\\_s\\_use\\_video\\_to\\_reinvent\\_education.html](http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html)



*Peter Norvig:*  
The 100,000-student classroom  
Березень 2012 р.

971,513 Views



[http://www.ted.com/talks/peter\\_norvig\\_the\\_100\\_000\\_student\\_classroom.html](http://www.ted.com/talks/peter_norvig_the_100_000_student_classroom.html)



# TED

Ideas worth spreading

*Daphne Koller:*

What we're learning from online education

Червень 2012 р.



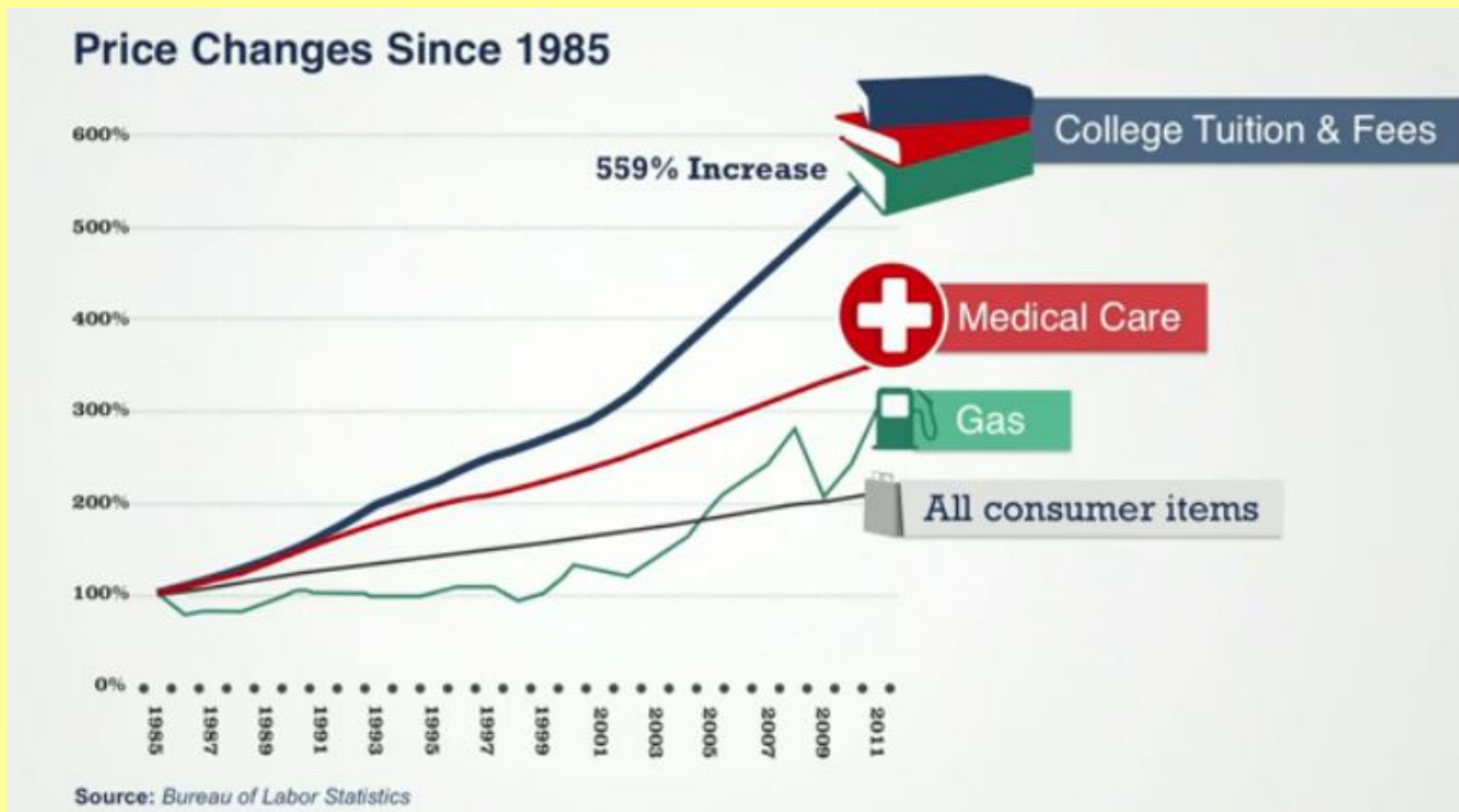
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[www.ted.com/talks/daphne\\_koller\\_what\\_we\\_re\\_learning\\_from\\_online\\_education.html](http://www.ted.com/talks/daphne_koller_what_we_re_learning_from_online_education.html)



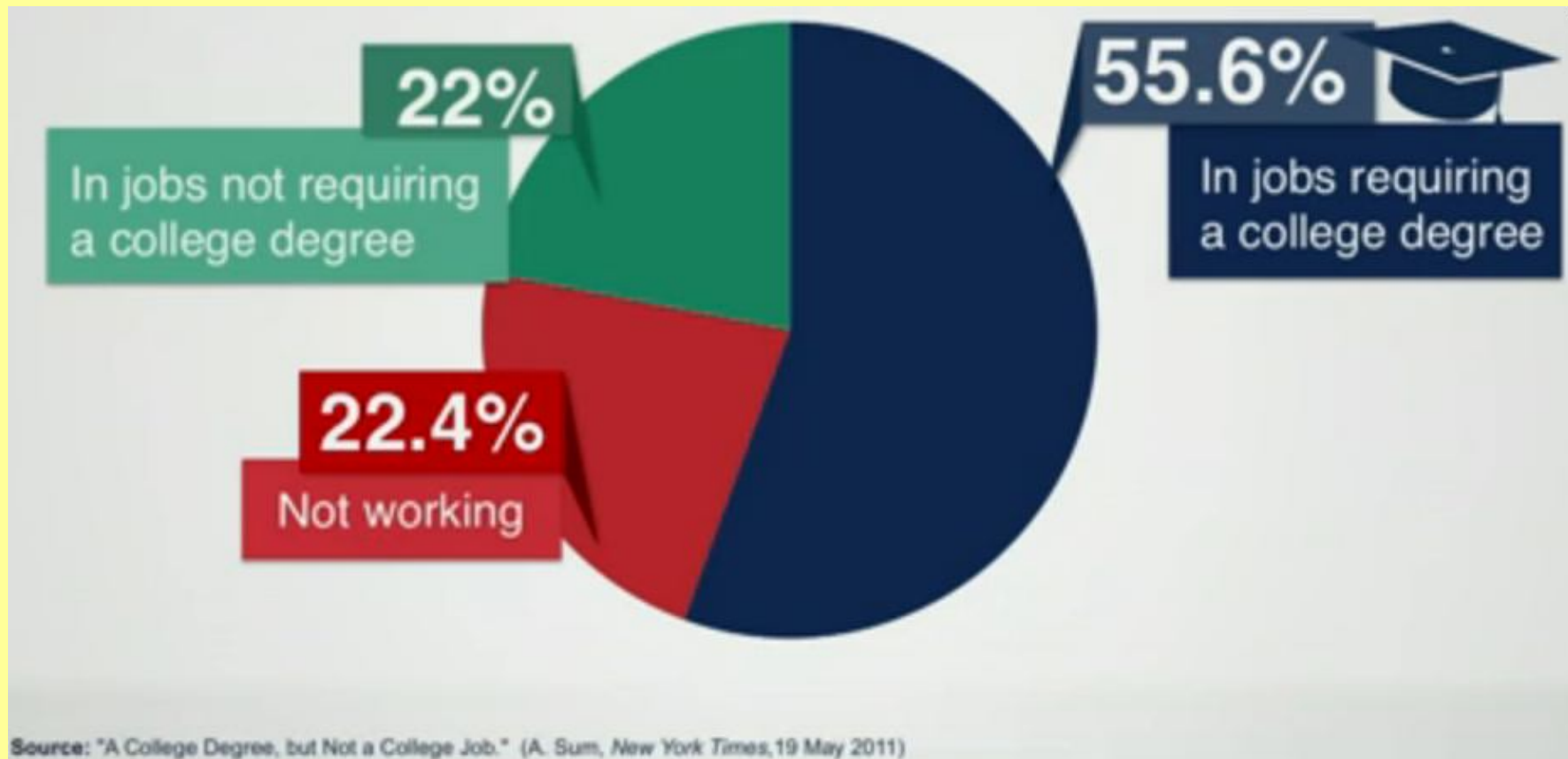


*Daphne Koller:*  
What we're learning from online education  
Червень 2012 р.



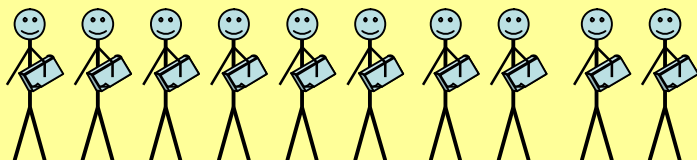


*Daphne Koller:*  
What we're learning from online education  
Червень 2012 р.



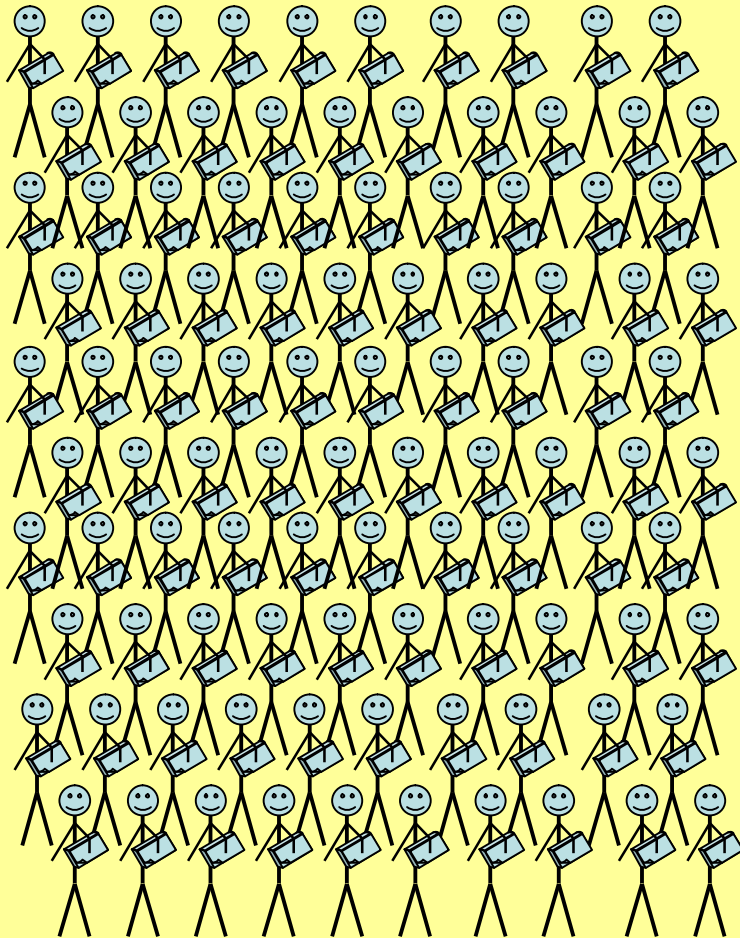
[www.ted.com/talks/daphne\\_koller\\_what\\_we\\_re\\_learning\\_from\\_online\\_education.html](http://www.ted.com/talks/daphne_koller_what_we_re_learning_from_online_education.html)

group



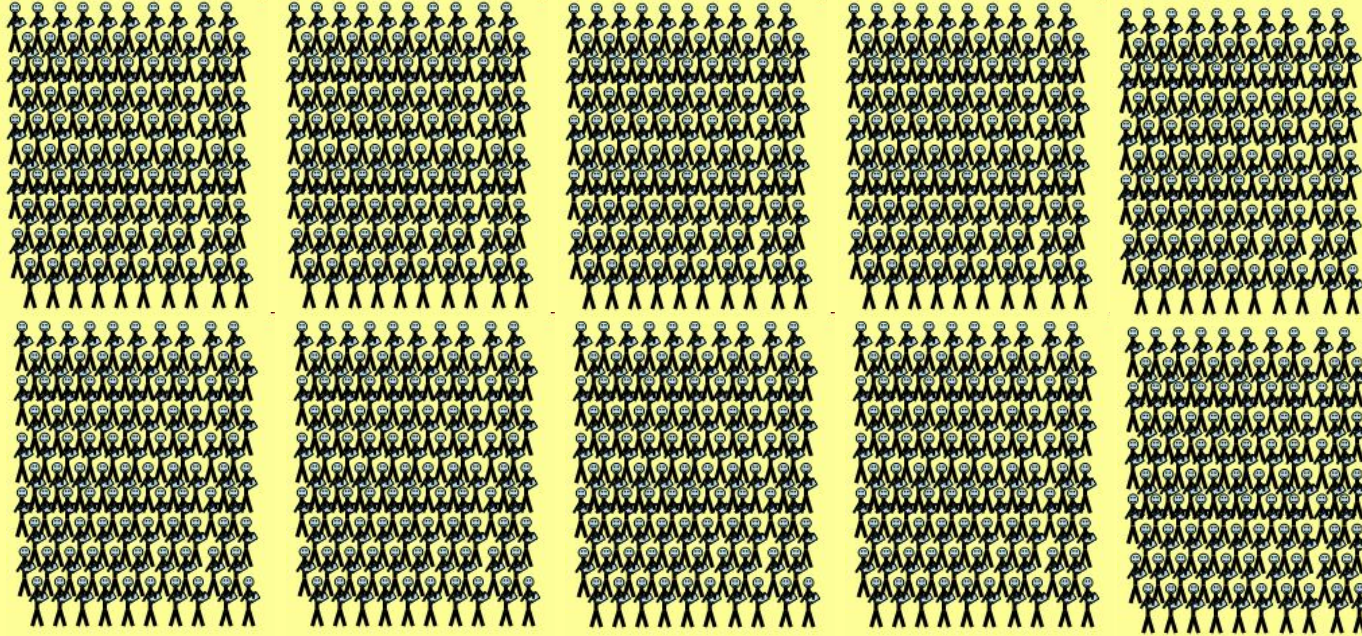
10

class



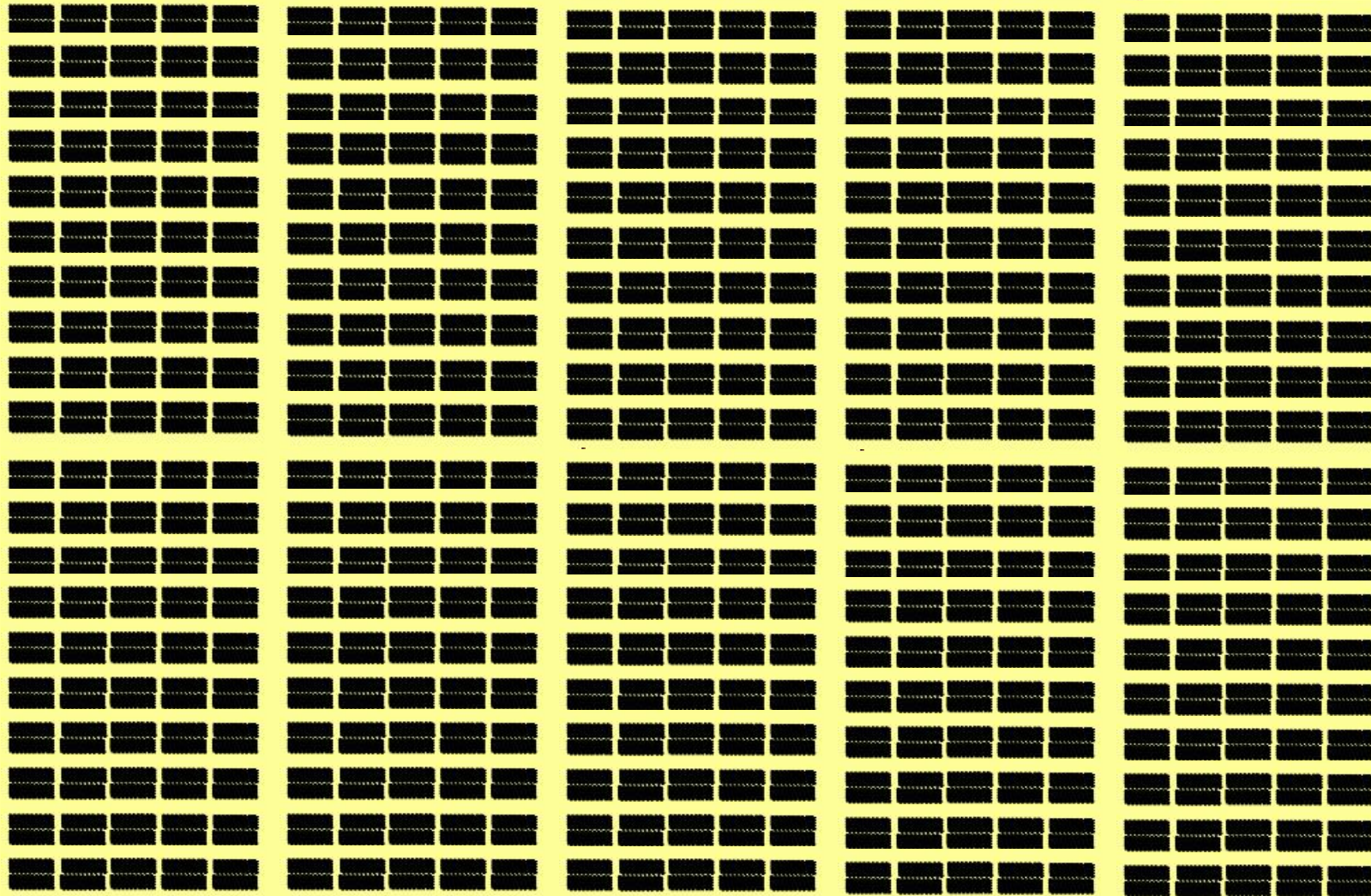
$$10^2 = 100$$

open online course  $10^3 = 1000$





# Massive open online course $10^6 = 1000000$





March 5<sup>th</sup> - June 14<sup>th</sup>, 2012

## MITx · Circuits and Electronics

6.002x had 154,763 registrants.

Of these, 69,221 looked at the first problem set, and 26,349 earned at least one point on it.

9,318 people got a passing score on the midterm.

5,800 people got a passing score on the final exam.

Finally, after completing 14 weeks of study,

7,157 people have earned the first certificate awarded by MITx.

## Courseware Index

▶ Overview

▶ Week 1

▶ Week 2

▶ Week 3

▼ Week 4

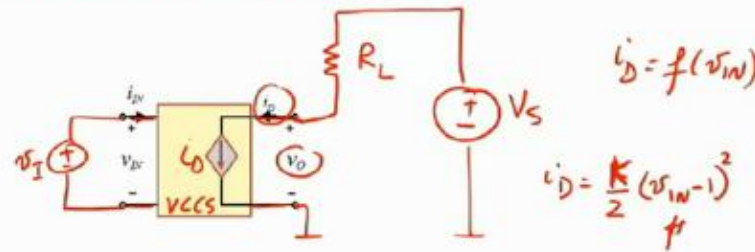
Incremental Analysis  
Lecture Sequence**Dependent Sources and  
Amplifiers**

Lecture Sequence

Incremental and Amplifiers  
Homework due April 8Curve Tracer  
Lab due April 8Week 4 Tutorials  
Tutorial Index

## S8V5: Another Dependent Source Example

## Another dependent source example



And I want to pick my current source, my controlled current source, to look as follows.

I'm going to pick this dependent source that has the following relationship to  $V_{IN}$ .

It's a nonlinear relation.

Its  $i_D$  equals  $K$  divided by 2 times

## S8V12: DEMO - Amplification



SPEAKER 1: Let me show you little demo of a small device

**that I built involving such a dependent source.**

On my x-axis is  $v_I$  and  $v_O$  is y-axis.

And focus on this little point here.

OK?

Right now my  $v_I$  is zero, and therefore that's my output.

to watch the output and see it behaves, pretty much

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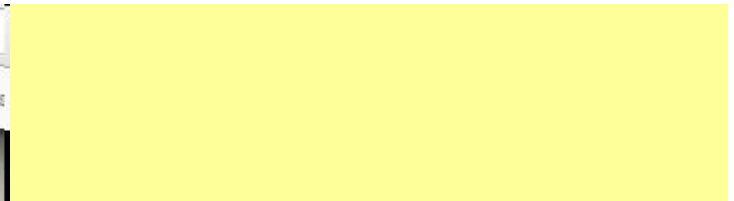
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- Case Western Reserve University **NEW**
- Columbia University **NEW**
- Curtis Institute of Music **NEW**
- Duke University
- École Polytechnique **NEW**
- École Polytechnique Fédérale de Lausa...
- Emory University
- Georgia Institute of Technology
- Hebrew University of Jerusalem
- IE Business School **NEW**
- Icahn School of Medicine at Mount Sinai
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- Pennsylvania State University **NEW**
- Princeton University
- Rice University
- Rutgers University **NEW**
- Sapienza University of Rome **NEW**
- Stanford University
- Technical University of Denmark (DTU) ...
- Technische Universität München (Techn...
- Tecnológico de Monterrey **NEW**
- The Chinese University of Hong Kong **NEW**
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- University of Maryland, College Pa
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- University of Rochester **NEW**
- University of Toronto
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- University of Wisconsin-Madison **N**

<https://www.coursera.org/>



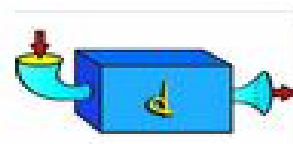
Think Again: How to Reason and Argue  
Nov 20th - Feb 10th  
Nov 20th 2012 | 12 weeks long  
[Go to class](#)  
[View course info](#)

Introduction to Astronomy  
Nov 27th - Jan 29th  
Nov 27th 2012 | 9 weeks long  
[Go to class](#)  
[View course info](#)

Galaxies and Cosmology  
Jan 7th - Mar 11th  
Jan 7th 2013 | 9 weeks long  
[Go to class](#)  
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Calculus: Single Variable  
Jan 7th - Apr 8th  
Jan 7th 2013 | 13 weeks long  
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Principles of Economics for Scientists  
Jan 7th - Mar 16th  
Jan 7th 2013 | 10 weeks long  
[Go to class](#)  
[View course info](#)



The Modern World: Global History since 1750  
Jan 14th - Apr 29th  
Jan 14th 2013 | 15 weeks long  
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Programming Languages  
Jan 14th - Mar 26th  
Jan 14th 2013 | 10 weeks long  
[Go to class](#)  
[View course info](#)





We started with **2 founders** and now we're a team of 20+ people doing **Engineering**, **Design**, **Course Operations**, and **Business Development**.

**16 of us** went to Stanford University.

We speak a variety of languages, like **Chinese**, **Hebrew**, **Spanish**, and of course, **Quechua**.

**2 of us** went to the same high school in Texas – but didn't know it until now.

The New York Times

## Education

# Universities Abroad Join Partnerships on the Web

By TAMAR LEWIN

Published: February 20, 2013





# University of Michigan

## Model Thinking

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[Exam](#)

**[Video Lectures](#)**

[Discussion Forums](#)

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[Course Wiki](#) ↗

### Video Lectures

#### > Introduction: Why Model?

✓ [Why Model?](#)



✓ [Intelligent Citizens of the World](#)



✓ [Thinking More Clearly](#)



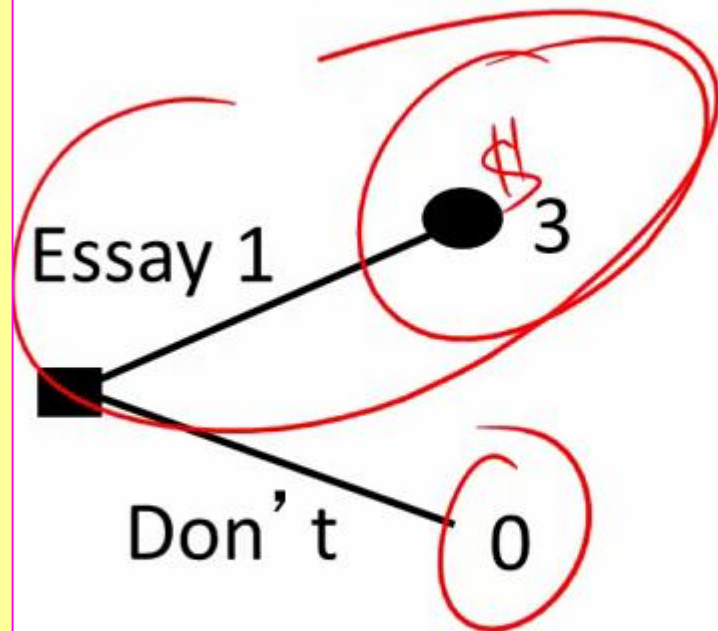
✓ [Using and Understanding Data](#)



✓ [Using Models to Decide, Strategize, and Design](#)



#### > Segregation and Peer Effects



09:23 | 14:38

< Previous Press H for shortcuts Decision Trees - Speed: 1.25x +

### Question 6

In regards to the Rational Actor Model, which of the following would make you MORE likely to assume that individuals act rationally?

- High Stakes Choice
- Emotional Decision
- Repeated Choice





## Principles of Economics for Scientists

Jan 7th

Mar 18th

California Institute of Technology

Jan 7th 2013 (10 weeks long)

[Go to class](#)

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## Calendar & deadlines

Week	Item	Out	Due
w1	Unit 1. Principles of optimizing behavior Lectures & Practice Problems	Jan 7	
w1	Problem Set 1	Jan 7	Jan 14
w2	Unit 2. Consumer Theory Lectures & Practice Problems	Jan 14	
w2	Problem Set 2	Jan 14	Jan 21
w3	Unit 3. Producer Theory Lectures & Practice Problems	Jan 21	
w3	Problem Set 3	Jan 21	Feb 4
w4	Unit 4. Competitive markets. Lectures & Practice Problems	Jan 28	
w4	Problem Set 4	Jan 28	Feb 11
w5	Unit 5. Government intervention in competitive markets: Efficiency. Lectures & Practice Problems	Feb 4	
w5	Problem Set 5	Feb 4	Feb 18

# Можливість вільно скачувати відеолекції

4 - 4 - Part IV Derivation (contd) (1558) (difficult material optional).mp4 - Media Player Classic ...

File View Play Navigate Favorites Help

## Calculating the matrix elements

$$\langle x_{k11} / x_k \rangle$$

- Reminder (this issue is often a source of confusion):  $|\Psi\rangle$  vs.  $\Psi(x) = \langle x | \Psi \rangle$

$$- \langle x | p \rangle = \frac{1}{\sqrt{2\pi\hbar}} e^{i p x / \hbar}$$

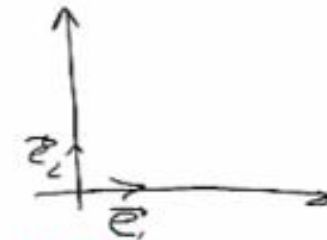
$$- \langle x | x' \rangle = \delta(x - x')$$

- Dirac delta-function

- Orthonormality condition for "usual" basis vectors,  $\{\vec{e}_i\}$ :

$$\sum_i \delta_{ij} = 1$$

$$\vec{e}_i \cdot \vec{e}_j = \delta_{ij} = \begin{cases} 0, & \text{if } i \neq j \\ 1, & \text{if } i = j, \end{cases}$$



- For a "continuum" basis,  $\{|x\rangle\}$ :

$$\int_{-\infty}^{+\infty} dx \delta(x - x') = 1$$

$$\langle x | x' \rangle = \delta(x - x') = \begin{cases} 0, & \text{if } x \neq x' \\ \infty, & \text{if } x = x', \end{cases}$$



- An important property (Fourier transform) of the  $\delta$ -function:

$$\delta(x) = \int_{-\infty}^{+\infty} \frac{dk}{2\pi} e^{ikx}$$

⏪ ⏩ ⏮ ⏭ ⏸ ⏹



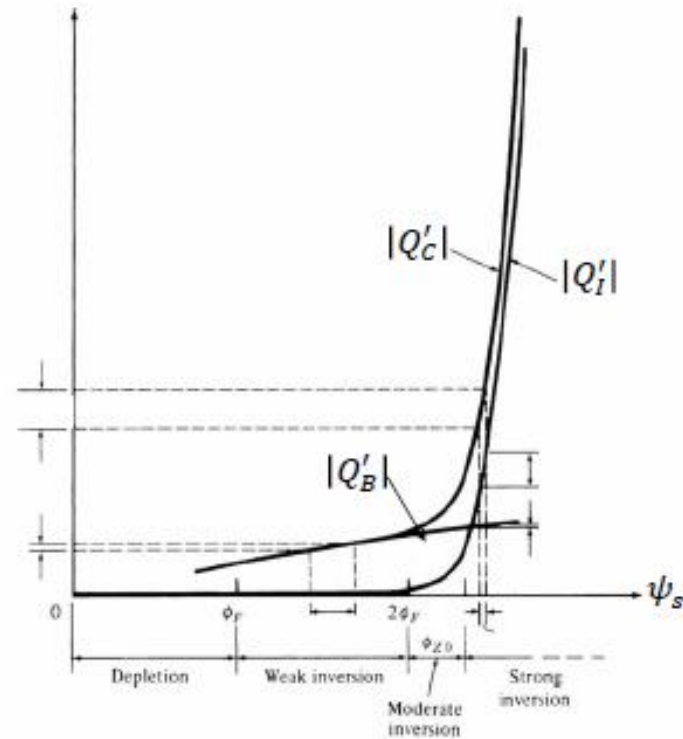
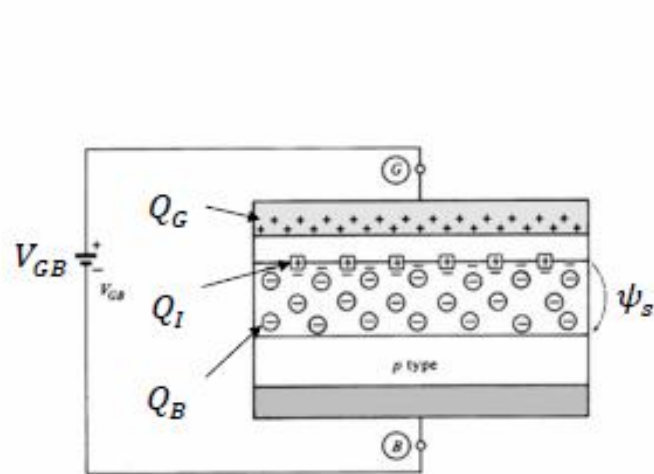
Paused

04:54 / 15:58

# Можливість вільно скачувати слайди лекцій

terminal MOS Structure - Inversion.pdf - Adobe Reader

4 / 6 56,5% Tools



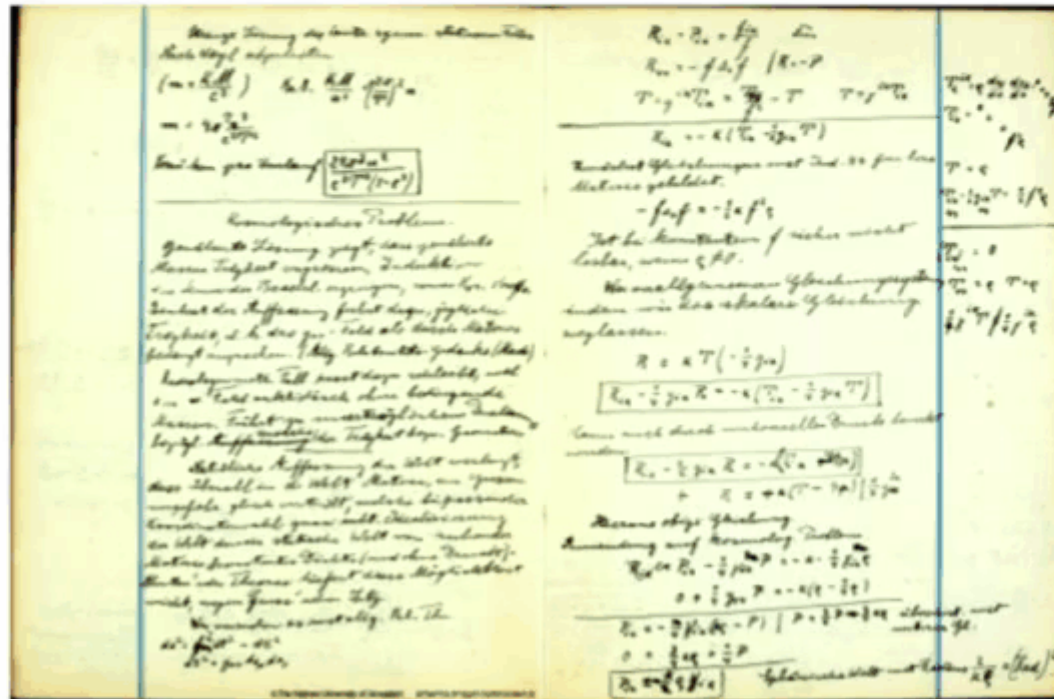
$$Q'_B = -\sqrt{2q\epsilon_s N_A} \sqrt{\psi_s}$$

$$Q'_I = -\sqrt{2q\epsilon_s N_A} \left( \sqrt{\psi_s + \phi_t e^{(\psi_s - 2\phi_F)/\phi_t}} - \sqrt{\psi_s} \right)$$

# Унікальні документи, експерименти та дані

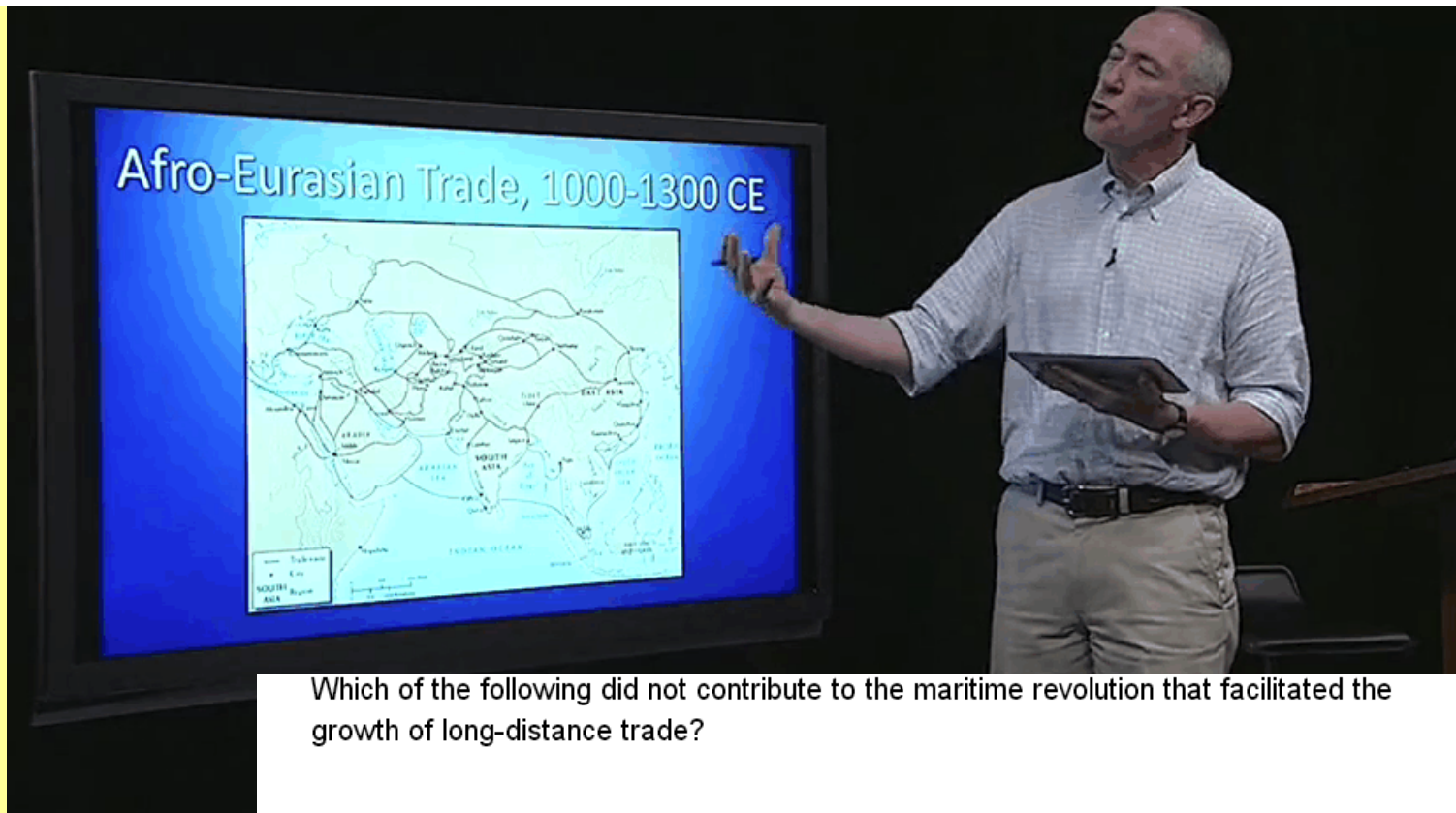


Einstein's lecture notes for a course he taught on GR in 1919. The final topic of the course was cosmology, which he had begun to investigate only two years earlier. Here he describes his methods in constructing the first mathematical model of cosmology in GR. This universe contains non-relativistic matter, stars and nebulae in agreement with the contemporary observations, but is spatially finite.



(From R. Caldwell)





Тести  
в  
лекції

Which of the following did not contribute to the maritime revolution that facilitated the growth of long-distance trade?

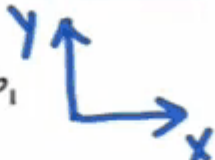
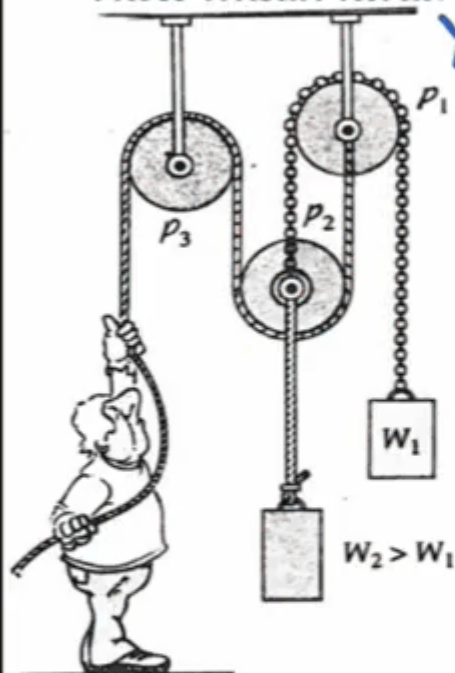
- Improved navigational technologies.
- Refinements in shipbuilding.
- Lack of protection from political authorities.
- Shift in business and accounting practices like credit.

Continue

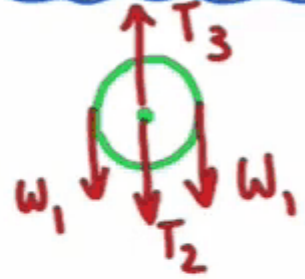
Correct! ✕



How much force must the person exert to hold the system in equilibrium?



FBD PULLEY P1



NOTE  
T2 IS THE  
FORCE THE  
PERSON EXERTS

$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\uparrow \sum F_y = 0$$

$$T_3 - W_1 - T_2 - W_1 = 0$$

$$\downarrow \sum F_y = 0$$

$$-T_3 + W_1 + T_2 + W_1 = 0$$

$$T_3 = 2W_1 + T_2$$

1 EQN  
2 UNK 😞

TRY

Used with permission from "Engineering Mechanics: Statics," McGill/King, 4th Ed, 2003



08:46 | 11:27

< Previous

Press H for shortcuts

Lecture Video Module 6 – Systems of ...

-

Speed: 1.50x

+

Next >

Practice problem 1.4 -- solution



1.13. Summary [6:05]



### Pre-lab 1

Logistics [3:02]



Lab description [9:12]

How to trade [13:58]

Final remarks

### Unit 2. Consumer theory

2.0. Introduction [4:20]

2.1. The experienced utility function [9:37]



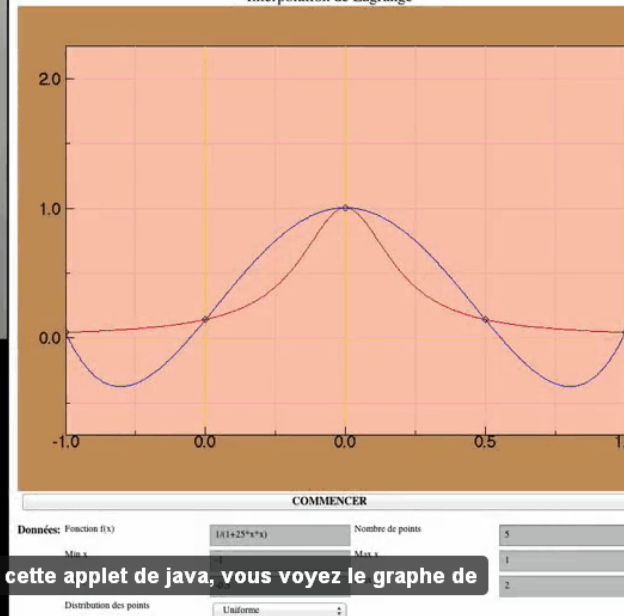
2.2. Utility maximization

2.3. The demand curve

2.4. Example [2:54]

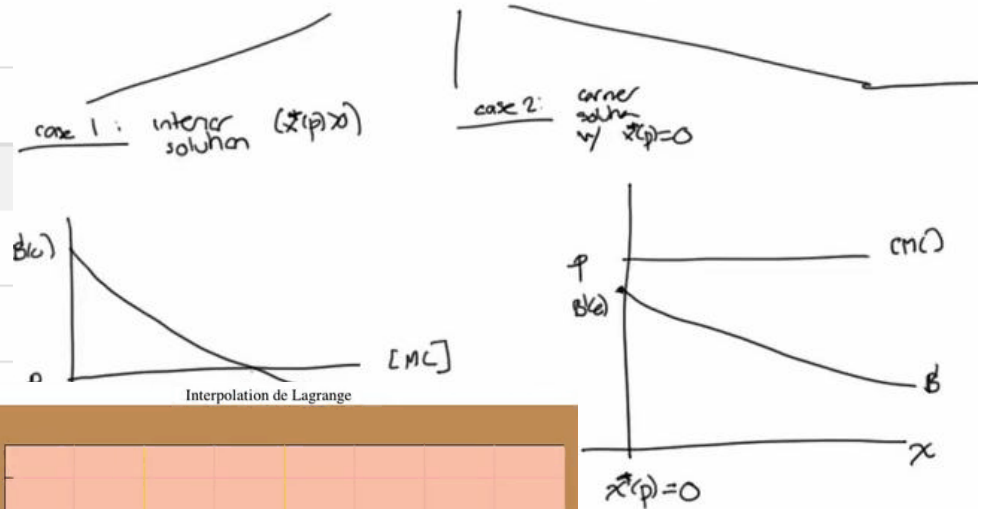


petite applet de java. Donc sur cette applet de java, vous voyez le graphe de



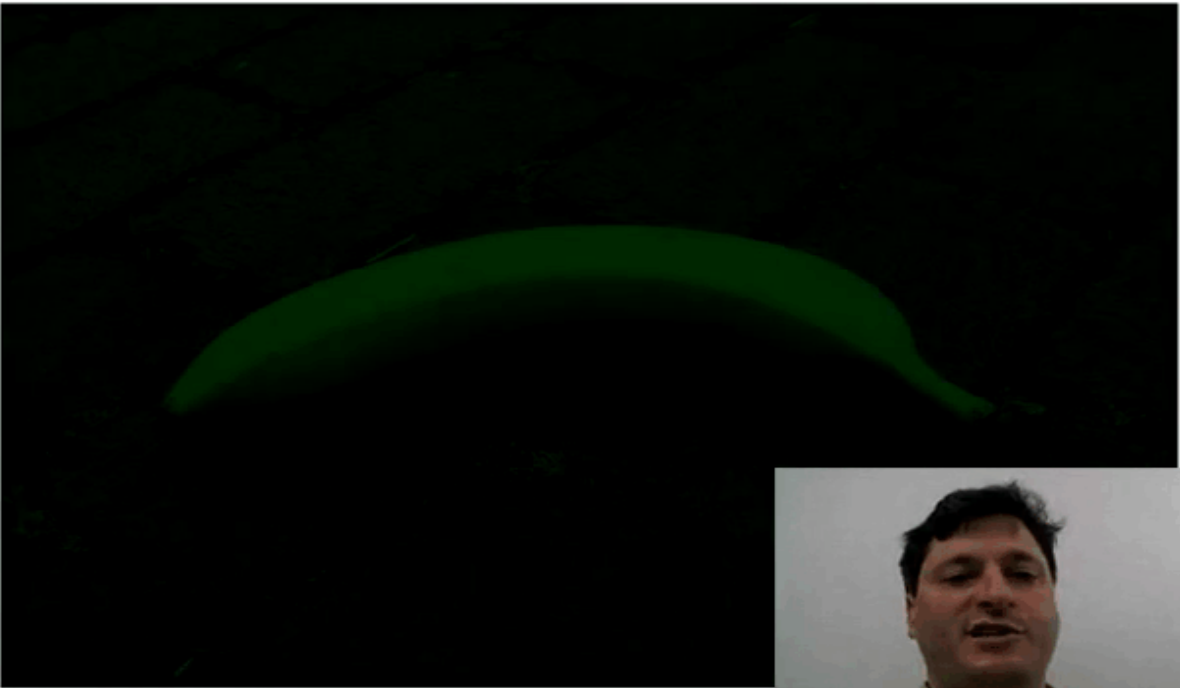
SOLUTION TO THE UTILITY MAXIMIZATION PROBLEM

max  $B(x) - xp$   
 $x \geq 0$   $B'$   
 $B''$



```
image = new SimpleImage("51020-banana.png");  
for (pixel: image) {  
    pixel.setRed(pixel.getRed() * 5);  
    pixel.setGreen(pixel.getGreen() * 10);  
    pixel.setBlue(pixel.getBlue() * 1);  
}  
  
print(image);
```

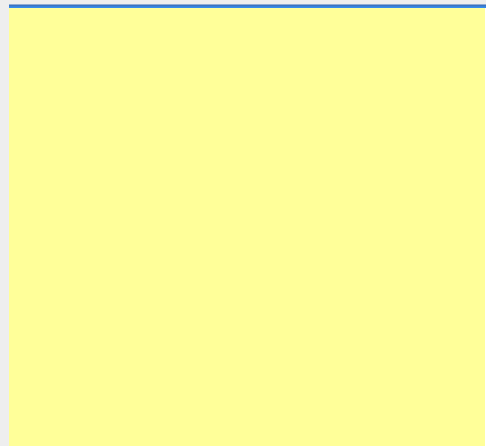
Run



Solution code:

```
image = new SimpleImage("51020-banana.png");  
for (pixel: image) {  
    // your code here  
    pixel.setRed(pixel.getRed() * 20);  
    pixel.setGreen(pixel.getGreen() * 5);  
    pixel.setBlue(pixel.getBlue() * 10);  
}  
  
print(image);
```

Run




# Уніфікована структура (як і в будь-якій LMS)

# Уніфікована структура (як і в будь-якій LMS)

101 Video Listing x 101 View Quizzes x View x Current local time in U.S.A. - x

← → ↻ <https://class.coursera.org/cs101/quiz/index> ☆

 **Stanford University**  
CS101

Nick Parlante  
April 2012

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- Lectures
- Exercises
- Discussion Forums
- Course Howto
- RGB Color Explorer
- Image Function Reference
- Course Syllabus and FAQ
- Re-Use Licensing
- Help with Subtitles

## Exercises

- ▶ Week 1
- ▼ Week 2
  - ✓ For loops
    - Attempt Exercise
    - Apply Late Days
    - View Previous Attempts
    - Due Date:** Tue 8 May 2012 11:59:00 PM PDT
    - Hard Deadline:** Fri 15 Jun 2012 11:59:00 PM PDT
    - # of Attempts:** 1 / 100
    - Effective Score:** 100.00 / 100.00  
*Explanation: Your effective maximum score is from your score for attempt 1.*
    - Last Attempted:** Tue 8 May 2012 12:41:27 PM PDT
    - Last Attempted Score:** 100.00 / 100.00

## Question about the Polysilicon Gate

Subscribe for email updates.

Sort replies by: **Oldest first** Newest first Most popular

 **gate** × + Add Tag

Nikhil · 8 days ago 

From what I know, in a N-MOS structure, we have a p-type body and n-type polysilicon gate (PSG). My question is, why do I have to use n-type polysilicon gate only? Can I not use P-type PSG? Is this because electrons have higher mobility than holes and hence offer lesser resistance and consequently lower RC delay??

^ 1 v

Mark R. Gehring · 4 days ago 

Look at the equation for  $V_{T0}$ . Using P gate, with positive work function, will dramatically shift the  $V_T$  to unusable values. Thus, P gates are used for p channel ( nwell ) MOSFETs. This is also why it took a long time to develop metal gates for low voltage MOS devices - you have to use the right metal alloy to get the  $V_T$  reasonable.



## Question 1

Simplify the expression

$$(-6x^2 + 9x) - (2x + 5 - 3x^2) + (7x^2 - 6x + 2)$$

to the form  $Ax^2 + Bx + C$ .

Enter your answer as a list of the values A B C separated by spaces.

## Аналітичні тести

## Question 1

Simplify  $(2\sqrt{7} + 3\sqrt{2})(\sqrt{7} - 5\sqrt{2})$ . For submitting an answer with symbols, please follow these instructions: "/" means division, "\*" means multiplication, and "^" means exponentiation. For adding a square root symbol, use sqrt (NUMBER). Please click the "preview" button for each question prior to submitting the answer so you can check that you've entered the right math expression.

Preview

Your submission is equivalent to:  $-7\sqrt{14} - 16$

# Взаємне оцінювання письмових робіт



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## Peer Assessments / 3. Concept Definition Forms

Submission Phase

1. Do assignment

Evaluation Phase

2. Evaluate peers

Results Phase

3. See results

Your effective grade is **32**

A 20% penalty has been applied because you did not complete the entire evaluation portion of the assessment.

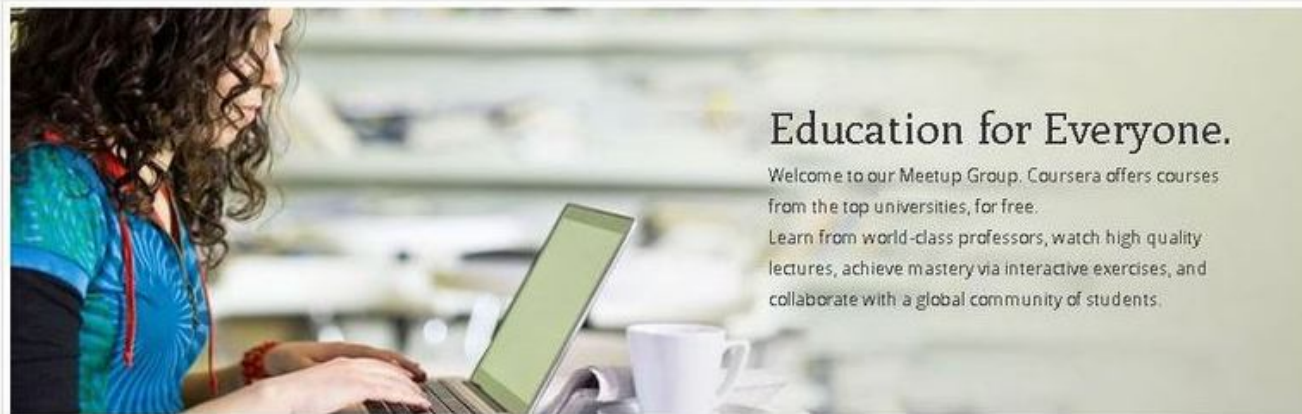
Your unadjusted grade is 40, which is simply the grade you received from your peers.

See below for details.

**Project Assignment 3: Concept Definition Forms (Group Assignment)** - The purpose of this assignment is to teach you how to synthesize, distill, and assess a large quantity of ideas into a small number of manageable

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## 2095 Coursera communities

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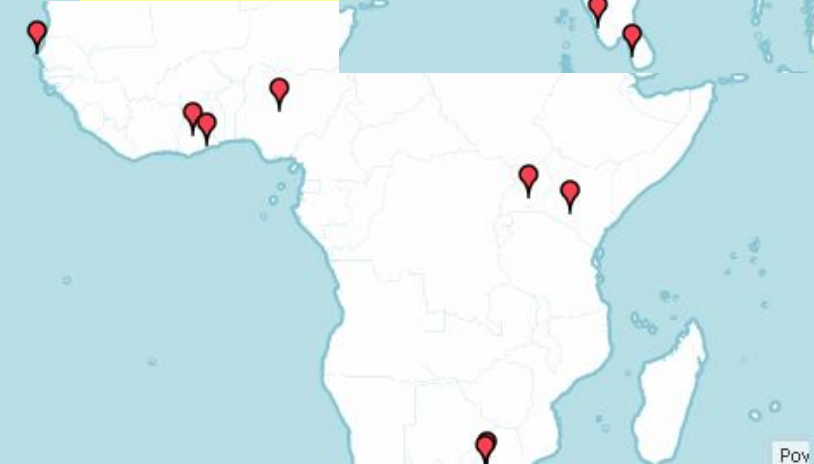
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Find a meetup near you, or start a new one. These events are for you, by you, so meet wherever you like. You choose the topic, the time and the venue.

For help with the meetup group, please email [everywherehelp@meetup.com](mailto:everywherehelp@meetup.com). To contact Coursera, email us at [community@coursera.org](mailto:community@coursera.org).



Coursera communities



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### New York, NY

Founded June 25, 2012

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## Mumbai

Coursea Community

### Mumbai, India

Founded June 25, 2012

Meetups 5

Coursearians 200



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Past Meetups 41

## Developing New Ideas for New Companies: Edu-Startup Focus

The Tipster

New York, NY



RSVP NEEDED: <https://class.coursera.org/innovativeideas-001/class/index> email Mark at [Markwguay@gmail.com](mailto:Markwguay@gmail.com) if you are interested in going. These will be a bi-weekly meet... [Learn more](#)

Sun Feb 10

3:00 PM

RSVP →

7 Coursearians attending

4 comments

# Welcome, Mumbai Coursearians

+ JOIN AND SUGGEST A NEW MEETUP

Upcoming Meetups 5

Past Meetups 11

## Web Based Startup | for ` Developers, Innovaters, Investors, Writers'

Andheri

Mumbai, India



All Those Who Want To Start A Web Based Solution For ` Education, College/Schools Events'.

Sat Feb 16

6:45 PM

RSVP

6 days left

2 Coursearians attending

2 comments

## #Soc101 Meet in Mumbai, India

Candies Bandra

Sat Feb 16

7:00 PM



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## ThinkAgain:Reference Card Week 4

[Reference Card Week 3](#) <---- **Reference Card Week 4** ----> [Reference Card Week 5](#)

### Propositional Logic

A propositional connective is a phrase that connects to one or more propositions in order to express another proposition (a proposition is either a premise or a conclusion, and can be either true or false), e.g. "it is necessary that X", "it is true that", etc

- The final proposition may not logically depend on the original proposition(s) (whether "I hate it when [proposition]" is true is independent of whether [proposition] is true)
- When the final proposition is dependent on the original proposition(s) ("[proposition 1] and [proposition 2]"), the connective is called a truth-functional connective
  - The associated truth table stays the same even if we change the propositions
  - Conjunction: a connective that requires all original propositions to be true ("and" or "&")
    - a conjunction introduction argument is a valid argument which the conclusion conjoins two or more of the premises (e.g.  $A, B \therefore A \text{ and } B$ )
    - a conjunction elimination argument is a valid argument which the conclusion is a conjunct of some conjunction that appears in the premises (e.g.  $A \text{ and } B \therefore A$ )

p	q	p&q
T	T	T
T	F	F



# Hangouts

Video chat with up to nine people at once, face-to-face-to-face.

**START A HANGOUT**



## Featured hangouts



## What's a hangout?

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### Chat face to face

Seeing someone's face can make all the difference, so catch up with together with the whole gang from your computer, phone or tablet device.



### Host virtual meetings

Get work done faster in virtual meetings with powerful tools like screen sharing and Google Drive collaboration.



### Broadcast to the world

Go live in front of a global audience whether you're an aspiring artist, a global celebrity or a concerned citizen.

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[▶ Watch video](#)

## up to 10 people

Hangouts include built-in productivity apps (like Google Drive) that improve team collaboration, even when you're not together. Your team can make last-minute changes to that important presentation, get live input on your analysis from remote team members, or just plan the company holiday party over coffee.

[Start a hangout](#)

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77

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906

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7.00x Introduction to Biology - The Secret of Life



MITx

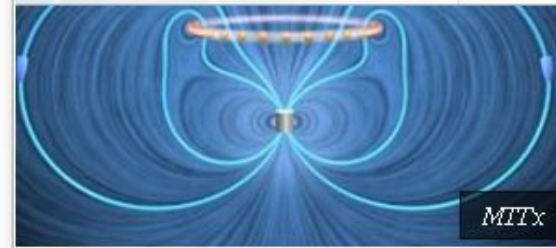
CS191x Quantum Mechanics and Quantum Computation



$$\frac{1}{\sqrt{2}}|\text{cat}\rangle + \frac{1}{\sqrt{2}}|\text{dog}\rangle$$

BerkeleyX

8.02x Electricity and Magnetism



MITx

NEW

PH278x Human Health and Global Environmental Change



HarvardX

NEW

2.01x Elements of Structures



MITx

CS184.1x Foundations of Computer Graphics



BerkeleyX

6.00x Introduction to Computer Science and Programming



```
def parse_data(experiment)
  final_results = 0
  for datum in experiment:
    final_results += datum
  return final_results
```

MITx

HLS1x Copyright



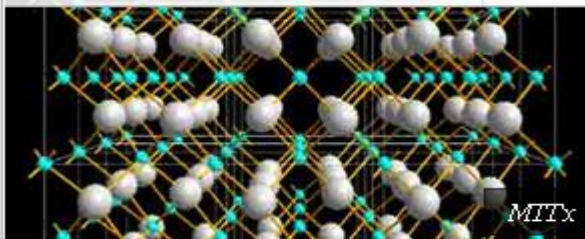
HarvardX

CS169.1x Software as a Service



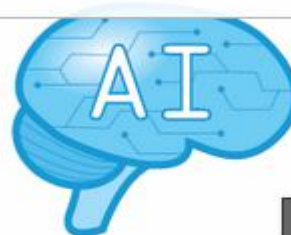
BerkeleyX

3.091x Introduction to Solid State Chemistry



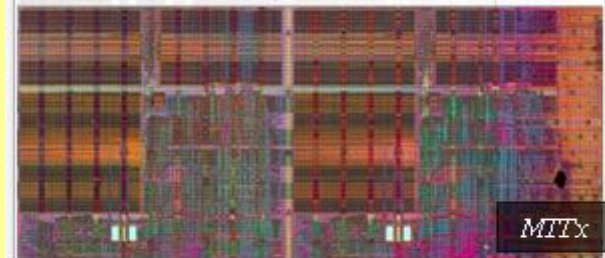
MITx

CS188.1x Artificial Intelligence



BerkeleyX

6.002x Circuits and Electronics



MITx



## The Small Signal Circuit View - Foundations

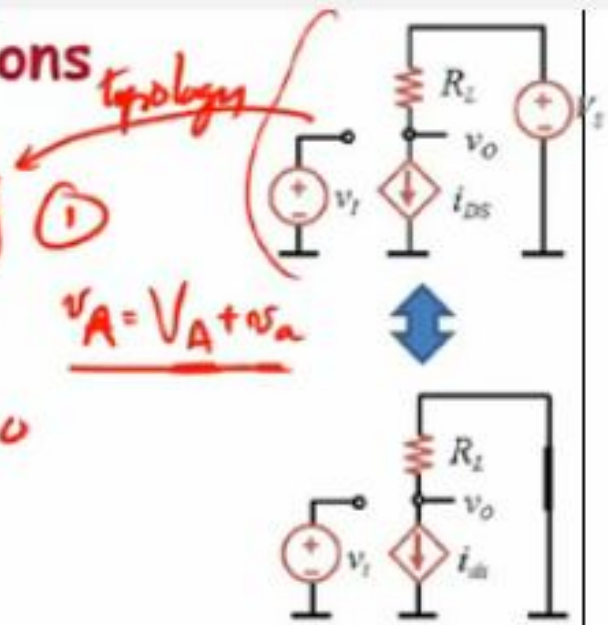
— KVL, KCL applied to some circuit  $C$  yields:

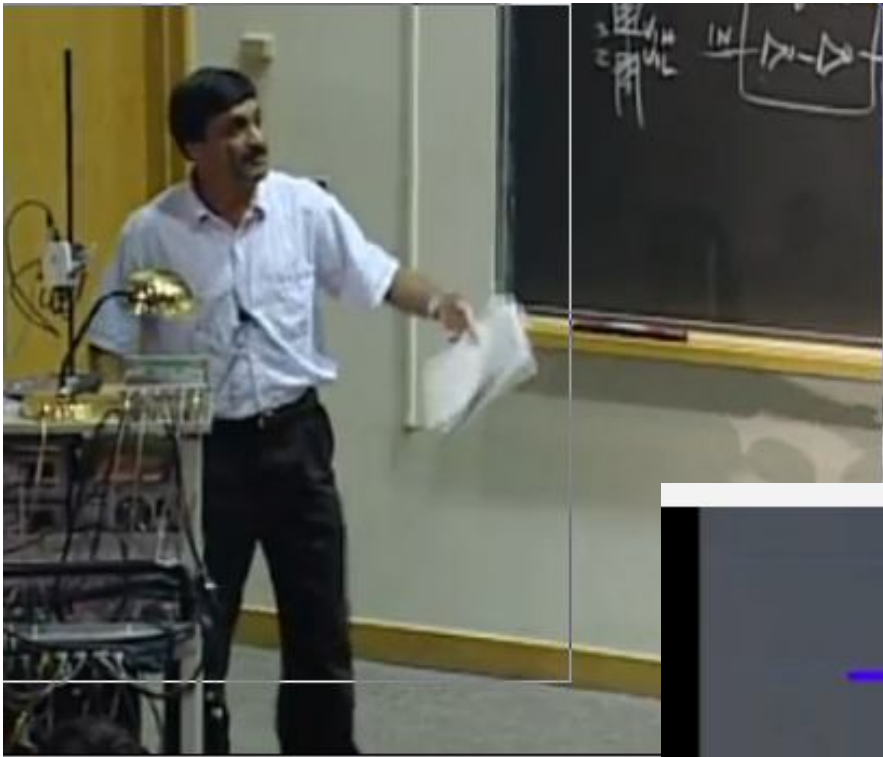
$$\dots + v_A + \dots + v_{OUT} + \dots + v_B + \dots = 0$$

— Replace total variables with operating point variables plus small signal variables

$$\dots + \underline{V_A} + v_a + \dots + \underline{V_{OUT}} + v_{out} + \dots + \underline{V_B} + v_b + \dots = 0$$

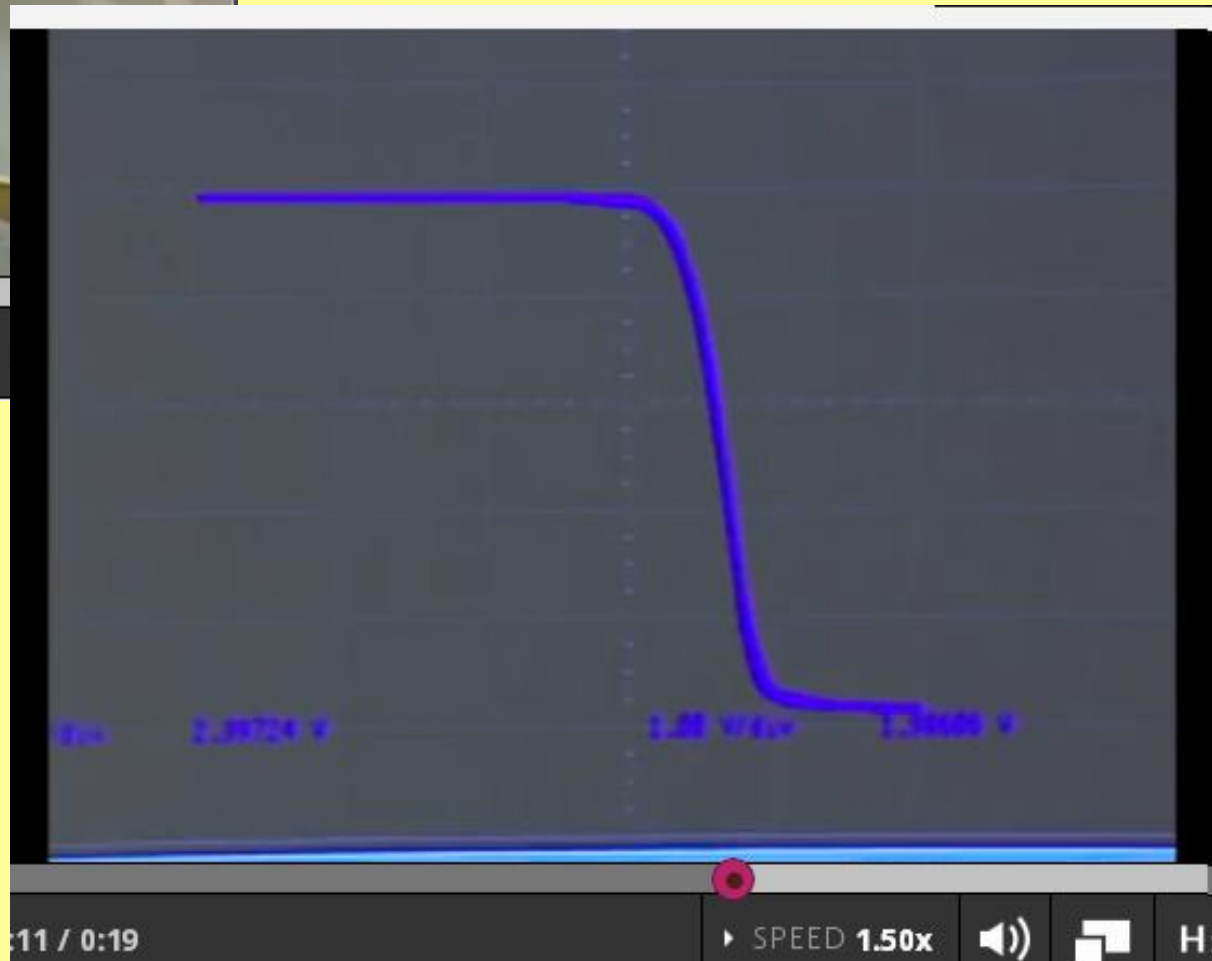
— Operating point variables themselves satisfy the same KVL, KCL equations



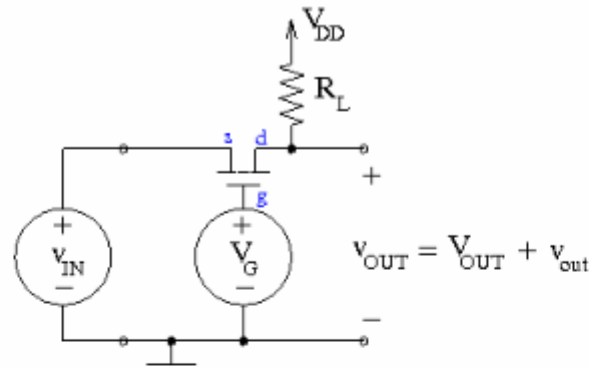


## Лекційні демонстрації

0:19



# Вбудовані інструменти аналізу електричних схем!



The MOSFET's parameters are:  $V_T = 1.1V$  and  $K = 0.009A/V^2$ . The resistance of  $R_L = 220.0\Omega$

If in the application of this circuit the input voltage  $v_{IN}$  may swing between  $1.0V$  the minimum value of the bias voltage  $V_G$ , in Volts, needed to keep the MOSFET

✓

Assume  $V_G = 4.0V$ , and the input swing is as specified. What is the minimum value of the power-supply voltage  $V_{DD}$ , in Volts, needed to saturation?

✗

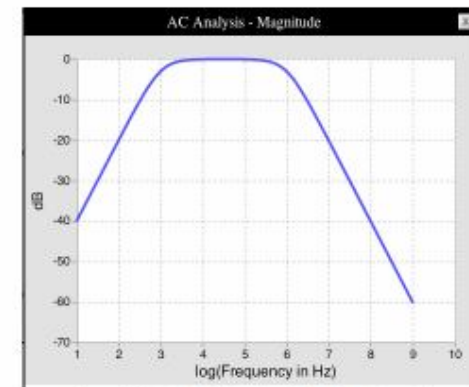
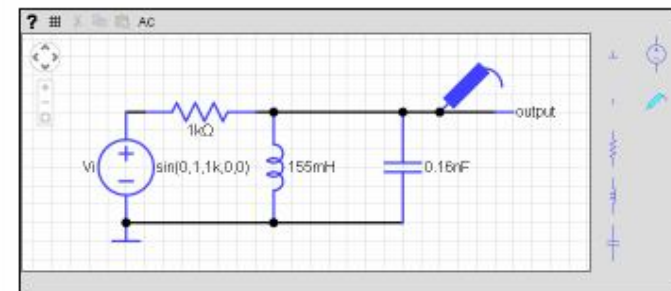


Figure 3. AC analysis of a band-pass filter (magnitude plot)

Hint: Cascade a lowpass and high-pass filter – their effects are cumulative. We've just finished analyzing one of each above! Complete the circuit below, adding the appropriate circuitry between the voltage source and  $V_G$ , the node labeled "output" in the schematic.



✓

# Ефект присутності в аудиторії

Courseware Course Info Textbook: Readings Discussion Periodic Table Wiki Progress

Week 1

Week 2

Week 3

**Electron Transfer and Ionic Bonding**  
Learning Sequence

**Covalent and Polar Covalent Bonding**  
Learning Sequence

**Additional Study Material**

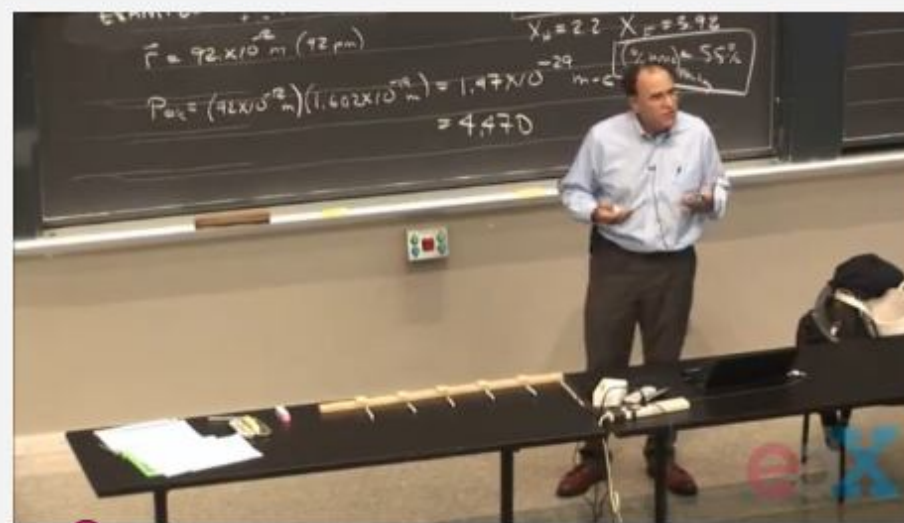
Week 4

Exam 1

Week 5



## S8V9: BONDING CHARACTER, TRENDS, AND MATERIALS PROPERTIES



He went backwards from the traditional chemists who, in the 19th century, was

mixing potions.

And he started--

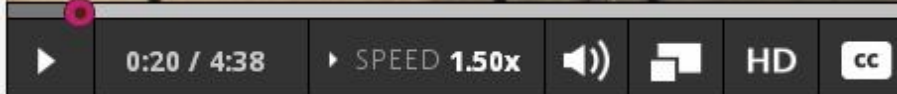
actually, his first papers dealt with crystallography,

**which we'll talk about.**

If you look at this book, *The Nature of the Chemical Bond*, he was

constantly taking what he was learning from these individual molecules and

trying to see what it taught him

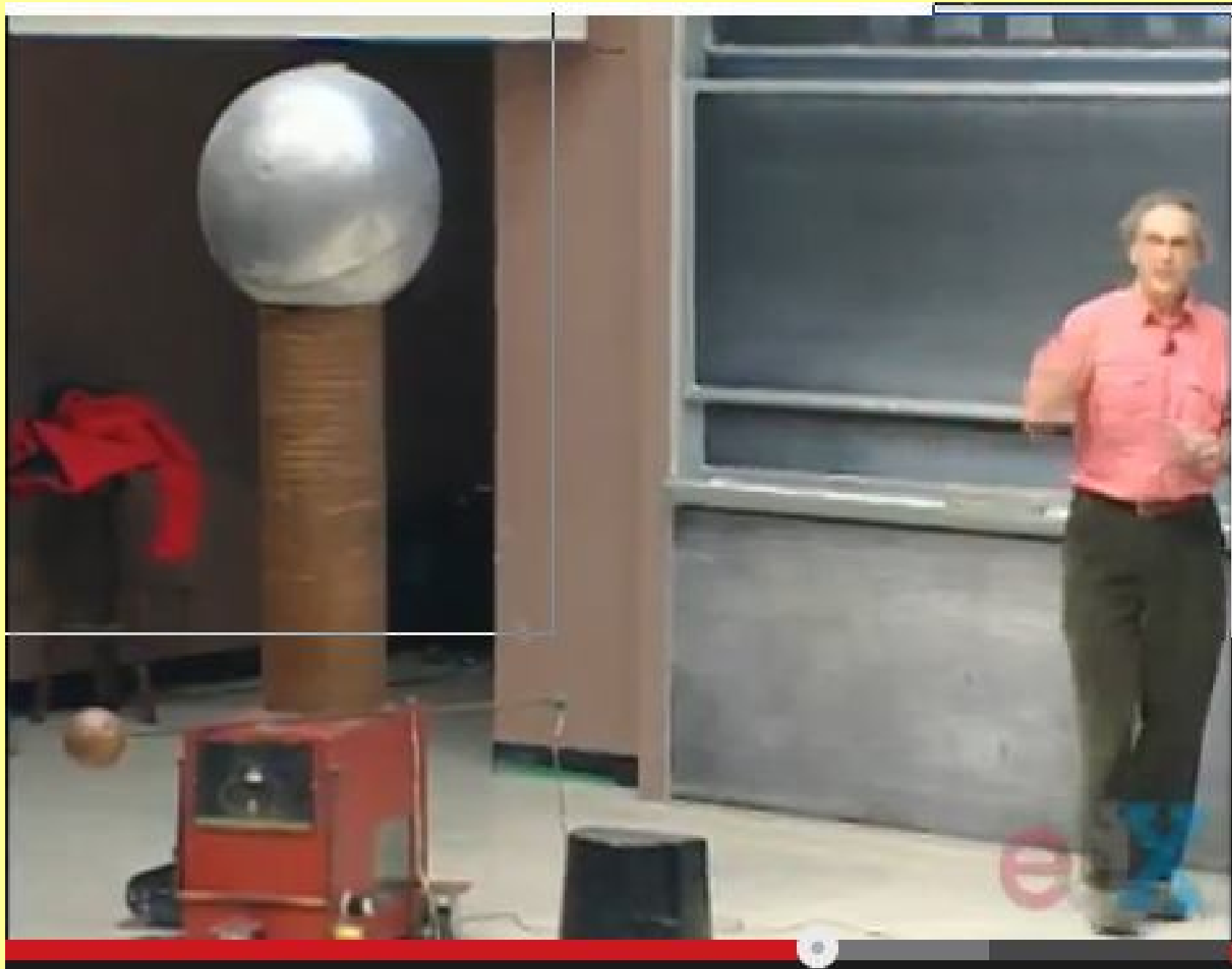


$\sqrt{234}/(2 \times 10^{14})$



7.64852927039e-14

НЕ НАМАГАЙТЕСЯ ПОВТОРИТИ В АУДИТОРІЇ!





Week 1

Week 2

Week 3

Electron Transfer and Ionic Bonding  
Learning Sequence

Covalent and Polar Covalent Bonding  
Learning Sequence

Additional Study Material

Week 4

Exam 1

Week 5

Week 6

Week 7

Week 8

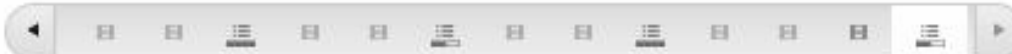
Exam 2

Week 9

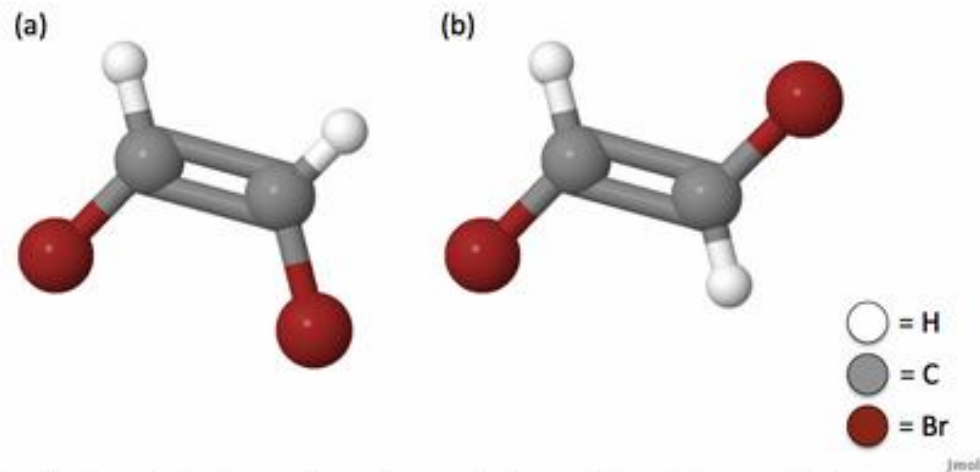
Week 10

Week 11

Week 12



#### S8E4: POLAR MOLECULES



Consider the molecules shown, which are known as *cis*- and *trans*-dibromoethene, respectively.

(a) Which is the correct order of bond dipole moment, from weakest to strongest:

- H-C, C-C, C-Br
- C-Br, H-C, C-C
- C-C, H-C, C-Br
- C-C, C-Br, H-C ❌

(b) Which forms of dibromoethene are polar molecules?

- cis*
- trans*

Check

Show Answer

#### S8E4: DETERMINING PERCENT IONIC CHARACTER

Calculate the percent ionic character of the  $\text{Al-F}$  bond. Recall that the  $\text{Al-F}$  bond is a polar covalent bond.

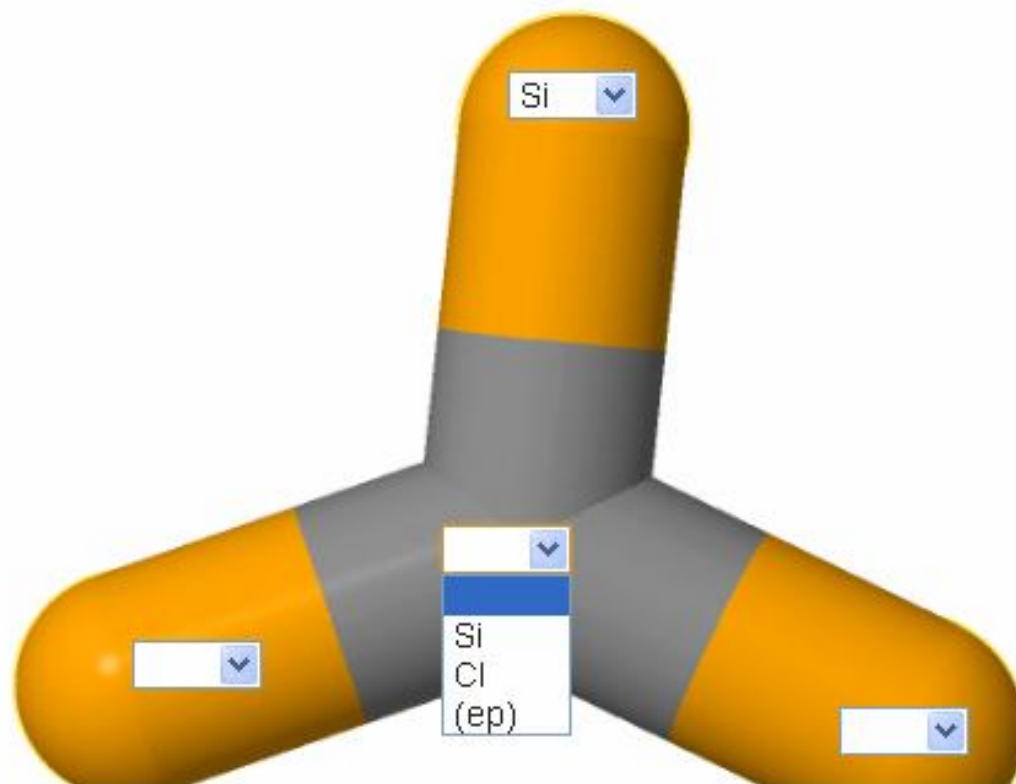
4 ❌

## Конструктор молекул

S10E3: SILICON TETRACHLORIDE

Silicon (Si) reacts with chlorine (Cl), forming the compound  $\text{SiCl}_4$ .

(a) Construct the structure of  $\text{SiCl}_4$ .



Linear  
Trigonal Planar  
Tetrahedral  
Trigonal Bipyramidal  
Octahedral



## Модульний контроль

ELECTRIC FIELD ON THE SURFACE OF A CONDUCTOR : 7.0 POINTS

**Note that you get 2 attempts for this problem. Everytime you click "Check" you use one attempt, so plan wisely. We encourage you to use the "Save" button if you need to save your answers and submit them later after you have answered all parts, or checked all answers.**

The electric field at point  $A$  on the surface of a conductor is  $32 \times 10^3$  V/m. What is the surface charge density (C/m<sup>2</sup>) at that point?



*You have used 2 of 2 submissions*

(e) What is the total charge residing on the upper plate of capacitor  $C_2$  (in Coulombs)? Make sure you have the correct sign.



(f) What now is the magnitude of the electric field between the plates of capacitor  $C_1$  (in V/m)?



(g) What now is the magnitude of the electric field between the plates of capacitor  $C_2$  (in V/m)?



Final Check

Save

*You have used 4 of 5 submissions*

Week 1

Week 2

Week 3

Lecture 7: Capacitance and Field Energy

Lecture

Lecture 8: Polarization and Dielectrics

Lecture

Lecture 9: Current, Resistivity and Ohm's Law

Lecture

Problem Solving

HW3

Homework due March 15, 2013

Charge by Induction Simulation

TEALsim due March 15, 2013

Week 4

Midterm 1

Week 5

Week 6

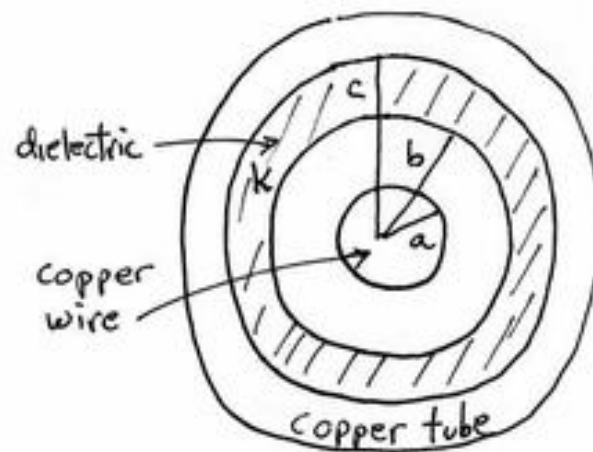
Visualization

TEALsim



### COAXIAL CABLE WITH DIELECTRIC : 14.0 POINTS

A certain coaxial cable consists of a copper wire, radius  $a$ , surrounded by a concentric copper tube of inner radius  $c$ . The space between is partially filled (from  $b$  out to  $c$ ) with material of dielectric constant  $K$ . The goal of this problem is to find the capacitance per unit length of this cable. You may neglect edge effects.



Note that for technical reasons, we use the symbol  $\ell$  for charge per unit length, rather than the more typical  $\lambda$ . Do not get confused,  $\ell$  is not a length!

(a) Assume that the copper wire has uniform positive charge per unit length  $\ell$  and the copper tube has uniform negative charge per unit length on its inner surface  $-\ell$ . Calculate the radial component of the electric field in the region  $0 < r < a$ . Express your answer in terms of  $a, b, c, K, \ell, r$ , and  $\epsilon_0$  (enter epsilon\_0 for  $\epsilon_0$ , pi for  $\pi$  and ln(x) for natural logarithm of x).

✓

Calculate the radial component of the electric field in the region  $a < r < b$ . Express your answer in terms of  $a, b, c, K, \ell, r$ , and  $\epsilon_0$  (enter epsilon\_0 for  $\epsilon_0$ , pi for  $\pi$  and ln(x) for natural logarithm of x).

✓

$$\frac{\ell}{2 \cdot \pi \cdot \epsilon_0 \cdot r}$$

✓

$$-\frac{\ell}{2 \cdot \pi \cdot \epsilon_0} \cdot \ln\left(\frac{b}{a}\right)$$

# Перевірка аналітичних формул!

Lecture 8: Polarization and Dielectrics

Lecture



Lecture 9: Current, Resistivity and Ohm's Law

Lecture



Problem Solving

Problem Solving

HW3

Homework due March 15, 2013



Charge by Induction Simulation

TEALsim due March 15, 2013



Week 4

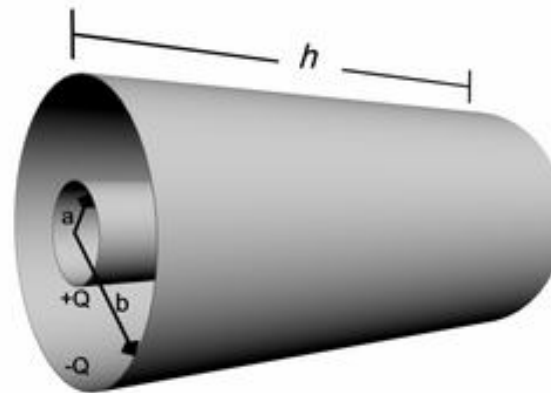
Midterm 1

Week 5

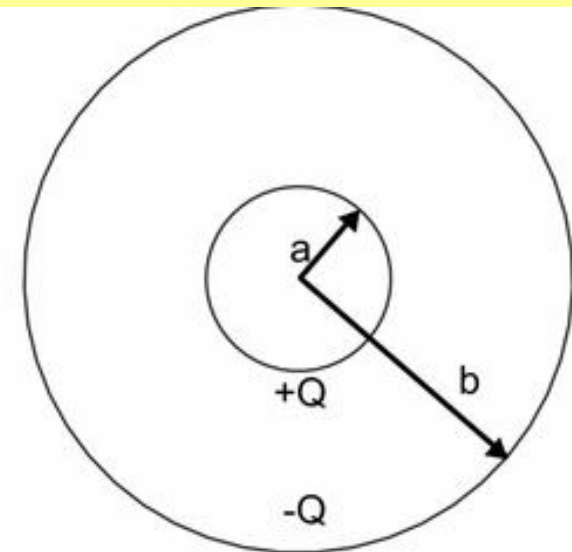
Week 6

Visualization

TEALsim



(a) Fig. 1



(b) Fig. 2

(a) What is the capacitance per unit length? Express your answer in terms of  $a, b$  and  $\epsilon_0$  (enter epsilon\_0  $\epsilon_0$ ).



$$2 \cdot \pi \cdot \frac{\epsilon_0}{\ln\left(\frac{b}{a}\right)}$$

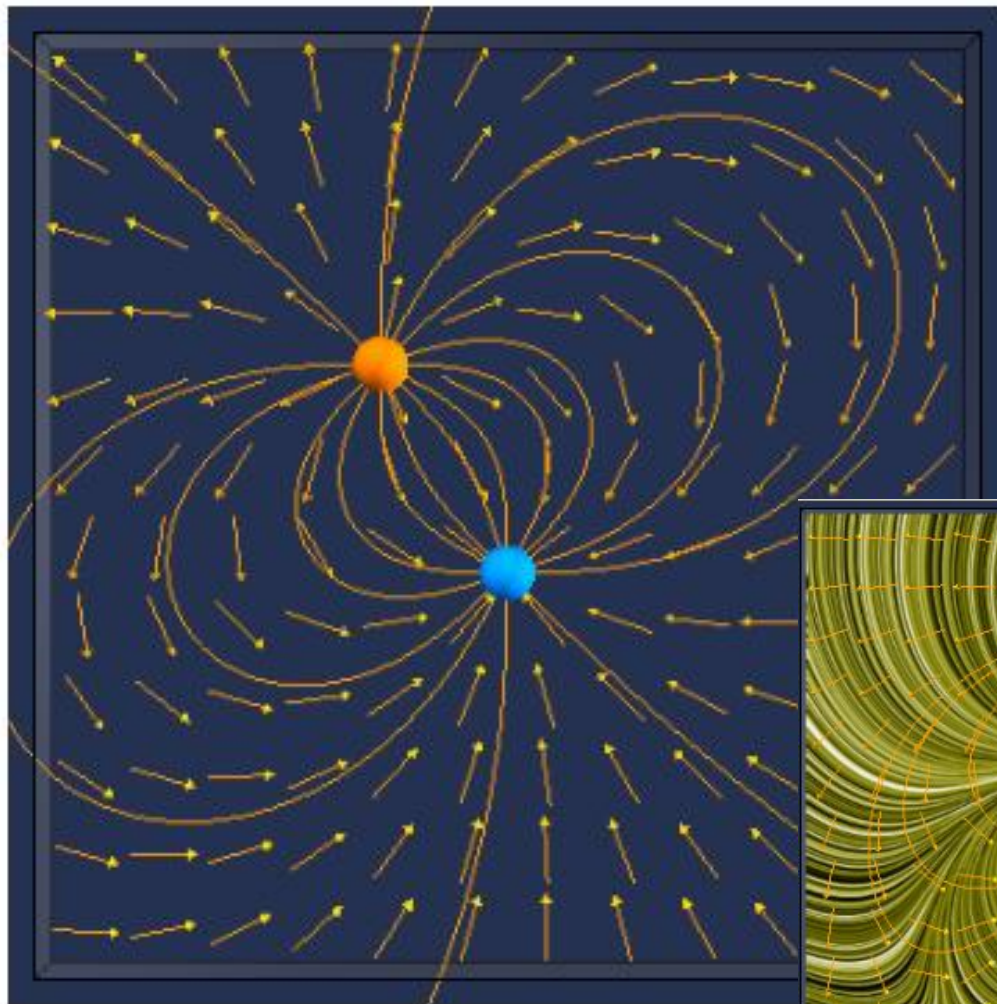
$$2 \cdot \pi \cdot \frac{\epsilon_0}{\ln\left(\frac{b}{a}\right)}$$

$$2 \cdot \pi \cdot \frac{\epsilon_0}{\ln\left(\frac{b}{a}\right)}$$

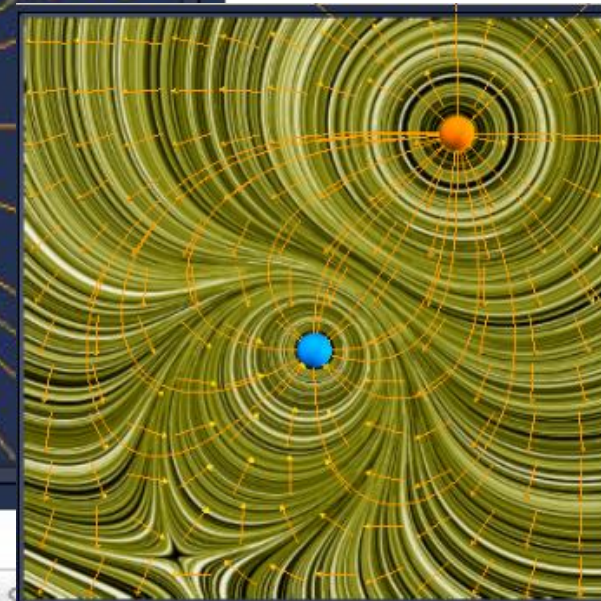


# Вбудовані візуалізації!

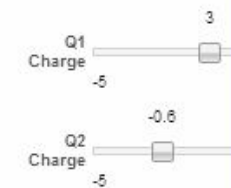
(Please be patient - the simulation may take ~20 seconds to load)



## Parameters



## Parameters



## Field Visualization

- Show Vector Field Gr
- Field Lines

Grass Seeds

Electric Potential

Reset camera

Resume

Reset Simulation

## Консультація: повторюй, скільки треба

We have two point charges, one positively charged ( $q_1 = 4 \times 10^{-9} \text{ C}$  located at  $x = 0.8 \text{ m}$  and  $y = 0.6 \text{ m}$ ) and one negatively charged ( $q_2 = -6 \times 10^{-9} \text{ C}$  located at  $x = 0.8 \text{ m}$  and  $y = 0.0 \text{ m}$ ). Find the electric field (magnitude and direction) at the origin due to these two charges.

### HELP SESSION

Diagram illustrating the setup for finding the electric field at the origin (O) due to two point charges:

- Charge  $q_1 = 4 \times 10^{-9} \text{ C}$  is located at  $(0.8 \text{ m}, 0.6 \text{ m})$ .
- Charge  $q_2 = -6 \times 10^{-9} \text{ C}$  is located at  $(0.8 \text{ m}, 0.0 \text{ m})$ .

The diagram shows a coordinate system with the origin O. A hand is drawing a vector labeled B pointing towards the origin, indicating the direction of the electric field.

here at point B, then the electric field is defined radially outwards from B pointing in the direction of A because this is a positive charge.

If this were a negative charge, it would be reversed.

**It would be pointing in the direction of B, so I call it E of A. And if the**

separation between them is  $r$ , then E of A--

if I take the magnitude of it now-- is the charge at location  $q$  divided by  $4 \pi \epsilon_0 r^2$ .

And I also do indicated the

# Форум, в якому хочуть і можуть допомогти

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I'm sorry...I couldn't resist	+28	12
IMPORTANT: Error In Problem 8	+27	1

## Stuck on S3E5

+ 31

**ravar**  
6 months ago

can someone give a hint on a general way to think about this problem?

(this post is about [Week 1 / S3E5: Cathode Ray Tube](#))

**marcmelendez**  
6 months ago

+ 0

Think about the definition of voltage (S3V6 video) and work out the energy of an electron that moves from one charged plate to the other.

does S3E5 video materials used for 3.091x? If so, where I can find it. someone answer me please

-posted 6 months ago by [nblotfy](#)

Add a comment...

**MichaelReach**  
6 months ago

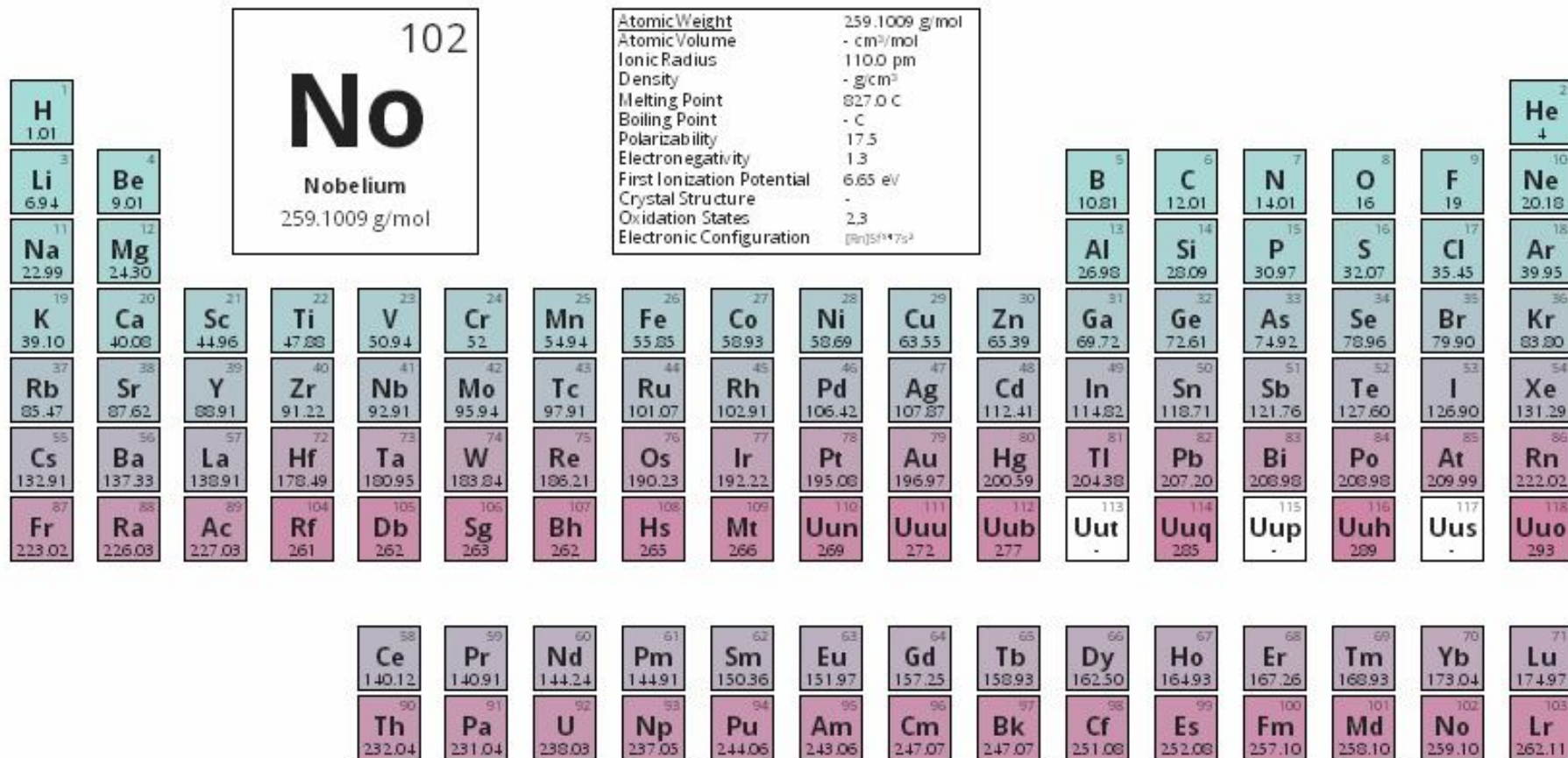
+ 15

The distance between the two plates is going to turn out not to matter. The field strength is  $V/d$ , voltage divided by distance, and then the force on the charged particle is  $q*V/d$ . Then



# Інтерактивні довідкові системи

[https://www.edx.org/courses/MITx/3.091x/2012\\_Fall/periodic\\_table/](https://www.edx.org/courses/MITx/3.091x/2012_Fall/periodic_table/)

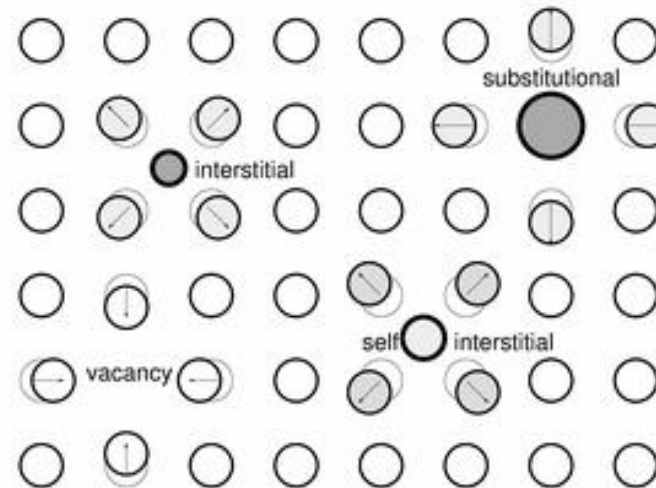


- 3. Bonding in Metals, Semiconductors, and Insulators - Band Structure
- 4. Nature of Crystalline Solids
- 5. X-rays and Diffraction
- 5a. Elastic Behavior of Solids
- 6. The Imperfect Solid State
- 6a. Bonding and Surfaces
- 7. Glasses
- 8. Theory of Reaction Rates
- 9. Diffusion
- 9a. Bonding and Solutions
- 10. Phase Equilibria and Phase Diagrams

$k$  = the Boltzmann constant  
 $A$  = proportionality constant

### B. Point Defects in "Pure" Metallic Systems

Point defects in "pure" crystalline metals are defects of atomic dimensions, such as impurity atoms, the absence of a matrix atom and/or the presence of a matrix atom in the wrong place. Some of these point defects are shown in fig. 2. An impurity atom that



occupies a normal lattice site is called a *substitutional impurity atom* and an impurity atom found in the interstice between matrix atoms is called an *interstitial impurity atom*. Whether a foreign atom will occupy a substitutional

Figure 2 Point defects in crystalline solids

or interstitial site depends largely on the size of the atom relative to the size of the site. Small atoms are usually interstitial impurities, while larger atoms are usually



## Можливість контролювати і прогнозувати свої досягнення

Courseware

Course Info

Textbook: Readings

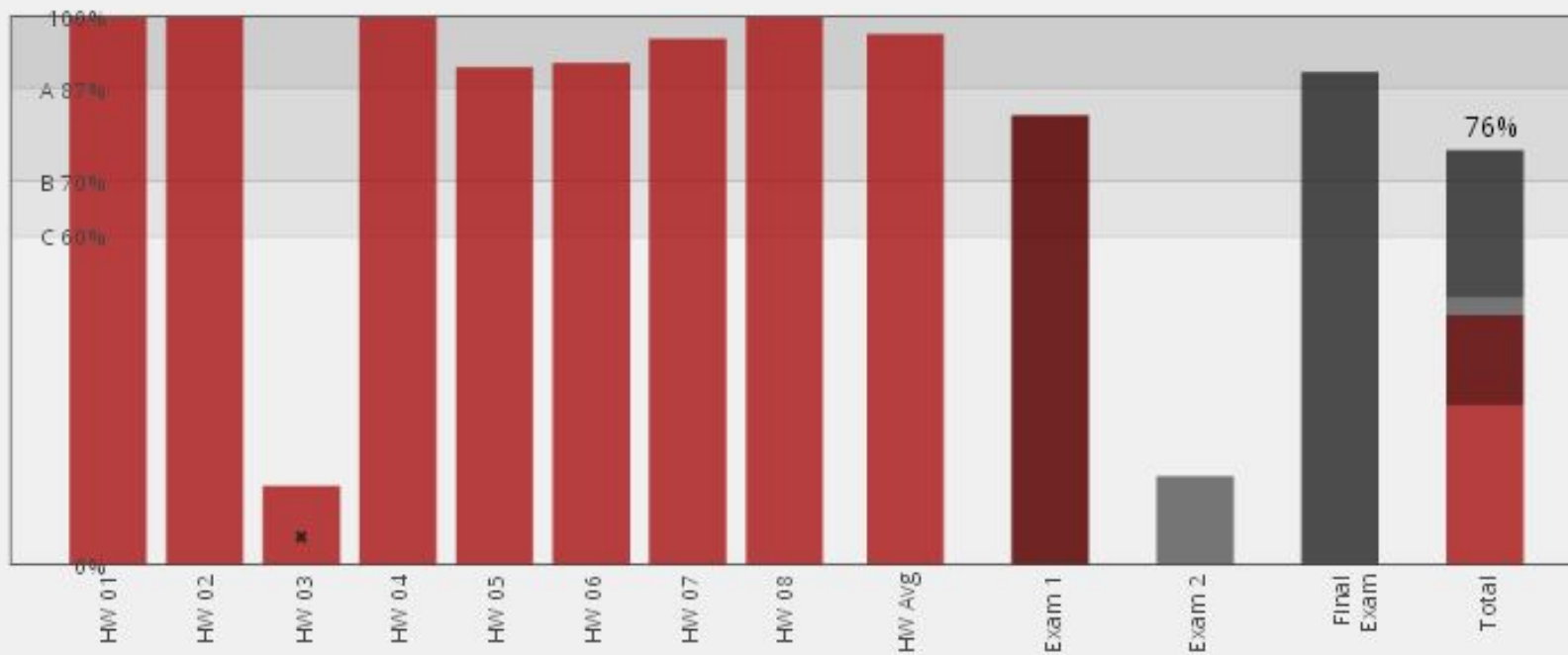
Discussion

Periodic Table

Wiki

Progress

### Course Progress



... Інші приємні дрібниці ... ☺



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**Yuriy Skorenkyy**

has successfully completed *Circuits and Electronics 6.002x*

A course of study offered by *MITx*, an online learning initiative of  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY, through *edX*,  
the online learning initiative of Harvard University and MIT

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W. Eric L. Grimson, Interim Dean of Online Education, *MITx*

JUNE 12<sup>TH</sup>, 2012

Knowledge Map

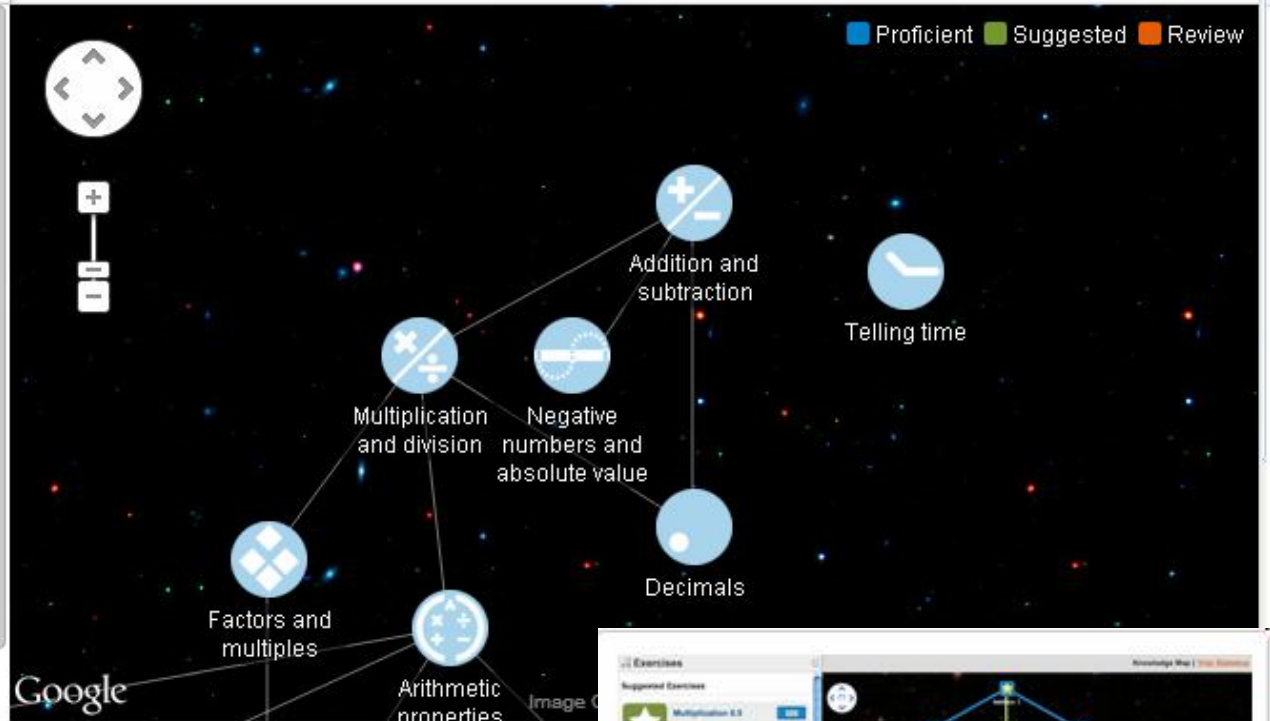
Vital Statistics

Start typing the name of challenge or skill to find it

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- Telling time (0/3 skills)
- Addition and subtraction (0/11 skills)
- Representing numbers
- Number line 1
- 1-digit addition
- Telling time 0.5

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Multiplication and division

$$9 \times 1 = ?$$

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Laplace transform

-  Laplace Transform 1
-  Laplace Transform 2
-  L{sin(at)} - transform of sin(at)
-  Part 2 of the transform of the sin(at)

$$\mathcal{L}\{f(t)\} = \int_0^{\infty} e^{-st} f(t) dt$$

$$\mathcal{L}\{e^{at}\} = \int_0^{\infty} e^{-st} e^{at} dt = \int_0^{\infty} e^{(a-s)t} dt$$

$$= \frac{1}{a-s} \left[ e^{(a-s)t} \right]_0^{\infty} = \frac{1}{a-s} [0 - 1]$$

$$= -\frac{1}{a-s} = \frac{1}{s-a}$$

$a-s > 0$  to no limit  
 $a > s$   
 $a-s < 0$   
 $a < s$

$$\mathcal{L}\{e^{at}\} = \frac{1}{s-a}$$

5:47 / 7:34



**Yuri**  
 Joined 10 months ago  
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## Test Prep

SAT Math	CAHSEE	Competition Math
GMAT	California Standards Test	IIT JEE

### SAT PREPARATION

Community Questions

## SAT Math

Sal works through every problem in the first edition of the College Board 'Official SAT Study Guide' (ISBN Number: 0-87447-718-2 published in 2004). You should take the practice tests on your own, grade them and then use these videos to understand the problems you didn't get or to review. Have fun! If you're using the second edition of the study guide with 10 practice tests, you can still use some of these videos. Practice tests 4-10 in the newer book correspond to tests 2-8 below.



SAT prep: test 1 section3 part 1



SAT Prep: Test 4 Section 8 Part 1



SAT Prep: Test 1 Section 3 Part 2



SAT Prep: Test 4 Section 8 Part 2

## Math

Arithmetic and pre-algebra	Calculus	Linear algebra
Algebra	Probability and statistics	Applied math
Geometry	Differential equations	Recreational mathematics
Trigonometry and precalculus		

## Science & Economics

Biology	Finance and capital markets	Healthcare and medicine
Chemistry	Microeconomics	LeBron asks
Physics	Macroeconomics	Projects
Cosmology and astronomy	Computer science	MIT+K12
Organic chemistry		

## Computer Science

Drawing	Animation	User Interaction
Programming Basics		

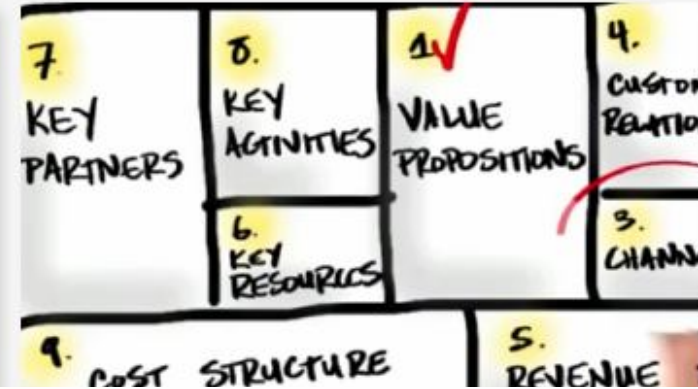
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### Open Detective



### Intro to Openness in



### Rooted

## Платформи для online-курсів

If you have previously taken online courses, which of the following providers did you use? Choose all that apply.

- Not applicable
- Coursera
- Udacity
- edX
- Open Yale
- MIT OpenCourseWare
- Stanford Venture Lab
- Khan Academy
- iTunes U
- Local community college
- For-profit college (i.e. University of Phoenix, etc.)



NATURE | NEWS FEATURE

# Online learning: Campus 2.0

Massive open online courses are transforming higher education — and providing fodder for scientific research.

M. Mitchell Waldrop

13 March 2013 | Corrected: 20 March 2013

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# MOOCs rising

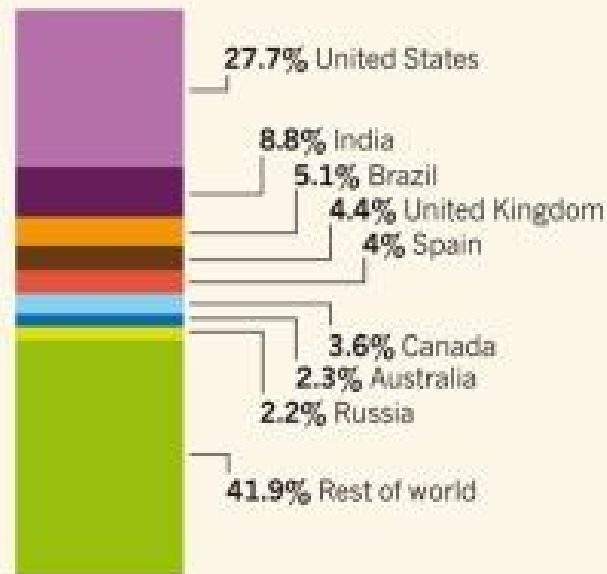
Over little more than a year, Coursera in Mountain View, California – the largest of three companies developing and hosting massive open online courses (MOOCs) – has introduced 328 different courses from 62 universities in 17 countries (left). The platform's 2.9 million registered users come from more than 220 countries (centre). And courses span subjects as diverse as pre-calculus, equine nutrition and introductory jazz improvisation (right).

## Supply and demand

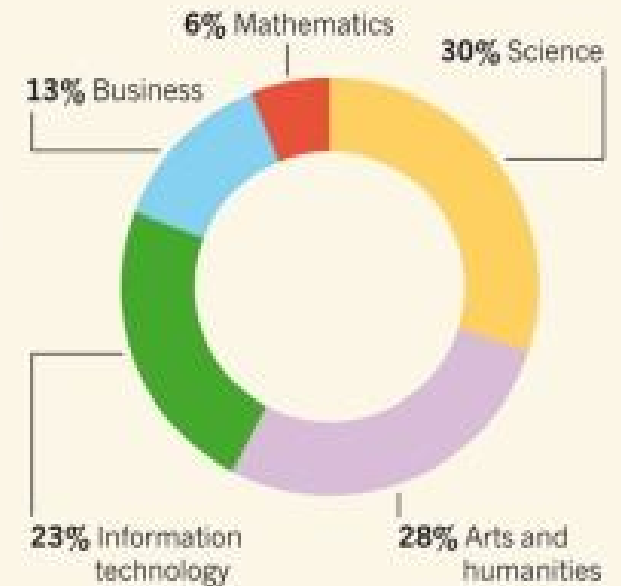
- Number of courses available on the platform
- Number of user accounts on the platform (millions)



## Student origins



## Courses offered



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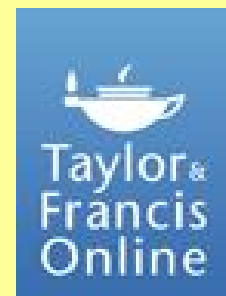
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GATES *foundation*

Open Yale courses

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Open Learning: The Journal of Open, Distance and e-Learning  
<http://www.tandfonline.com>

<http://elearnmag.acm.org/featured.cfm?aid=2016017>

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