
Teaching Exchange Fellowship Sharing Session: Learning Glass

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Dr. Rachel Lui
Faculty of Science
Oct 12, 2017

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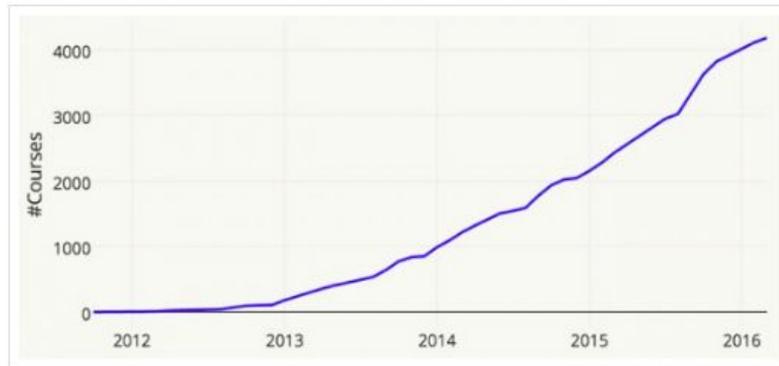
Movitation

Online Courses

MOOCs and SPOCs are popular now!

An international bent

Class Central reports as well that 1,800 new MOOCs were offered in 2015, taking the number of total courses introduced (since late-2011) to 4,200 as of this month.



Teaching & Learning TML@HKU 4-Year UG Curriculum Common Core Academic Advising Experiential Learning Horizons Staff

THE UNIVERSITY OF HONG KONG > e-learning Blog > HKU Online Learning & MOOCs > CETL > UG Research Fellowship

"If history is our guide, we can assume that the battle between the intellect and will of the human species and the extraordinary adaptability of microbes will be never-ending."
Fauzi AS, et al. Emerg Infect Dis 2005

Epidemics

Starting on 28 September 2017

Learn about the origin, spread and control of epidemics with world-renowned experts from The University of Hong Kong

The University of Hong Kong (HKU) has released a series of MOOCs (Massive Open Online Courses) since late 2014. These interactive MOOCs, designed and taught by world-renowned professors at the University, are built around self-paced video lectures, online discussion groups and assessment exercises. Registration is open to all, with no prerequisites. Join our courses on **edX** and **Coursera** now!

[e-learning Blog](#) [How to join HKUx](#) [Our Facebook](#)

Materials in Oral Health 40

Introduction to Microbiology HKU

<http://monitor.icef.com/2016/01/mooc-enrolment-surpassed-35-million-in-2015/>

Components of Online Courses

1. Instructional videos
2. Presentation slides
3. Exercises & Quizzes
 - Instant feedback

Question 2

Incorrect

Mark 0.00 out of 1.00

Flag question

Edit question

Which of the followings is NOT a differential equation?

Select one:

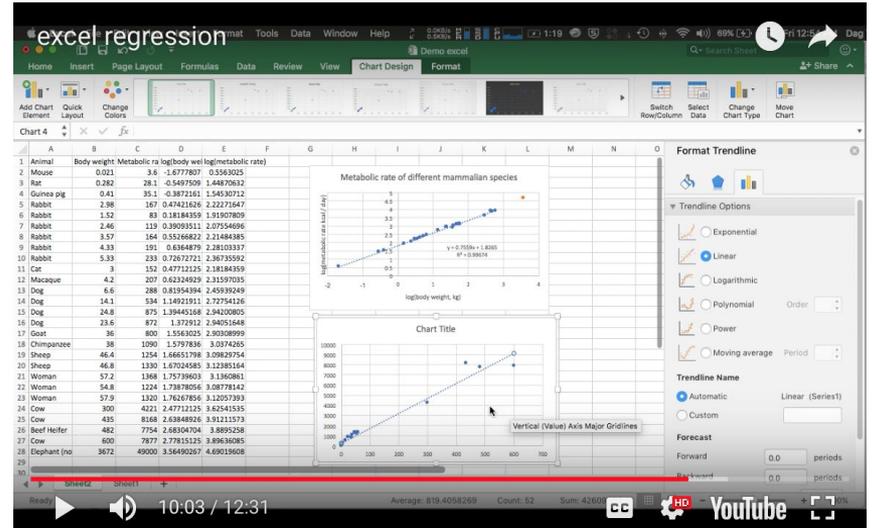
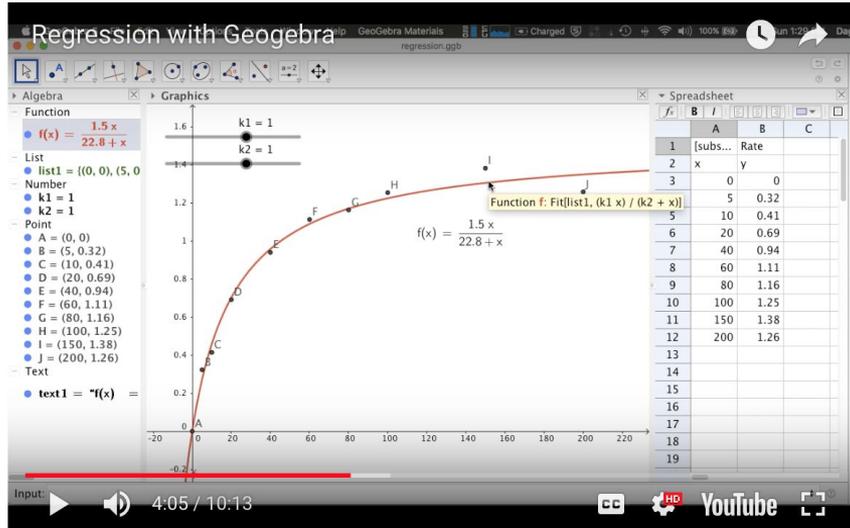
- a. $y(dy/dx)^2 - d^3y/dx^3 = 0$
- b. $dy/dx + 4x = 2y/x$
- c. $dy/dx = (x^2 + y^2)/xy$ ✗
- d. None of the other options
- e. $5d^2y/dx^2 + 3\sin(x) = 3\sin(x) + 2dy/dx$

Your answer is incorrect.

The correct answer is: None of the other options

What are Instructional Videos?

- A simple recording of lecture or a combination of slides, audio and animation.

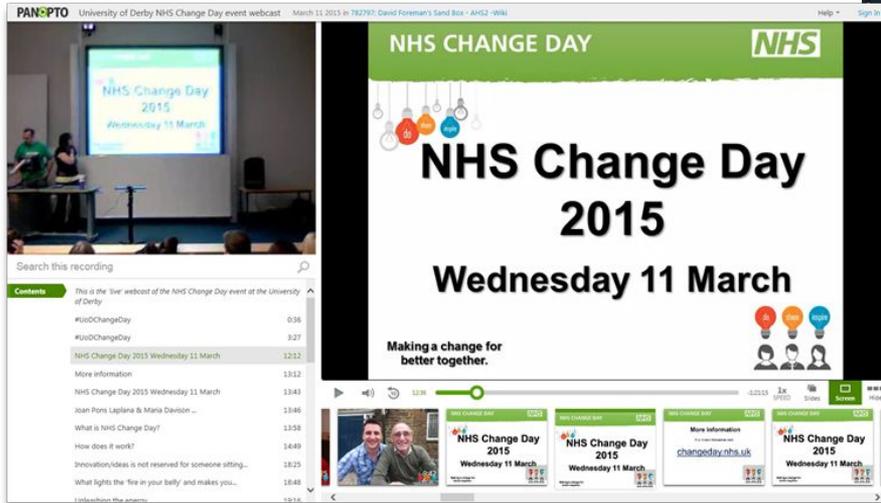


Why do we create Instructional Videos?

- Flipping the classrooms
- Customized learning
- Efficient sharing of teaching materials.

Different softwares

- Camtasia
- Panopto



Camtasia

- Capture the screen
- Video Editing -- on multi-tracks
- Works well with different formats e.g. MP4, MPEG-4 etc.
- Good for sharing
- Many library of tutorial materials or resources

<https://tl.hku.hk/2016/07/diy-video-production-for-flipped-classroom/>

DIY Video Production for Flipped Classroom

Creating online videos is easier than you think, even if you are no tech guru. With a graphing tablet, a microphone and a screen capture software, you can create DIY videos efficiently. In the Spring 2016 semester, Dr. Rachel K.W. Lui, Dr. K.F. Lam, Dr. William M.Y. Cheung and Dr. N.K. Tsing of the Faculty of Science tried this DIY approach of creating videos for flipping their first-year science foundation course, “SCNC1111 Scientific method and reasoning.”



Support from HKU - A DIY streaming station



Like Follow Share ...

HKU Online Learning added 3 new photos. September 13 at 7:00pm

TELI is glad to have filmed Professor Rick Glofcheski's flipped class for Tort Law (LLAW 1005) this morning.

A DIY streaming station was set up in our studio room – from now on, professors can help themselves at the station and film online courses whenever they want. This DIY streaming station is a great time-saver and is convenient to use. It is a cradle where many high quality, innovative and educational videos were conceived. Through real-time streaming, subject experts can share their ideas and insights efficiently with a large audience, saving the trouble of setting up and post-editing.

The development of softwares has made filming technology more accessible to amateurs. It has empowered us to create sharable content more easily with a much smaller budget. In the past, expensive TV broadcaster level hardware and a team of experienced crew are prerequisites to produce videos. Today, with a laptop camera and your trusty smartphone or computer, you're good to go!



DIY streaming station



Teaching Exchange Fellowship

Host Institute and Hosts

- UCLA
- Professor James W. Stigler & Karen Givvin
- Co-author of The Teaching Gap & The Learning Gap
- Directed the TIMSS video studies



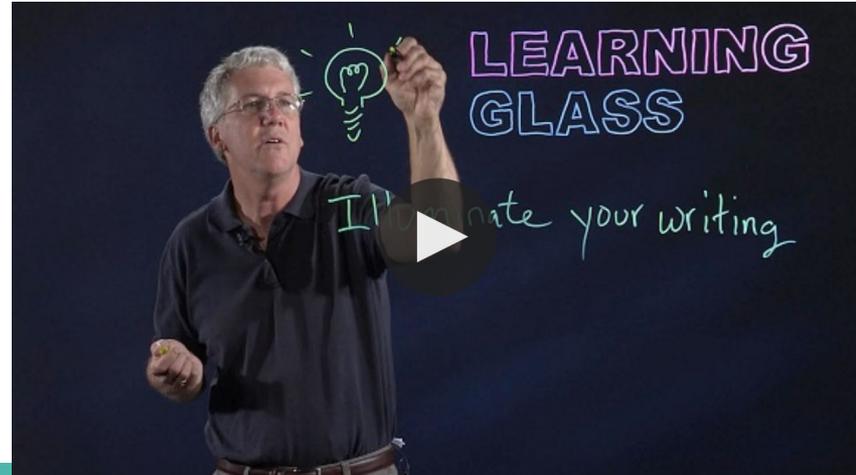
Hardware: Learning Glass

- A transparent whiteboard
- A neon marker
- Camera
- One computer
- Two monitors



What is Learning Glass?

- A new technology for recording lectures
- Allows instructors to write lecture notes while maintaining face-to-face contact with students
- It's a transparent whiteboard/ lightboard paired with a lecture capture system



In the news

New York Times, September 2015

San Diego State University's New Learning Glass Studio

Makes Class Time More Engaging

Students say they feel more connected to their professor while watching lectures online via Mediasite versus face-to-face instruction.

San Diego State University is making class time more personable in a unique new learning studio with help from Mediasite from Sonic Foundry, inc., the trusted global leader for video solution and management solutions.



LINK UNAVAILABLE

<http://www.learning.glass/in-the-news/>

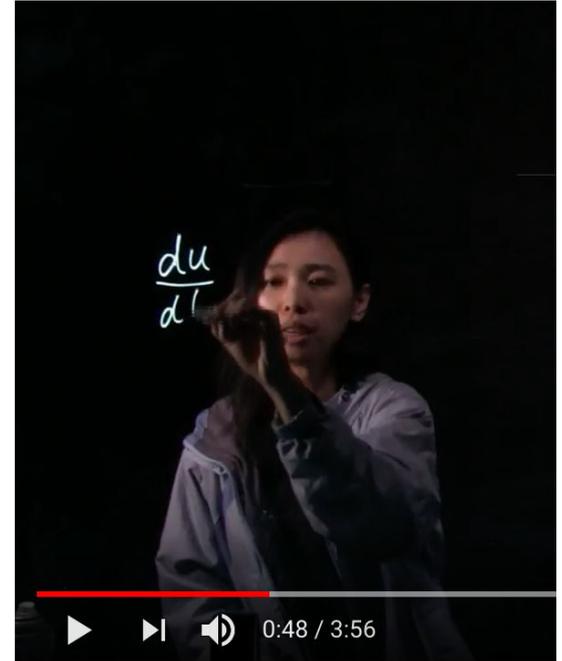
Learning Glass Users

Learning Glass Users



Left-handed?

- Images are flipped in real time for streaming or live presentations.
- No special skills (such as writing backwards) are needed.



Facing the audience with the PowerPoint file

- Students get disturbed when teacher faces towards board. (Jadhav et al., 2016)

Procedure of Finding Closed Form Solution of Homogeneous Linear Difference Equation

- **Step 4:** When all the roots have been considered in Step 3, there should be altogether k component closed forms. Multiply each of them by an arbitrary constant coefficient, and sum them up. This will be the general closed form solution for $y(x)$
- **Step 5:** If initial conditions are given, substitute them into the general closed form obtained in Step 4, and solve for the particular values of the coefficients.

$$\frac{d^3y}{dx^3} - 4\frac{d^2y}{dx^2} + 5\frac{dy}{dx} - 2y = 0$$
$$-4\lambda^2 + 5\lambda - 2 = 0$$
$$(\lambda - 1)^2(\lambda - 2) = 0$$
$$\lambda = 1, 1, 2$$
$$= a e^{x} + b x e^{x} + c e^{2x}$$

Scientific Method & Reasoning

0:13 / 0:59

CC HD

Writing

Petimani (2015):

- “Blackboard teaching remains the best preferred teaching aid”
- “A good lecturer can motivate the students on a journey of discovery, exposing students to one interesting fact after another by blackboard teaching method.”
- “Students will have better retention of the subject afterward if the notes are written with the lecturer's explanation.”

Point a particular place in the slide

Solving higher order homogeneous linear difference equations

Step 1

Difference equation	Characteristic polynomial equation
$x_n = 1.55 x_{n-1}$	$\lambda = 1.55$
$F_n = F_{n-1} + F_{n-2}$	$\lambda^2 = \lambda + 1$
$z_n = z_{n-1} + 5z_{n-2} + 3z_{n-3}$	$\lambda^3 = \lambda^2 + 5\lambda + 3$
$p_n = 5p_{n-2}$	$\lambda^2 = 5$
$y_n + 4y_{n-2} = 0$	$\lambda^2 + 4 = 0$
$x_{n+3} - 7x_{n+1} + 6x_n = 0$	$\lambda^3 - 7\lambda + 6 = 0$

Scientific Method & Reasoning 37

$x_n = 1.55 x_{n-1}$
 $\lambda = 1.55 \times 1$
 $= F_{n-1} + F_{n-2}$
 $= \lambda + 1$

1:10 / 3:51

CC HD

Hardware: Learning Glass

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Without PowerPoint

The half-life of radium-226 is 1,600 years. If the current amount of radium-226 is M_0 , then

- after one half-life, there will be only

$$M_1 = 0.5M_0 \text{ left.}$$

- after two half-lives (i.e. 3,200 years), there will be just

$$M_2 = 0.5M_1.$$

- after three half-lives (i.e. 4,800 years), there will be just

$$M_3 = 0.5M_2.$$

In general, the amount M_n of radium-226 after n half-lives satisfies the difference equation

$$M_n = 0.5 M_{n-1}$$



0:10 / 0:53



Write at a specific place

Problem of the Rabbits

- Initially there is a pair of baby rabbits – one of each gender.
- Each month, a couple of baby rabbits will mature.
- Each month, a couple of adult rabbits will produce a couple of baby rabbits.
- Assume that the rabbits will never die. What is the total number of rabbit pairs after one year?

		Number of pairs of baby Rabbits	Number of pairs of mature rabbits	Total number of pairs of rabbits
Start	Jan 1	1	0	1
After 1 month	Feb 1	0	1	1
After 2 months	Mar 1	1	1	2
After 3 months	Apr 1	1	2	3
After 4 months	May 1	2	3	5
After 5 months	Jun 1			
After 6 months	Jul 1			
After 7 months	Aug 1			
After 8 months	Sept 1			
After 9 months	Oct 1			
After 10 months	Nov 1			
After 11 months	Dec 1			
After 1 year	Jan 1			

Include a title/your name/your affiliation

Solving Differential Equation

Solve $\frac{dy}{dx} = 2x + 3$ with initial condition $y(1) = 2$.

$$\frac{dy}{dx} = 2x + 3$$

The University of Hong Kong

Dr. Rachel Lui
SCNC1111 Scientific Method and Reasoning

0:23 / 0:48

Why not PowerPoint in writing equations?

If I teach using PowerPoint, ...

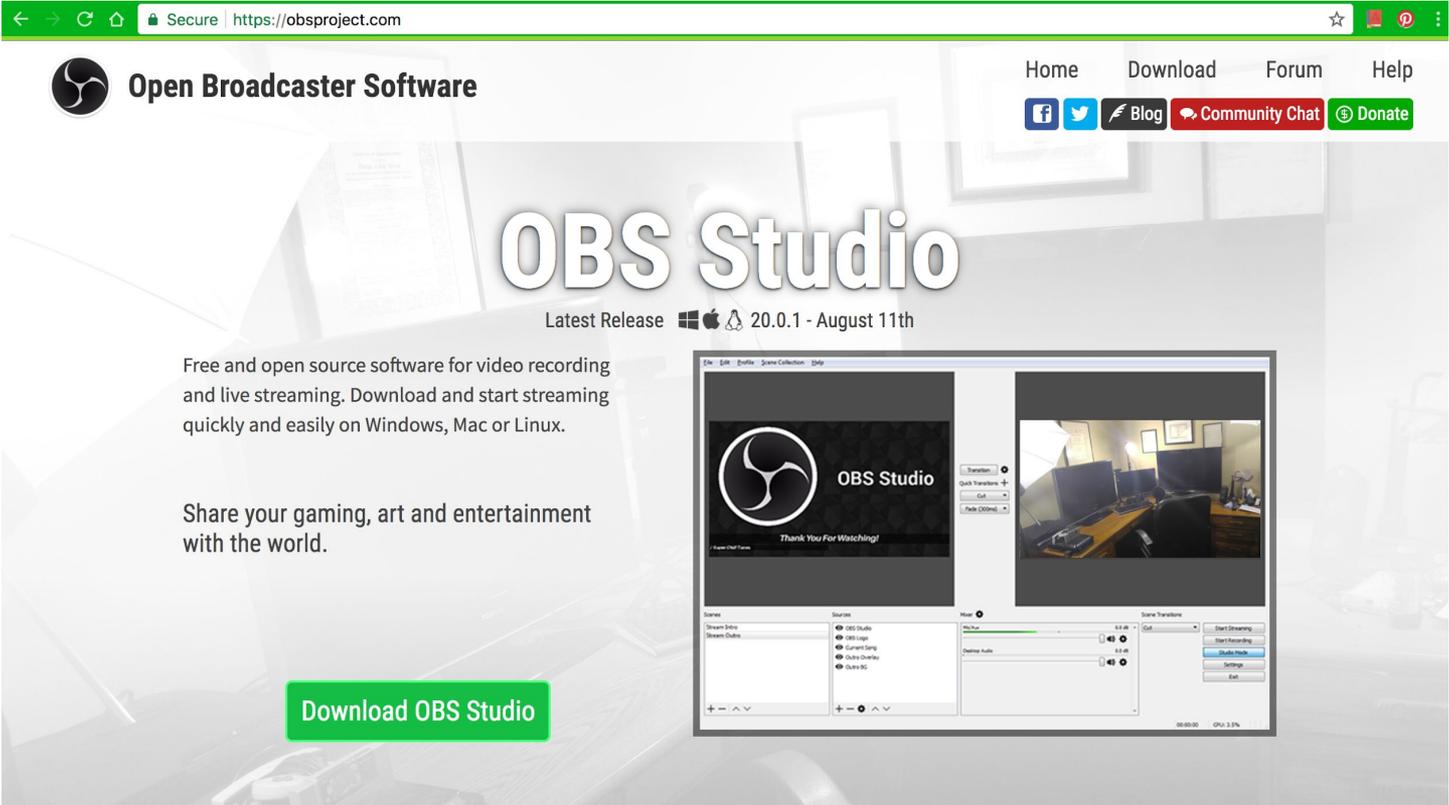
Petimani (2015):

- The lecturer shows the PPT slides and explains the important points during the lectures.
- PPT promotes better organization and understanding of the lecture topics as the coverage and flow of subject are well fixed.
- During lecture, the individual PPT slides serve as memory aids, which reduce the mental strain on the lecturers.
- As most of the contents are already given in the form of handouts, this reduces the need to take notes during the lecture.
- Moreover, students able to pay more attention to the discussion part of the topic instead of taking notes.

Continue....

“However, few drawbacks come with PPT presentation. Some lecturers tend to create PPT slides that are more suitable for them to read rather than explaining.”

Software: Open Broadcaster Software Studio



The image shows a screenshot of the OBS Studio website homepage. At the top, there is a browser address bar with the URL 'https://obsproject.com'. Below the address bar, the OBS logo is followed by the text 'Open Broadcaster Software'. To the right, there are navigation links for 'Home', 'Download', 'Forum', and 'Help', along with social media icons for Facebook, Twitter, and a 'Blog' link, and buttons for 'Community Chat' and 'Donate'. The main heading 'OBS Studio' is prominently displayed in the center, with the text 'Latest Release' and system icons (Windows, Apple, Linux) followed by '20.0.1 - August 11th'. Below this, there are two paragraphs of text: 'Free and open source software for video recording and live streaming. Download and start streaming quickly and easily on Windows, Mac or Linux.' and 'Share your gaming, art and entertainment with the world.' At the bottom left, there is a green button that says 'Download OBS Studio'. On the right side, there is a screenshot of the OBS Studio software interface, showing a preview window with the OBS logo and a 'Thank You For Watching!' message, a source window showing a desk setup, and various control panels for sources, audio, and streaming.

Secure | <https://obsproject.com>

Open Broadcaster Software

Home Download Forum Help

Facebook Twitter Blog Community Chat Donate

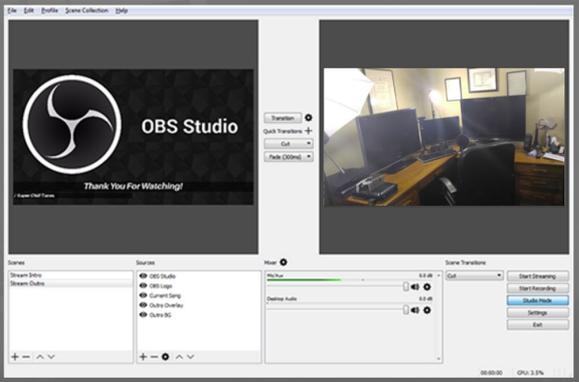
OBS Studio

Latest Release    20.0.1 - August 11th

Free and open source software for video recording and live streaming. Download and start streaming quickly and easily on Windows, Mac or Linux.

Share your gaming, art and entertainment with the world.

[Download OBS Studio](#)



Software: WireCast



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WIRECAST 8 IS HERE! Wirecast Rendezvous, Facebook Live Comments, Multi-track Audio Mixing & so much more!
COMING SOON: Vimeo Live Integration—Title and create events directly from within Wirecast to make streaming to Vimeo a breeze

Wirecast
Live streaming video production software for Mac or PC

Download Free Trial

Buy starting at \$695

The image shows a woman in a white shirt speaking into a microphone. In the background, a laptop displays the Wirecast software interface. The interface features a multi-camera view with three video feeds: 'Carl Lee, Event Organizer', 'Marianne Simpson', and 'BREAKING NEWS'. Below the video feeds is a control panel with various icons and settings. The text 'Wirecast Live streaming video production software for Mac or PC' is overlaid on the image. Two buttons are visible: 'Download Free Trial' and 'Buy starting at \$695'.

— Camtasia vs Wirecast —

Camtasia vs WireCast

Camtasia 9:

- Quiz
- 30 FPS

WireCast: Live Streaming

- 60 FPS
- ScoreBoard



Write on slides using Camtasia

difference equation Part V - Classification

Classification of difference equations

Difference equations	Order?	Linear or non-linear?
$y_{k+1} - 3y_k + y_{k-1} = e^{-k}$	2 nd order	Linear
$y_{k+1} = y_k^2$	1 st order	Non-linear
$y_{k+4} - y_k = k2^k$	4 th order	Linear
$y_{k+1} = y_k - 0.25y_k^2$	1 st order	Non-linear
$y_{k+3} = \cos y_k$	3 rd order	Non-linear

$$y_{k+4} + 0 \cdot y_{k+3} + 0 \cdot y_{k+2} + 0 \cdot y_{k+1} - y_k$$

$$y_{k+3} + 0 \cdot y_{k+2} + 0 \cdot y_{k+1} = \cos(y_k)$$

Research on effective making of videos: face vs no face?

- A recent study attempted to compare the learning effectiveness of different types of video lecture, and reached a conclusion that the learning performance with videos showing the lecturer is significantly better than voice-only videos (Chen & Wu, 2015).
- Some researchers proposed that the presence of lecturer in videos could enhance the learning process, probably by non-verbal communications such as gestures (Valenzano et al., 2003).

Gestures

- Gestures are regarded as an important tool to present abstract ideas and enhance students' comprehension of course materials in classroom (Alibali & Nathan, 2007).
- There were studies demonstrated that children exposed to gestures of the lecturer in instructional video had better understanding of taught concepts about linguistics and symmetry compared to those who were exposed to videos without gestures (Valenzeno et al., 2003; Church et al., 2004).

Shall we invest?

It depends on the application.

- Learning Glass: face, gesture, powerpoint slides, facing the audience, writing, pointing at the powerpoint slides
- Camtasia/Panopto: powerpoint slides, face, writing

WireCast: <https://www.telestream.net/wirecast/overview.htm>

Learning Glass Studio: <http://www.learning.glass/learning-glass-products/>

Thank you!

— Q&A —
