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Open Educational Resources for the state of Texas

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Open Educational Resources

The Open Educational Resource (OER) movement was inspired by the Open Source movement in software. Information is freely usable, re-usable, mixable, modifiable, etc.

• Open Course Ware “OCW” (MIT)
• Connexions “Cnx” (Rice)
• Wikipedia (Wikibooks, etc.)
• Siyavula project (Shuttleworth Foundation)
• CK-12, Curriki, PLoS, PubMed, EOL, etc.
What is Connexions?

1. A **repository** of modules of information available through the **web** on the Internet
   - Modules (and collections) encoded in XML, one concept, a few pages, a quantum of information

2. A set of **tools** for authoring, maintaining and using the content of the repository
   - Module **editor**, importer, course or book **composer**, repository organizer, **Creative Commons** license, tools for printing **books**

3. A **community** of **people** who share educational interests and information
   - Interest groups (authors, instructors, students),
Modular Structure of Connexions

• The **module** contains a stand-alone concept. It is a quantum of knowledge.
• The module should make sense if found by a search engine such as Google or Bing.
• A **collection** or **book** is a coherent collection of modules.
• Analogy with a **CD** as being a collection of songs, or a play-list for a band or MP3 player, or a concert program, or an anthology
• Analogy with the **degree requirements** for a major at a university
Books and On-Line Use with XML

Books from Connexions:
• Personalized, on-demand printing, up-to-date, inexpensive, collaboratively authored, allows pre and post publication review, never “out of print”, “Long tail” publications, content for eBooks, one button to buy printed book

On-Line use of Connexions:
• Allows modern pedagogy: concept-based, problem solving-based, discovery-based learning. Dynamic, interactive, linked, adapts to learning style, student and author driven, allows “assessment and evaluation”, Virtual Labs
Possible Ways to Use

• Bound and **printed paper books** that look like traditional books but are low cost and always up-to-date. This is **phase one**.

• Down Loadable **pfd files** which are free and can be used on a eBook reader or printed locally. This is also **phase one**.

• Free, interactive, dynamic **on-line use** on a screen such as a computer or hand-held device (iPhone). This is **phase two**!

• **New methods** that we cannot imagine now. This is the definition of **phase two**.
Fourier Analysis in Complex Spaces

By: MICHAEL HAAG, JUSTIN ROMBERG

Summary: This module 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 numbers 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:

\[ f(t) = \sum_{n} (c_n e^{i \omega_0 n t}) \]

\[ c_n = \frac{1}{T} \int_{n} f(t) e^{-i \omega_0 n t} \, dt \]

\[ = \frac{1}{T} \langle f, e^{i \omega_0 n t} \rangle \]

In this module, we will derive a similar expansion for discrete-time, periodic functions. In doing so, we will derive the Discrete Time Fourier Series (DTFS), or the DISCRETE FOURIER TRANSFORM (DFT).
Author of Music Content

Catherine Schmidt-Jones

well over 600,000 page views per month

many by US K-12 teachers

Introduction to Music Theory

By CATHERINE SCHMIDT-JONES

Start Course

Instructor: Catherine Schmidt-Jones
Course Author: Catherine Schmidt-Jones

Course Description: This course introduces the basic concepts and terms needed to discuss melody and harmony. It is intended for teens or adults with no background in music theory but some familiarity with reading common notation and playing an instrument (or singing). Concepts covered include interval, major and minor keys and scales, triads and chords.

Contributing Authors: Catherine Schmidt-Jones, Russell Jones

Pitch and Interval
- Octaves and the Major-Minor Tonal System
- Half Steps and Whole Steps
- Interval
- Ear Training

Keys and Scales
- Major Keys and Scales
- Minor Keys and Scales
- The Circle of Fifths

Triads and Chords
- Triads
- Naming Triads
- Beginning Harmonic Analysis
- Cadence in Music
- Consonance and Dissonance
- Beyond Triads: Naming Other Chords
Fundamentals of Signal Processing

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 Gjendemsjo, 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
**Análisis de Fourier en Espacios Complejos**

By: MICHAEL HAAG, JUSTIN ROMBERG, ERIKA JACKSON, FARA MEZA

Based on: FOURIER ANALYSIS IN COMPLEX SPACES by MICHAEL HAAG, JUSTIN ROMBERG

**Summary:** Este módulo deriva la serie de Fourier discreto en el tiempo (DTFS), la cual es un tipo de expansión de Fourier para funciones periódicas y discretas en el tiempo. El módulo también da un repaso a los senosoidales complejos que sirven como bases.

![Image of students working on computers](image-url)

Esta derivación nos lleva a las siguientes ecuaciones las cuales usted

\[
f(t) = \sum_{n} (c_n e^{i \omega_0 n t})
\]

\[
c_n = \frac{1}{T} \int_{t_0}^{t_0+T} f(t) e^{-i \omega_0 n t} dt
\]

\[
= \frac{1}{T} \langle f, e^{i \omega_0 n t} \rangle
\]

Donde \(c_n\) nos dice la cantidad de frecuencia en \(\omega_0 n\) in \(f(t)\).
Preface for U of I DSP Laboratory (Thai Version)

By: DOUGLAS L. JONES, PATRICK FRANTZ, KAMOLCHANOK KRIENGCHAIPRUCK

Based on: PREFACE FOR U OF I DSP LABORATORY by DOUGLAS L. JONES

Summary: The DSP Laboratory textbook is well suited for a variety of course organizations, and Connexions provides the ideal venue for the textbook.

Preface for U of I DSP Laboratory (Japanese Version)

By: PATRICK FRANTZ, EMIKO YAMAI

Based on: PREFACE FOR U OF I DSP LABORATORY by DOUGLAS L. JONES

Summary: The DSP Laboratory textbook is well suited for a variety of course organizations, and Connexions provides the ideal venue for the textbook.

Preface for U of I DSP Laboratory (Chinese Version)

By: PATRICK FRANZ, KANGLIN WANG

Based on: PREFACE FOR U OF I DSP LABORATORY by DOUGLAS L. JONES

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用，其早期版本被华盛顿大学(the University of Washington)等成功地用于教学。

该教程可用于多种不同的教学安排，包括：
- 一学期制的以课程设计为主(project-oriented)的DSP实验课，
- 半学期制或一学期制的并在每周有实验安排的DSP实验课，
Interactive, Dynamic Virtual Lab

Inverted Pendulum on a Translating Base
By: ROBERT BISHOP

Summary: The objective of this lab is to understand the dynamics of an inverted pendulum with a translating base. Students will use feedback to control an unstable system. The controller will be designed and implemented in LabVIEW using the Simulation Module and Control Design Toolkit.
FIR Filter Example

By: DON JOHNSON

Summary: An example of using a Finite Impulse Response filter.
Distribution

View On Line

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Collaborative Statistics

This collection contains:

Modules by: Dr. Barbara Illowsky, Susan Dean

Comments, questions, feedback, criticisms?

Send feedback

- E-mail the authors of the collection, Collaborative Statistics

More about this content: Metadata | Version History

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Last edited by Connexions on Feb 2, 2009 1:10 pm US/Central.
Success

Collaborative Statistics

Barbara Illowsky & Susan Dean
The customization
Collaborative Statistics

- Estimated cost savings to students ~ $200,000 in the first year

- Roughly 50% of students bought a hard copy of textbook
Collaborative Statistics Textbook Adopters

Since Fall 2008

- **Arkansas**
  - Arkansas Tech University
- **South Carolina**
  - Converse College
- **California**
  - CSU Dominguez Hills
  - De Anza College
  - Sacramento City College
  - San Diego Mesa College
  - Cabrillo College
  - Lake Tahoe Community College
  - San Francisco State University
- **Maryland**
  - Frederick Community College
- **Canada**
  - St. Mary's Collegiate Institute
- **Colorado**
  - University of Colorado
- **Georgia**
  - Emory University
- **Ohio**
  - University of Toledo
- **Virginia**
  - Virginia Tech University
- **New York**
  - Borough of Manhattan Community College
  - Syracuse University
  - SUNY - Purchase College
- **Michigan**
  - Eastern Michigan University
- **Massachusetts**
  - Berkshire Community College
- **Washington**
  - South Puget Sound Community College
- **Vermont**
  - Green Mountain College
ecosystem – primordial state
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- VIETNAM EDUCATION FOUNDATION
- RICE UNIVERSITY PRESS
- TEXAS INSTRUMENTS
- NATIONAL INSTRUMENTS
- IBM
- HP
- AMD
- OLPC
- Foothill-De Anza Community College
- National Council of Professors of Educational Administration
Current State

Usage

Repository: 17,081 modules, 18,000 revisions, 1015 courses or books, over 8000 author accounts, 147 countries, 200 print-on-demand books

In Sept. 2006: 17M hits, 1.2M pages views, 520K unique users from 157 countries

Globalization

Europe: Germany, Norway, Macedonia, France, etc.

Asia: China, India, Pakistan, Japan, Vietnam, etc

LACCEI: “Connexions in the Americas” project
Growth of Numbers of Modules

Growth of Number of Modules in the Connexions Repository vs. Date of Publication
from April 11, 2000 to May 15, 2009