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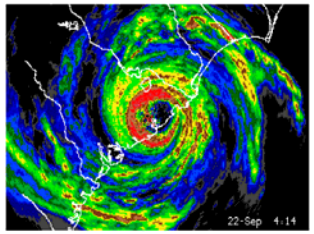
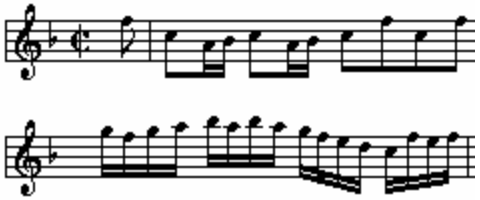
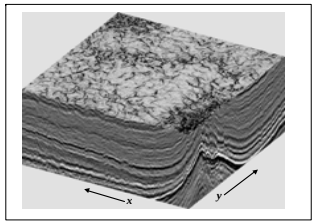
Richard Baraniuk
Rice University

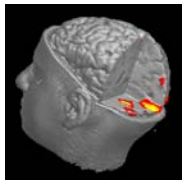
$$c_n = \frac{1}{T}\int_0^T f(t)e^{-(i\omega_0 nt)}\,\mathrm{d}t$$

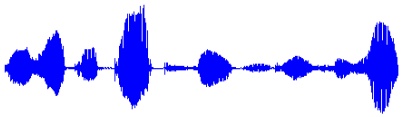
signal processing











$$c_n = \frac{1}{T}\int_0^T f(t)e^{-(i\omega_0 nt)}\,\mathrm{d}t$$

signal processing

Bonvin, *Still Life with Book, Papers and Inkwell*, 1876

motivation – 1999

difficult to **connect** across concepts, courses, grades, curricula

- ex: mathematics <> engineering <> technology <> policy
- K <> 12 <> college <> graduate school <> lifelong learning
- curricular stove-piping
- disintegration of ideas

motivation – 1999

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- many potential authors shut out
- inefficient: no economies of scale
- glacial time scales of development and updating

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- inefficient: no economies of scale
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high cost and **limited access** of high-quality textbooks and learning materials


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community
connected
innovative
up-to-date
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1. liberate course materials

book	>>>	**page**	[XML modules]
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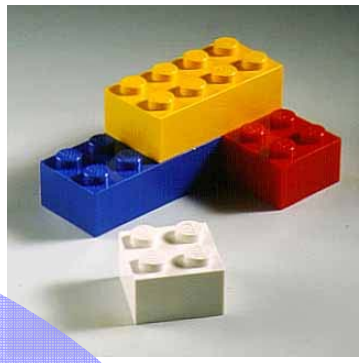
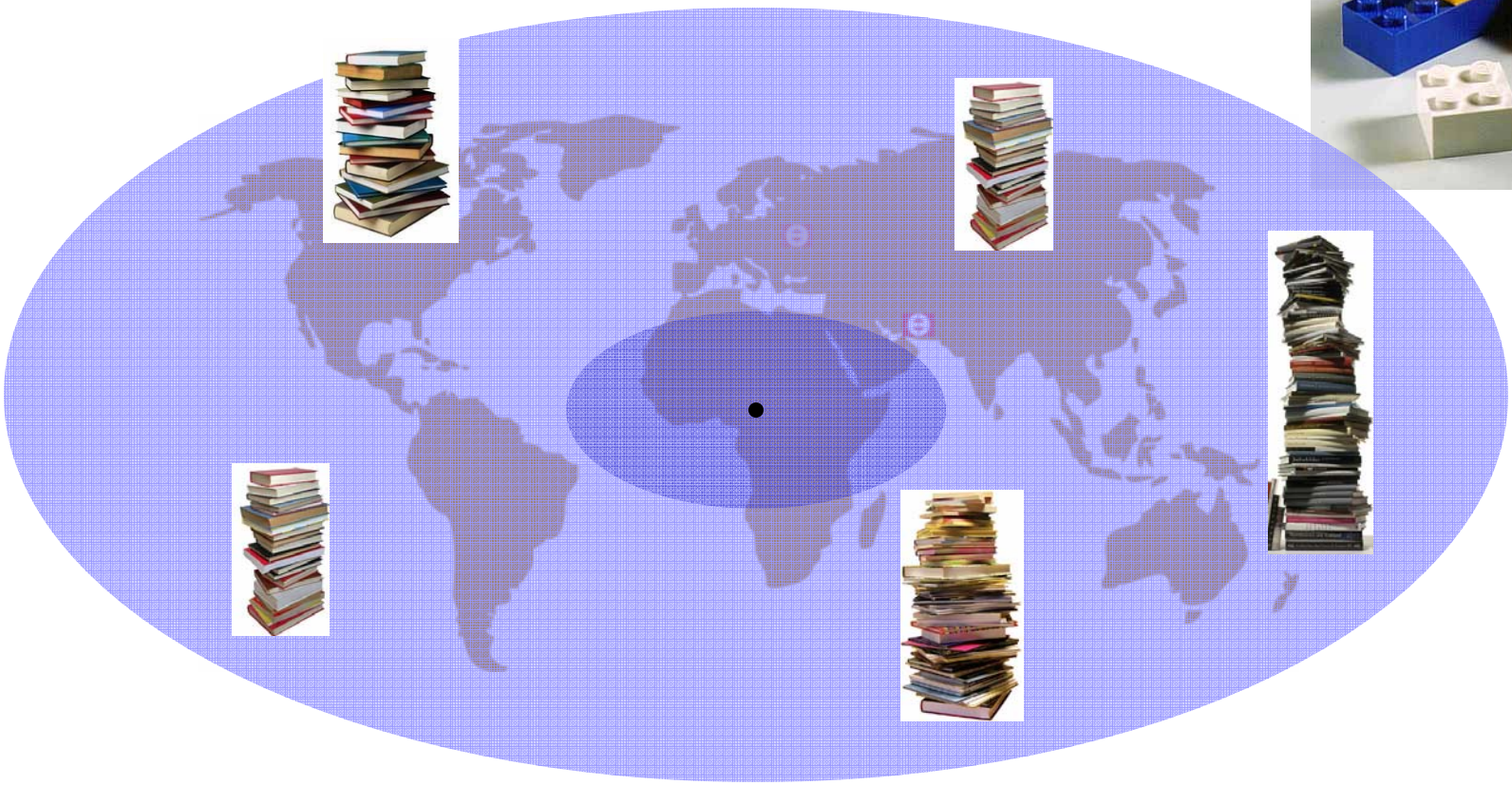
$	>>>	**free**	
slow	>>>	**fast**	





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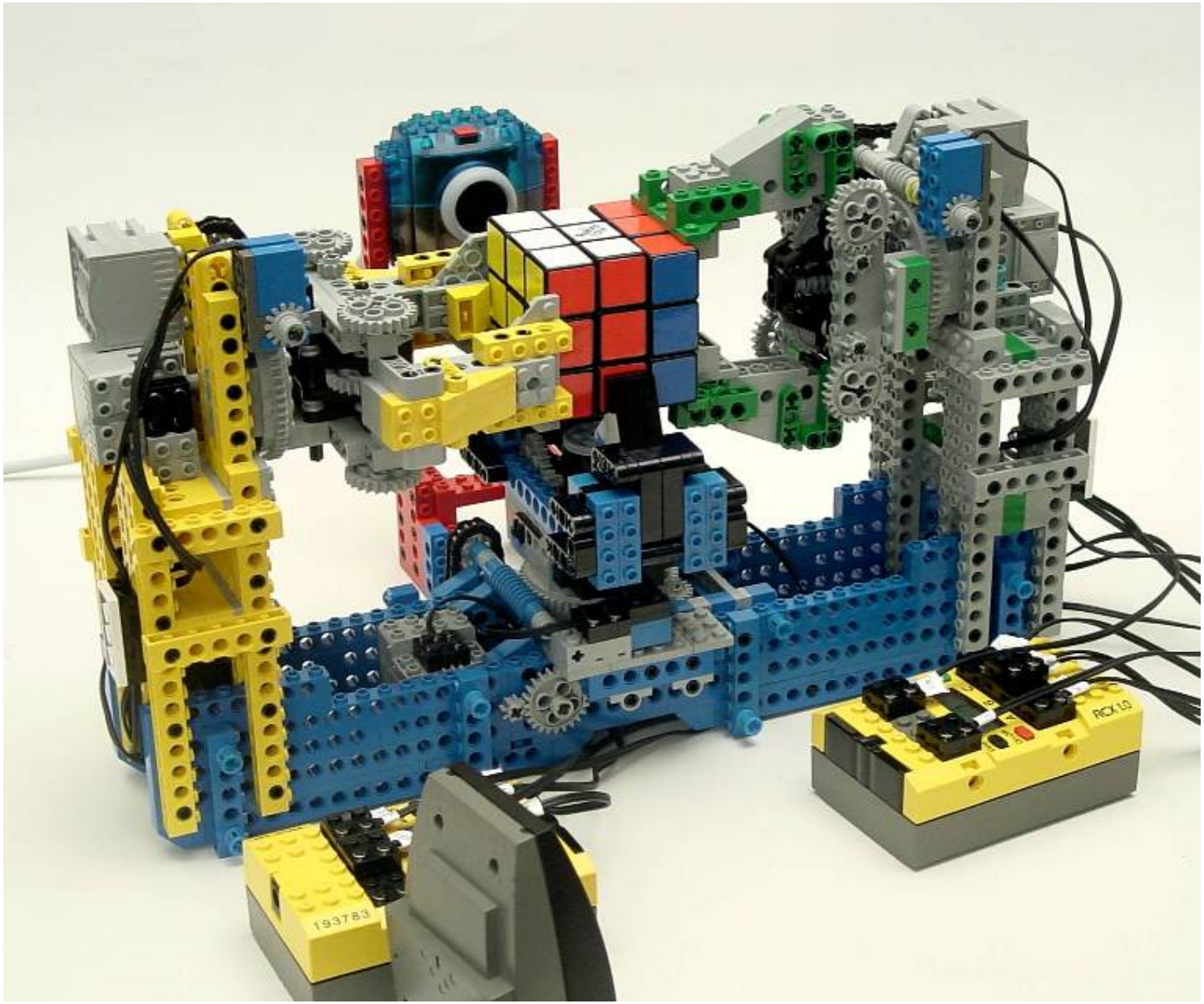
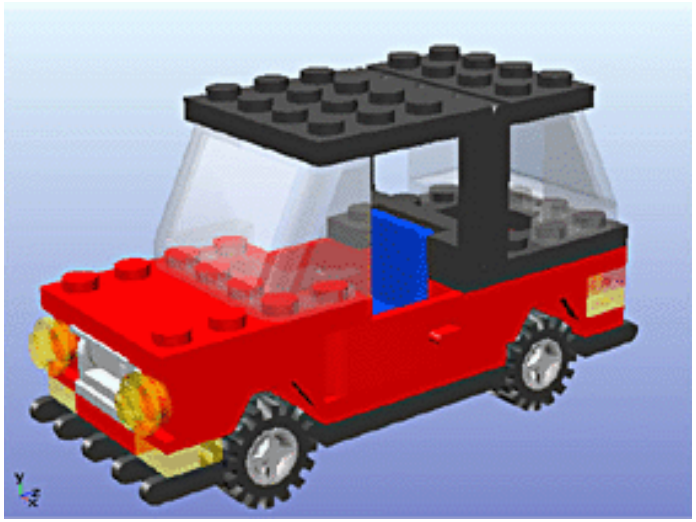
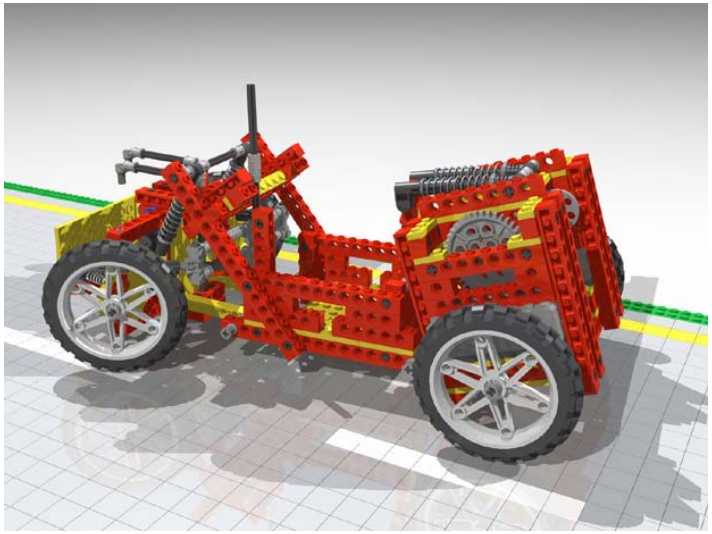
textbook / course

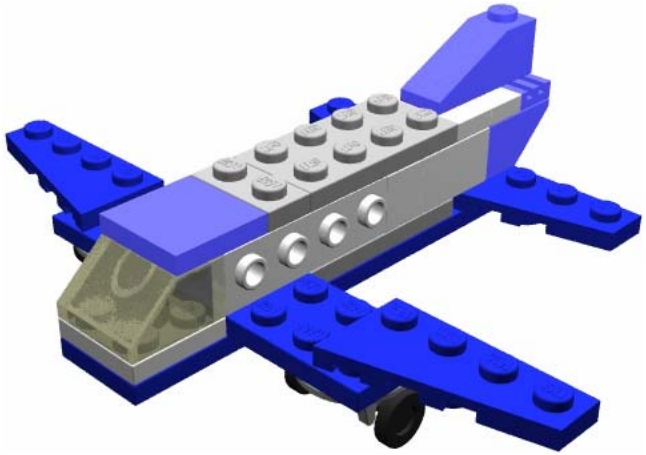


personalized courses

reuse materials







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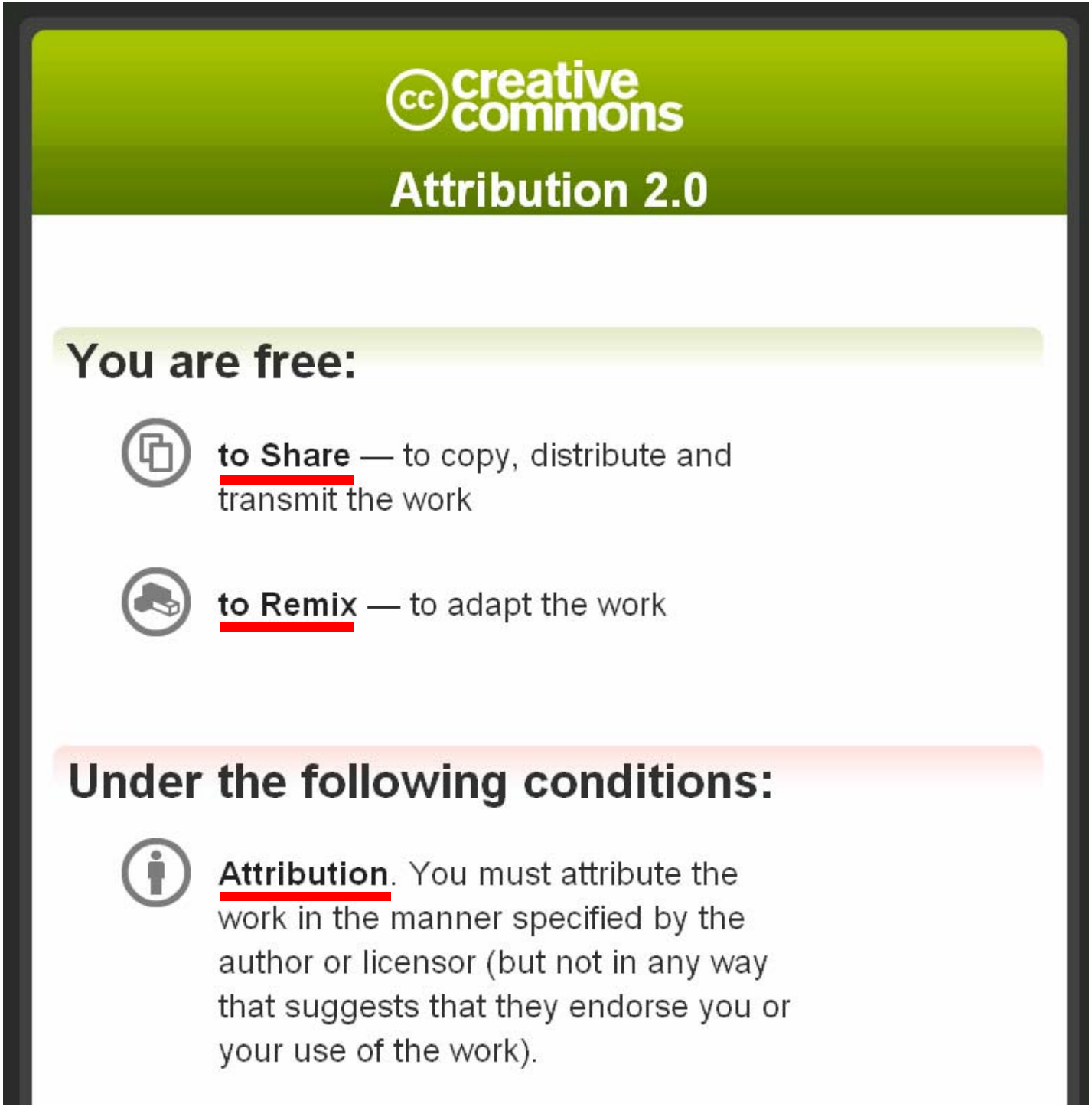

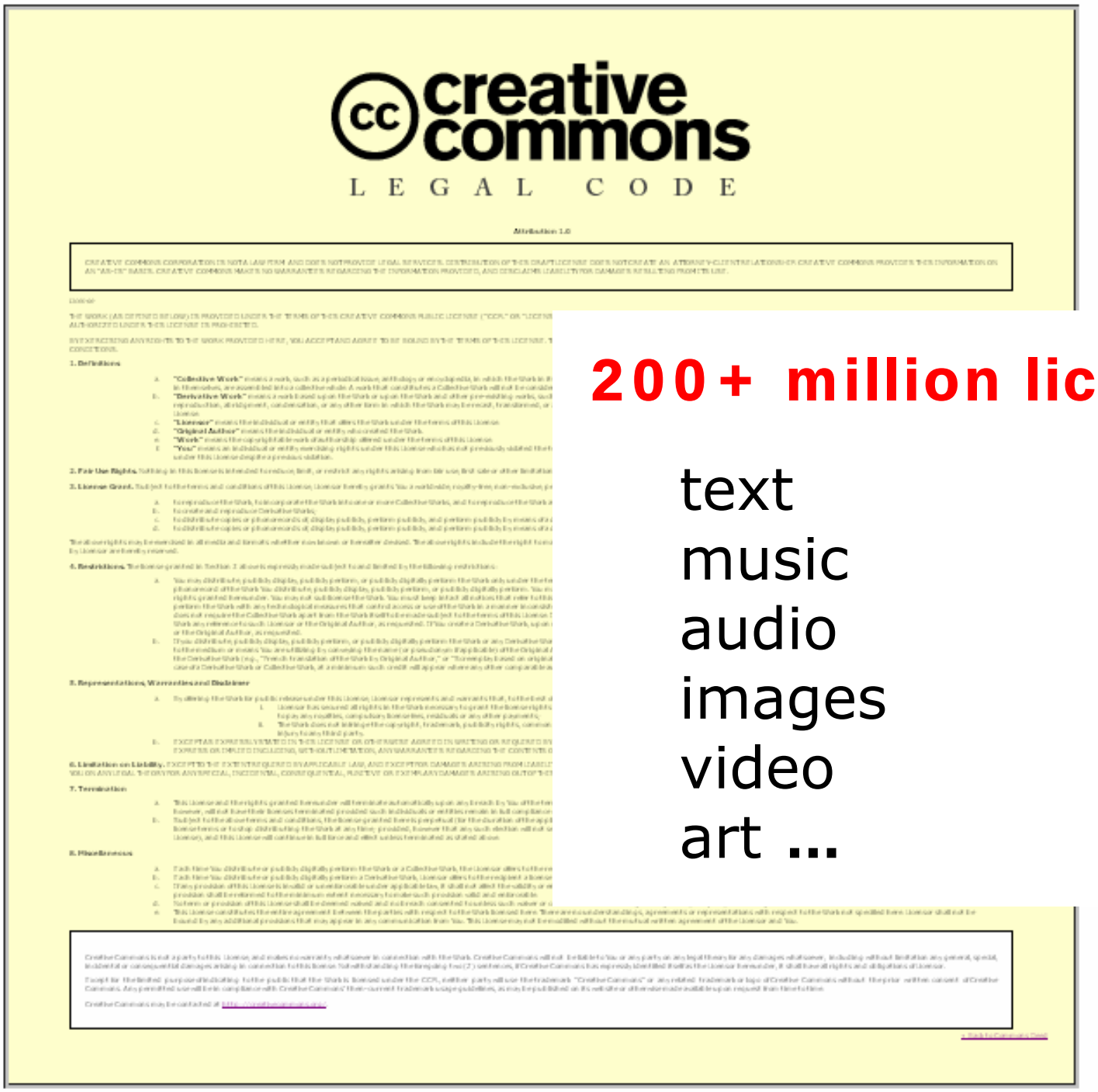
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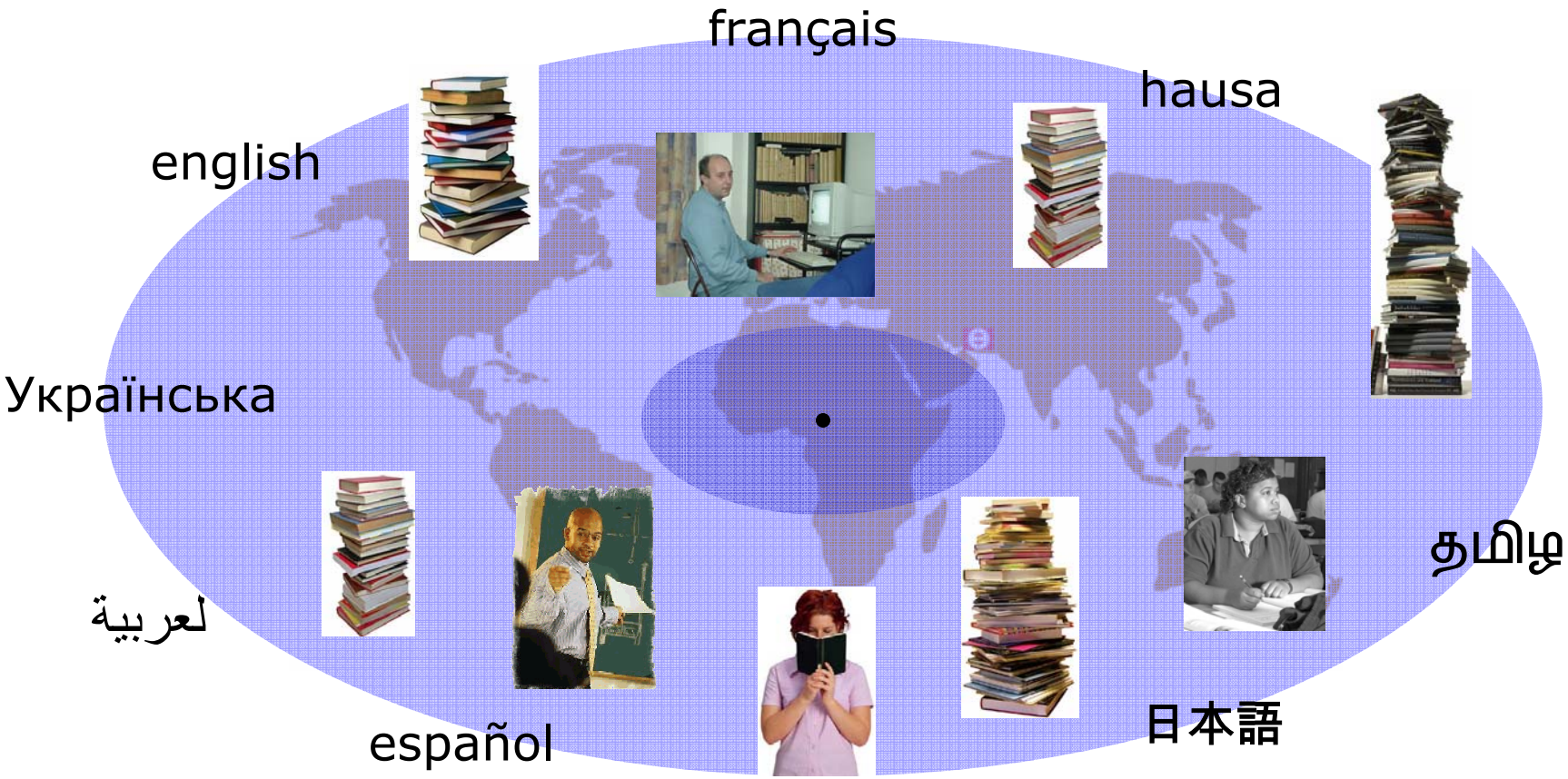
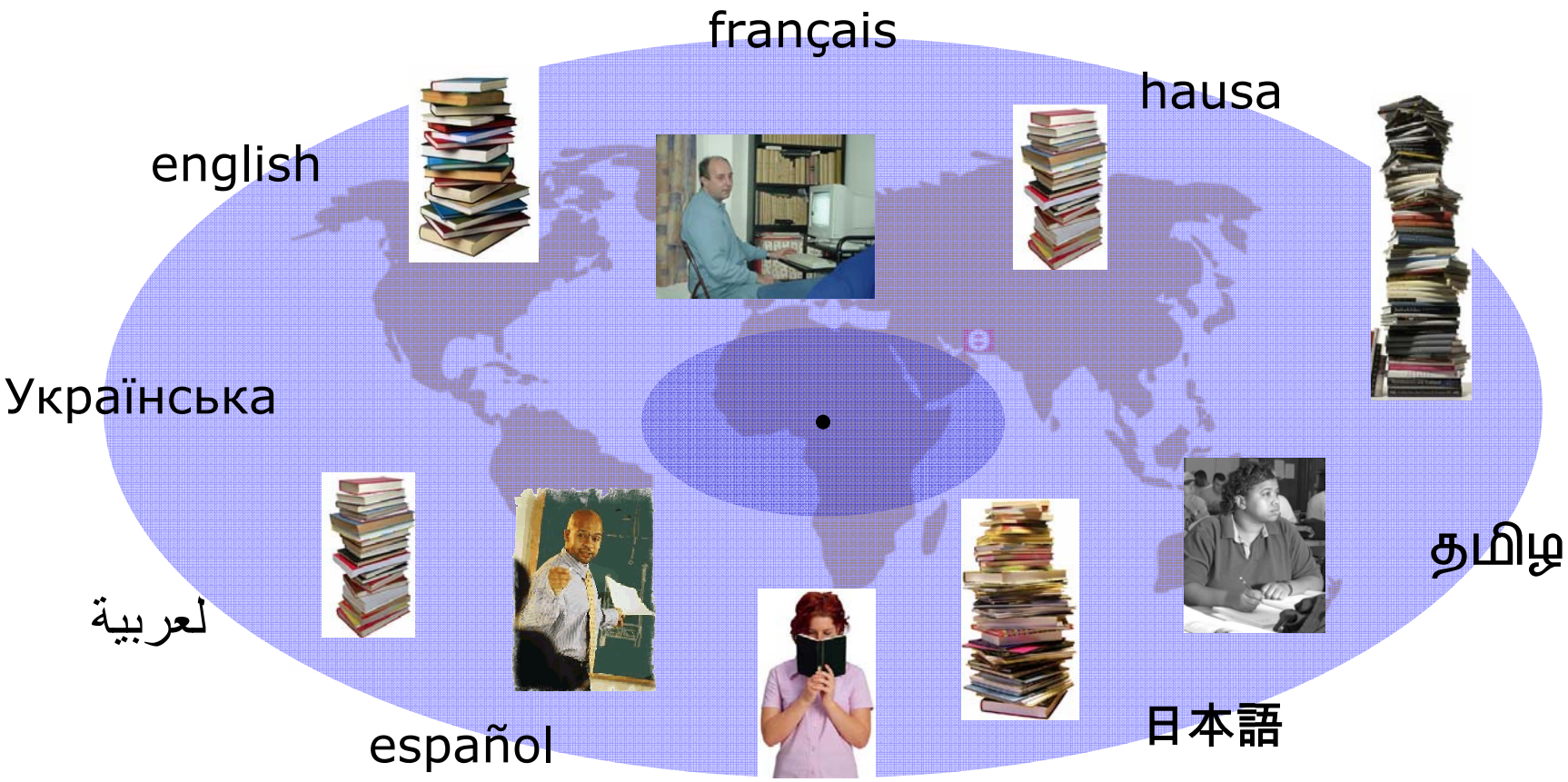


knowledge ecosystem



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By: MICHAEL HAAG, JUSTIN ROMBERG

Summary: This modules derives the Discrete-Time Fourier Series (DTFS), which is a fourier series type expansion for discrete-time, periodic functions. The module also takes some time to review complex sinusoids which will be used as our basis.

Introduction

By now you should be familiar with the derivation of the FOURIER SERIES for continuous-time periodic functions. This derivation leads us to the following equations that you should be quite familiar with:

$$f(t) = \sum_n \left(c_n e^{i \omega_0 n t} \right) \quad (1)$$

$$c_n = \frac{1}{T} \int_n f(t) e^{-(i \omega_0 n t)} = \frac{1}{T} < f, e^{i \omega_0 n t} > \quad (2)$$

equency

In this module, we will derive a similar exp

derive the **Discrete Time Fourier Series**

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IEEE Signal Processing Society

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many by
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and faculty

but also
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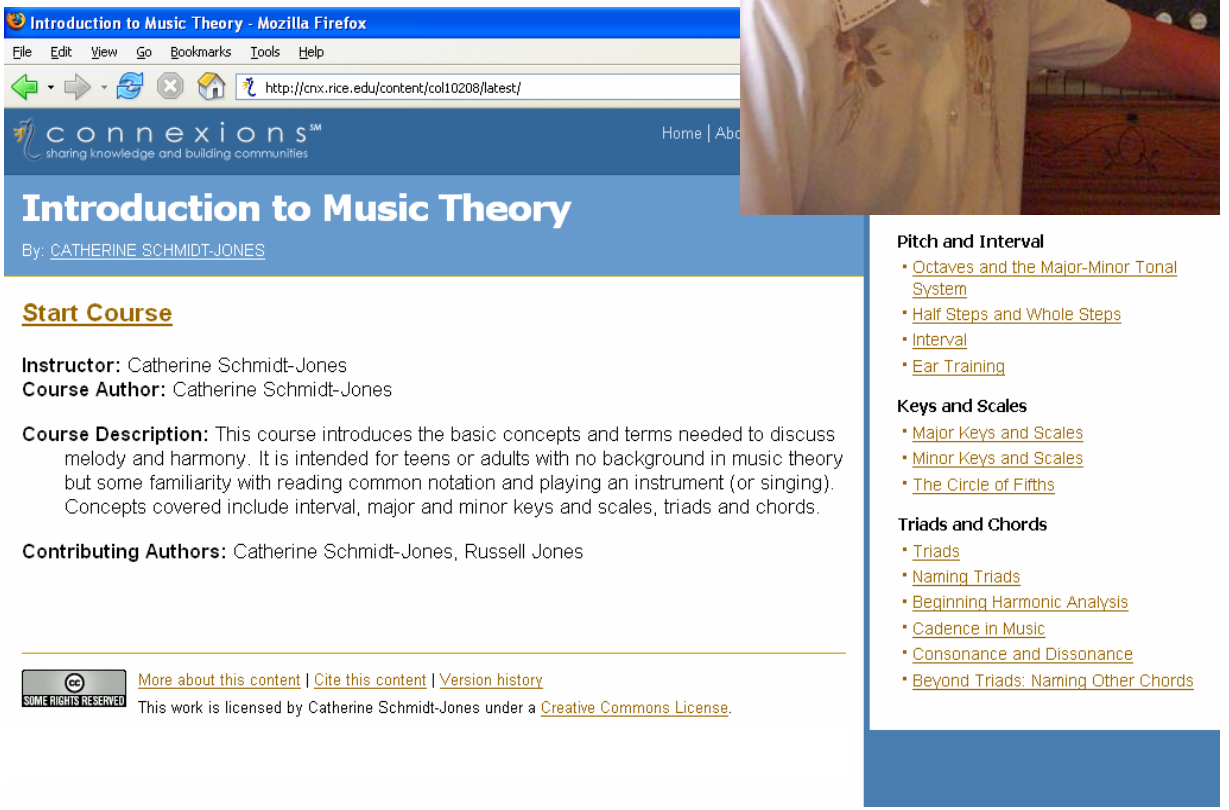

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Análisis de Fourier en Espacios Complejos

Print (PDF)

By: MICHAEL HAAG, JUSTIN ROMBERG, ERIKA JACKSON, FARA MEZA
Based on: FOURIER ANALYSIS IN COMPLEX SPACES by MICHAEL HAAG, JUSTIN ROMBERG

Summary: Este modulo deriva la series de Fourier discreto en el tiempo (DTFS), la cual es un tipo de expansión de fourier para funciones periodicas y discretas en el tiempo. El modulo tambien da un repaso a los senosoidales complejos que sirven como bases.

estar familiarizado con la derivación de la SERIES DE FOURIER par alas Esta derivación nos lleva a las siguientes ecuaciones las cuales usted

$$f(t) = \sum_{n} \left(c_n e^{i \omega_0 n t} \right)$$

$$c_n = \frac{1}{T} \int_{n} f(t) e^{-(i} \quad (2)$$

$$= \frac{1}{T} < f,$$

Univ. Texas-El Paso

donde c_n nos dice la cantidad de frecuencia en $\omega_0 n$ in $f(t)$.


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Based on: PREFACE FOR U OF I DSP LABORATORY by DOUGLAS L. JONES
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By: PATRICK FRANTZ, KANGLIN WANG
Based on: PREFACE FOR U OF I DSP LABORATORY by DOUGLAS L. JONES
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Summary: The DSP Laboratory textbook is well suited for a variety of course organizations, and Connexions provides the ideal venue for the textbook.
摘要：该DSP(数字信号处理)教程适合多种相关课程使用，而Connexions则为该教程提供了一个理想的演示平台。
该教程是建立在使用了14年以上的实验指导和历时10年经合作开发的实验讲义基础上的。内容主要来自ELEC320----伊利诺伊大学厄本那 - 香槟分校(the University of IllinoisUrbana-Champaign)一门本科四年级两学分的实验选修课。本教程编排结构和教学目的都与其大致相同。本教程适合多种相关课程使
顿大学(the University of Washington)等成功地用于教
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的并在每周有实验安排的DSP实验课,
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Fundamentals of Signal Processing

By: Minh Do

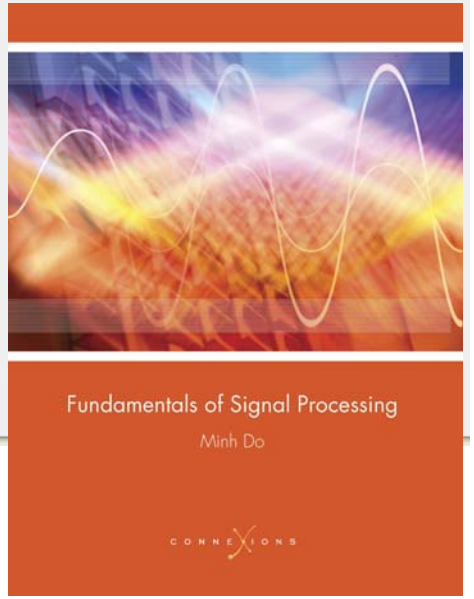
Start Course

Course Author: Minh Do

Course Description: Presents fundamental concepts and tools in signal processing including: linear and shift-invariant systems, vector spaces and signal expansions, Fourier transforms, sampling, spectral and time-frequency analyses, digital filtering, z-transform, random signals and processes, Wiener and adaptive filters.

Contributing Authors: Anders Gjendemsjø, Benjamin Fite, Clayton Scott, Don Johnson, Douglas L. Jones, Hyeokho Choi, Ivan Selesnick, Justin Romberg, Melissa Selik, Michael Haag, Minh Do, Ricardo Radaelli-Sanchez, Richard Baraniuk, Rob Nowak

Course Content



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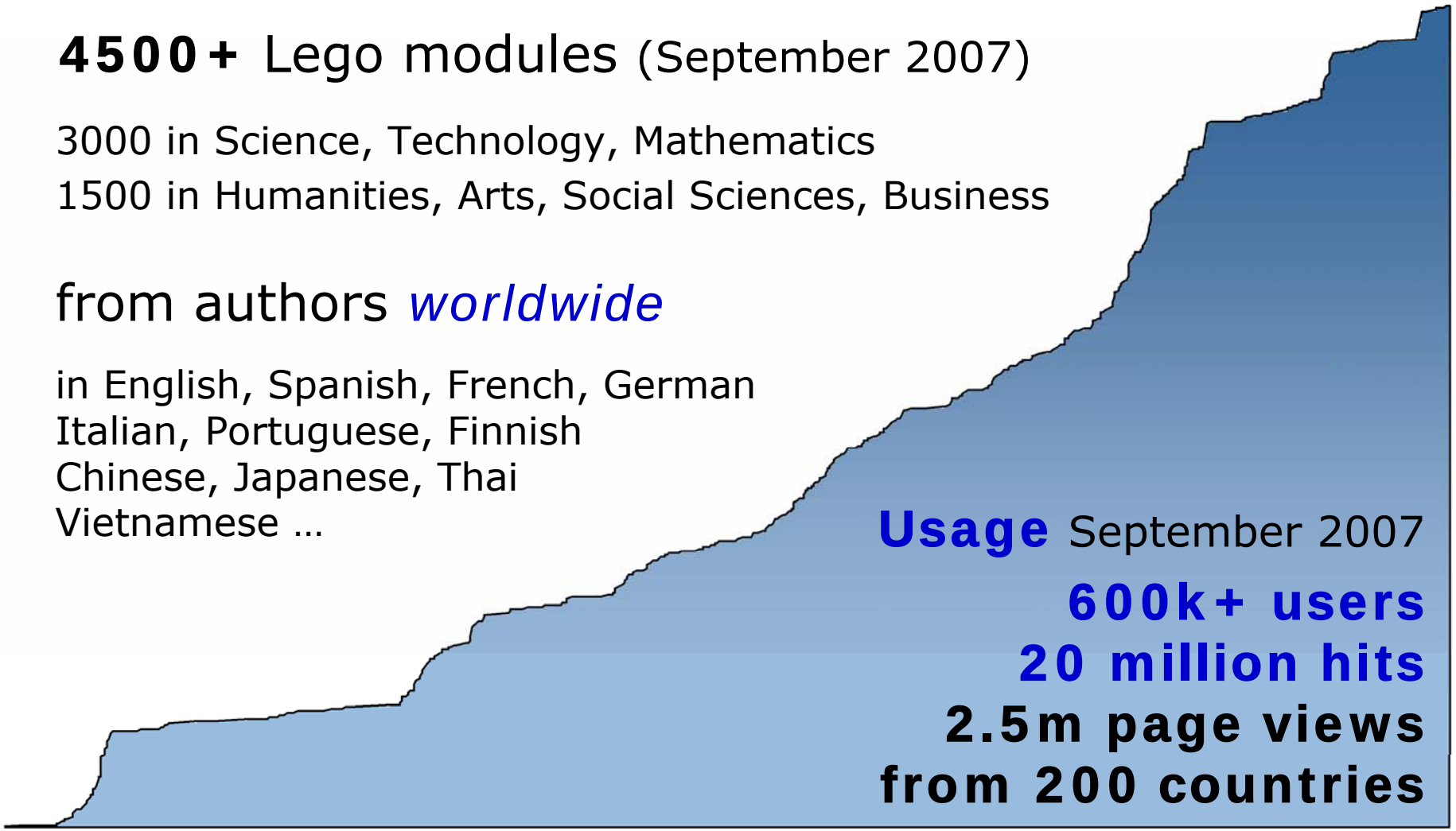

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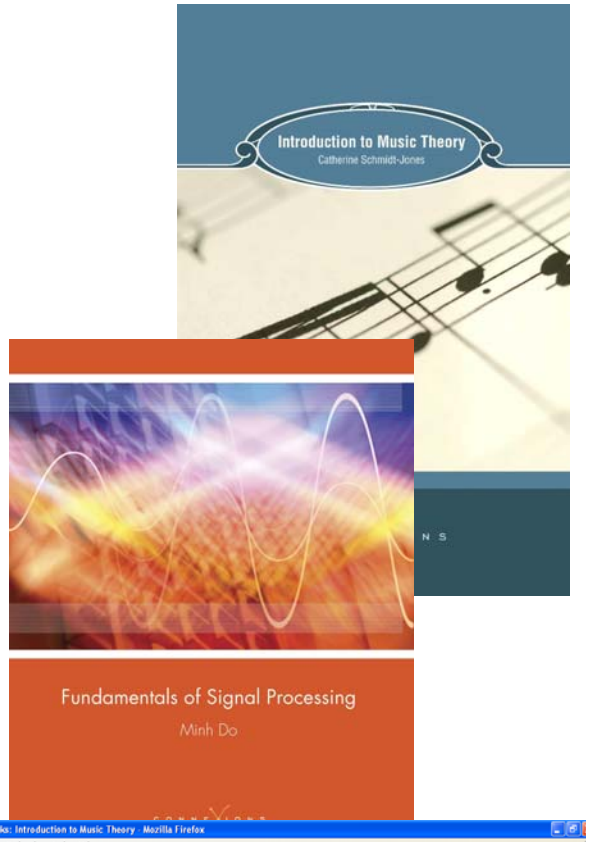

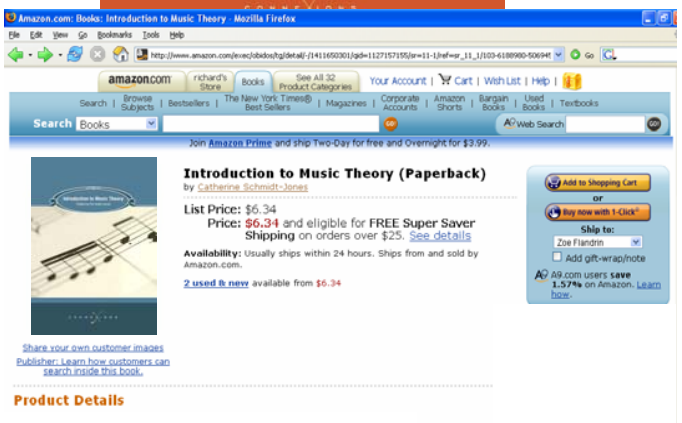

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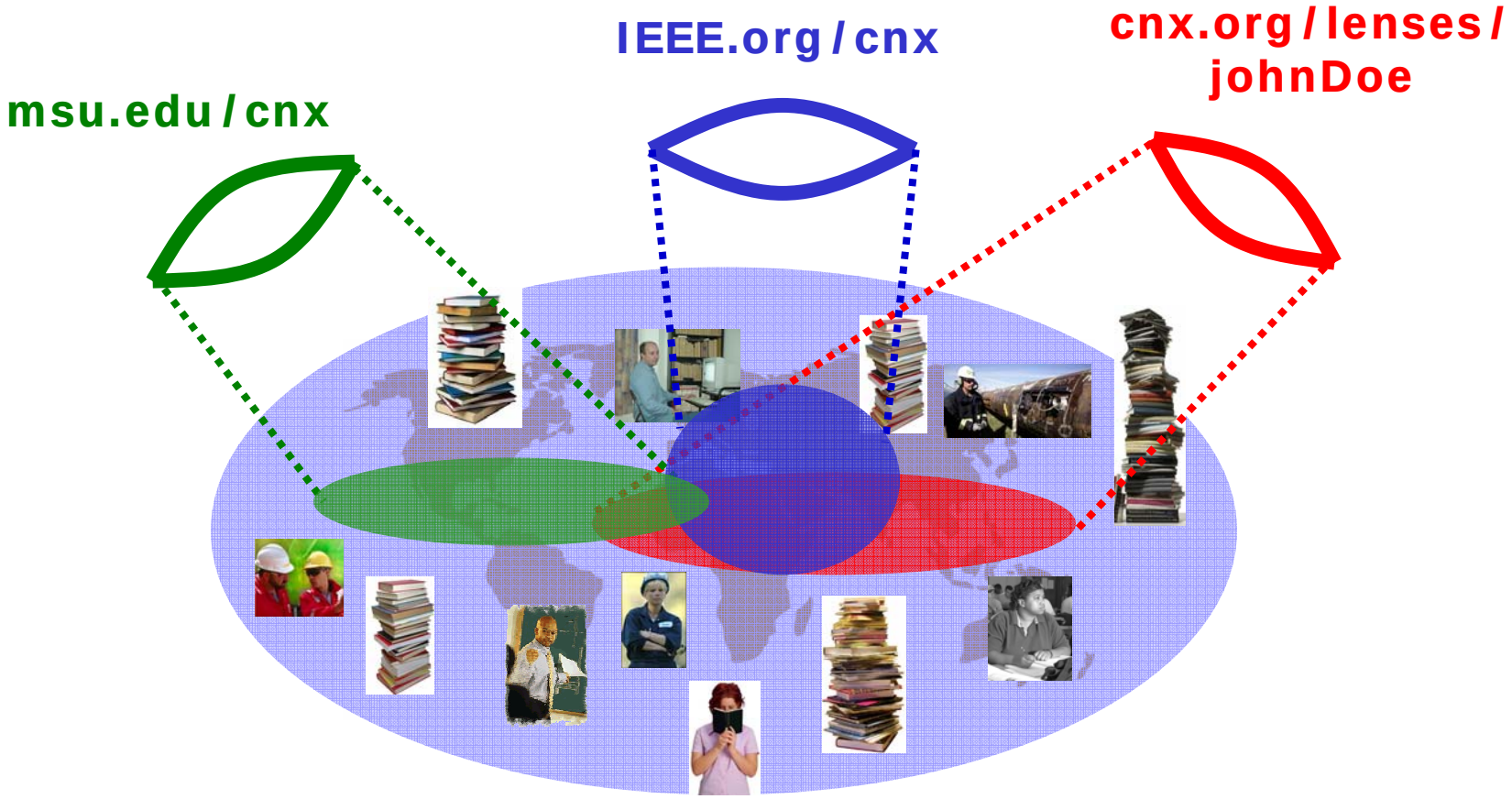

initiatives

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CNX current initiatives

tools

XML authoring and conversion tools (LaTeX, Word, …)
course-building, quality control lenses, printing
distributed and federated repositories (CNX as a *platform)*
interactive simulations via XML, content MathML

outreach

USA, Latin America, China (OOPS), Japan (TI), Vietnam (VEF)
North Korea (PUST)

content projects

K-12 textbooks and teacher materials
"top 10" community college courses
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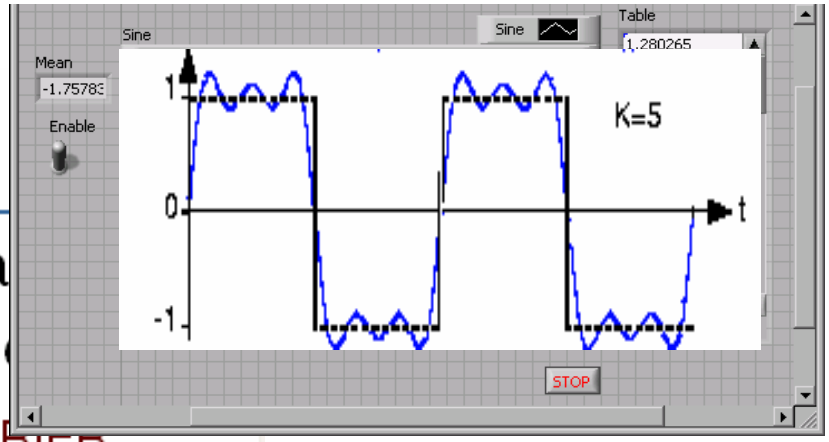
I hear, I forget;
I see, I remember;
I *do*, I *understand*

Confucius



Coefficients

(t), the Fourier coefficients can be calcula
by solving for c_n, which requires a little alg
n (for the complete derivation see the FOURIER
'S DERIVATION). The end results will yield the
neral equation for the fourier coefficients:

$$c_n = \frac{1}{T}\int_0^T f(t)e^{-(i\omega_0 nt)}\,dt$$

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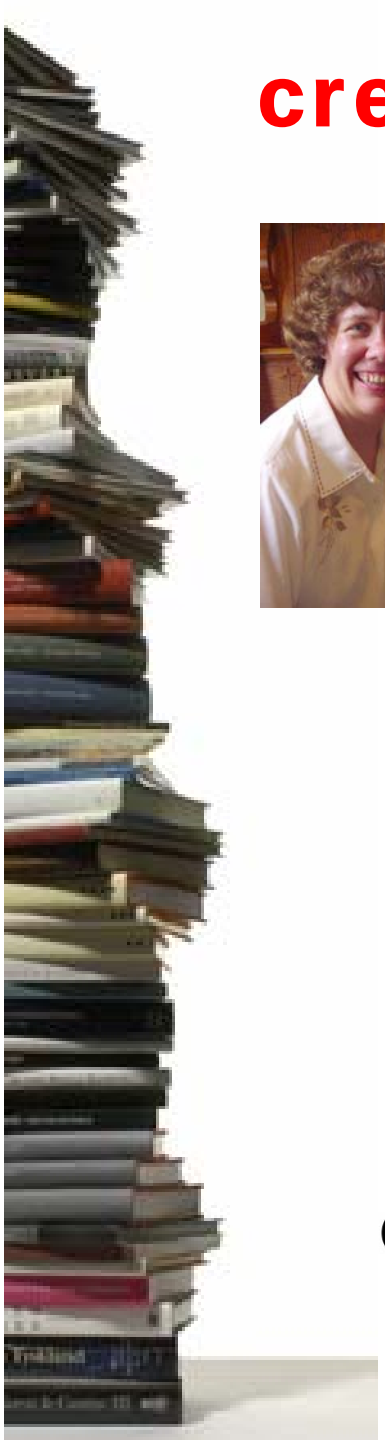

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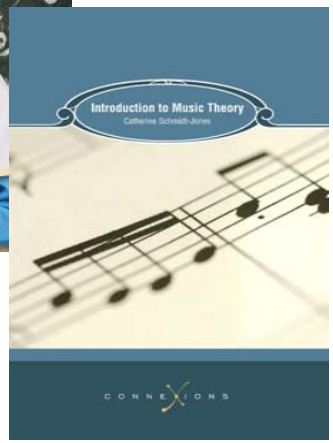

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