The AIM Open Textbook Initiative

Kent Morrison

American Institute of Mathematics
San Jose

February 2022

2010 - Start of the initiative

- David Farmer (AIM) and Rob Beezer (Univ. of Puget Sound)
- UTMOST (Undergraduate Teaching of Mathematics with Open Software and Textbooks)

Background

- I had a long standing interest in cost effective textbooks as prices rose far faster than the average inflation rate.
- I believed every student should have the textbook on the first day of class.
- I supported the Student PIRG "Make Textbooks Affordable."
- I was overwhelmed by number of hits when searching for math books online.
- I had recently retired from 30+ years at Cal Poly, San Luis Obispo.

Starting up

- From personal contacts and signers of the faculty petition I found people willing to serve on the "editorial board."
- All were experienced college math faculty and most had published textbooks.
- With a board of five we agreed on a shared philosophy and established criteria for evaluating books.

Editorial Board

- David Austin, Grand Valley State
- George Jennings, CSU Dominguez Hills
- Kent Morrison, AIM
- Vic Reiner, Univ. of Minnesota
- Kathy Yoshiwara, Pierce College (Los Angeles)

The aims of the AIM Open Textbook Initiative

- To make faculty aware of and encourage the use of open access textbooks for traditional undergraduate mathematics courses
- To substantially reduce the time and effort to find and evaluate textbooks

And

- To ensure that every student has the required textbook on the first day of class

Philosophy

- We focus on textbooks for standard undergraduate math courses.
- The dominant mode is a single required text.
- The target audience of the project is faculty choosing a text for class adoption.
- We imagine them asking: which books for this course should I take a closer look at?
- We do not list supplementary modules, applets, lecture notes, textbooks for unique courses.
- Open access–Texts must be available in digital format at no cost over the internet.
- We are agnostic about pedagogical styles.

Evaluation criteria

- Primary text in a mainstream mathematics course at the undergraduate level in U.S. colleges and universities
- Sufficient material for a term
- Mathematically sound, written in standard English, proofread and edited
- Exercises
- Class tested

Recommended

- Answers/solutions to some or all exercises
- A stable website for the book
- An adoption list
- An errata list and an easy way to report errors
- For computation open source software such as Sage
- Gnu Free Documentation License or a Creative Commons license

http://aimath.org/textbooks/approved

Programs Projects Library Videos Visitors About News Donate

Approved Textbooks

The list below groups open textbooks by course title. All the books have been judged to meet the evaluation criteria set by the AIM editorial board.

- Liberal Arts Math
- Elementary and Intermediate Algebra
- College Algebra and Precalculus
- Trigonometry
- Calculus
- Differential Equations
- Introduction to Proofs
- Discrete Math
- Combinatorics
- Computing and Numerical Analysis
- Number Theory
- Abstract Algebra
- Real Analysis
- Complex Analysis
- Geometry and Topology
- Probability
- Statistics
- Logic

Approved Textbooks

The list below groups open textbooks by course title. All the books have been judged to meet the evaluation criteria set by the AIM editorial board.

- **Liberal Arts Math**
- **Elementary and Intermediate Algebra**
- **College Algebra and Precalculus**
- **Trigonometry**
- **Calculus**
- **Differential Equations**
- **Linear Algebra**
- **Introduction to Proofs**
- **Discrete Math**
- **Combinatorics**
- **Computing and Numerical Analysis**
- **Number Theory**
- **Abstract Algebra**

  Abstract Algebra: Theory and Applications
  Tom Judson

  Elements of Abstract and Linear Algebra
  E. H. Connell

  Algebra: Abstract and Concrete
  Frederick Goodman

- **Real Analysis**
- **Complex Analysis**
- **Geometry and Topology**
- **Probability**
- **Statistics**
- **Logic**

Abstract Algebra: Theory and Applications

Tom Judson

Digital versions	PDF; online HTML English and Spanish
Latex source	Yes
Exercises	Yes
Solutions	Yes
License	Gnu Free Documentation License

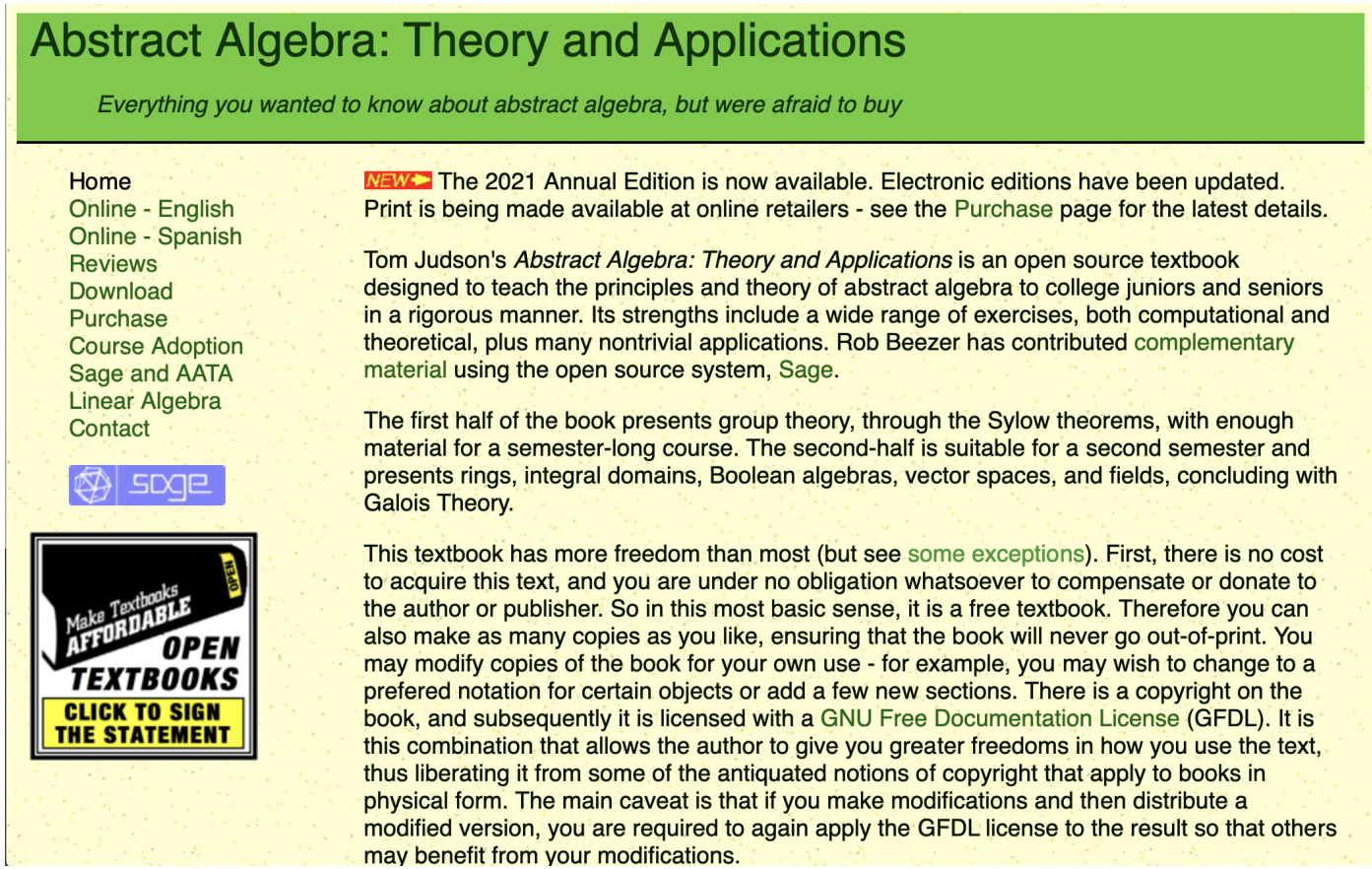
- Junior/senior level text for math majors
- First published by PWS in 1994
- Class tested
- Hardcover version for less than $25; paperback for $17
- Sage tutorial available
- Reviews available
- For more information and to download the PDF and to access the online versions

The content of this book is traditional for a first course in abstract algebra at the junior or senior level. It may be used for either one or two semesters. The exercises include both computational and theoretical and there are a number of applications. Hints or short answers are given to most problems but not fully written solutions.

From the book's homepage:

> The first half of the book presents group theory, through the Sylow theorems, with enough material for a semester-long course. The second-half is suitable for a second semester and presents rings, integral domains, Boolean algebras, vector spaces, and fields, concluding with Galois Theory.

http://abstract.pugetsound.edu



Abstract Algebra: Theory and Applications

Everything you wanted to know about abstract algebra, but were afraid to buy

Home
Online - English
Online - Spanish
Reviews
Download
Purchase
Course Adoption
Sage and AATA
Linear Algebra
Contact

sage

Make Textbooks AFFORDABLE OPEN TEXTBOOKS
CLICK TO SIGN THE STATEMENT

NEW The 2021 Annual Edition is now available. Electronic editions have been updated. Print is being made available at online retailers - see the Purchase page for the latest details.

Tom Judson's *Abstract Algebra: Theory and Applications* is an open source textbook designed to teach the principles and theory of abstract algebra to college juniors and seniors in a rigorous manner. Its strengths include a wide range of exercises, both computational and theoretical, plus many nontrivial applications. Rob Beezer has contributed complementary material using the open source system, Sage.

The first half of the book presents group theory, through the Sylow theorems, with enough material for a semester-long course. The second-half is suitable for a second semester and presents rings, integral domains, Boolean algebras, vector spaces, and fields, concluding with Galois Theory.

This textbook has more freedom than most (but see some exceptions). First, there is no cost to acquire this text, and you are under no obligation whatsoever to compensate or donate to the author or publisher. So in this most basic sense, it is a free textbook. Therefore you can also make as many copies as you like, ensuring that the book will never go out-of-print. You may modify copies of the book for your own use - for example, you may wish to change to a prefered notation for certain objects or add a few new sections. There is a copyright on the book, and subsequently it is licensed with a GNU Free Documentation License (GFDL). It is this combination that allows the author to give you greater freedoms in how you use the text, thus liberating it from some of the antiquated notions of copyright that apply to books in physical form. The main caveat is that if you make modifications and then distribute a modified version, you are required to again apply the GFDL license to the result so that others may benefit from your modifications.

Results

- 60 books in 20 courses
- The approved books and the AIM site are prominent in search results.
- We no longer have to look for books; they find us.
- Around some of the books have developed active communities of users and collaborators.
- OER awareness and usage has increased, and is highest in math and statistics among discipline areas.

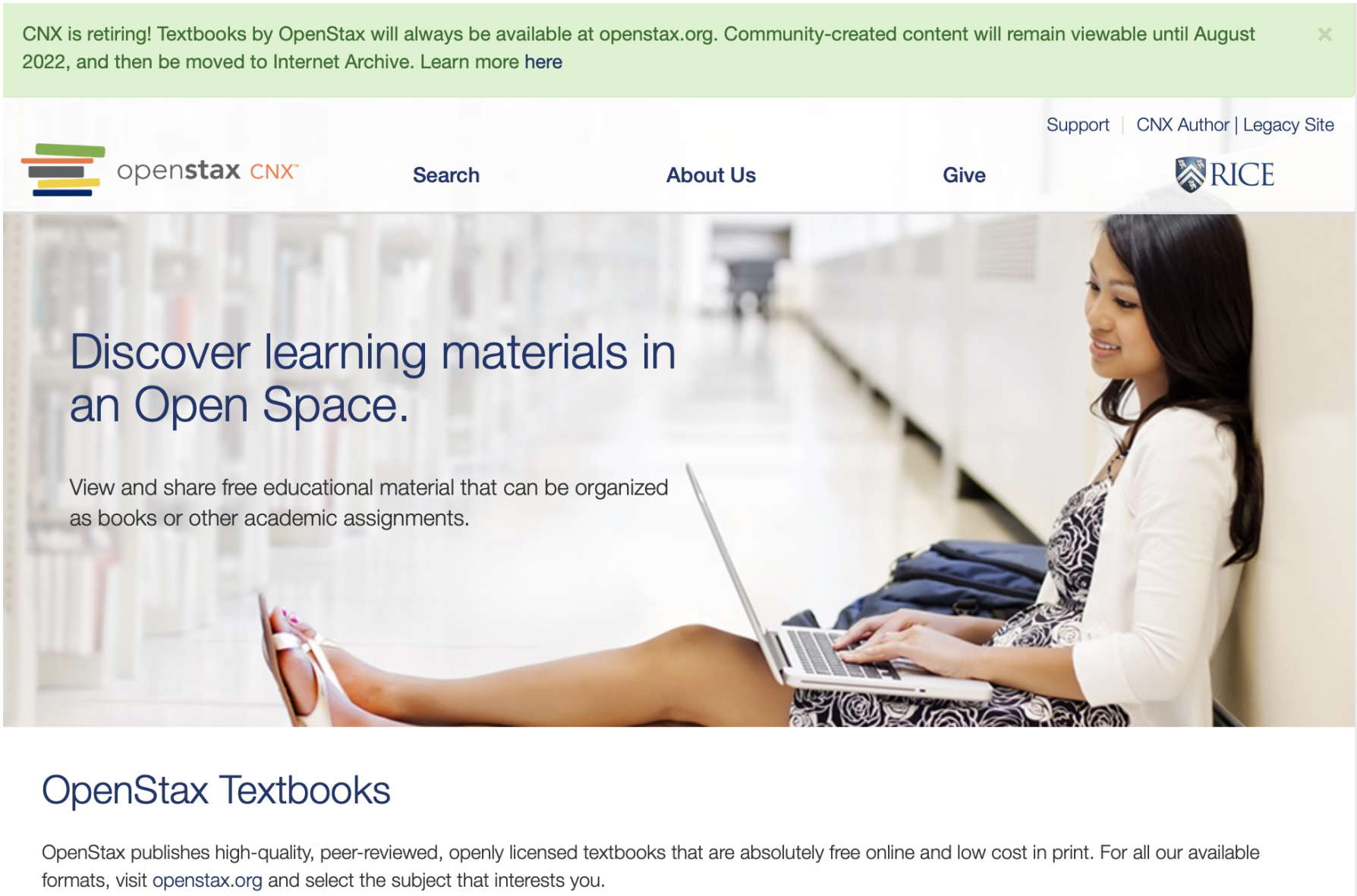
Related projects

- Merlot 1997 -
- Connexions $\rightarrow$ OpenStax CNX 1999 - 2022
- Open Textbook Library 2012-
- LibreTexts 2018 -

MERLOT 1997 - ...


MERLOT
Browse
Add
Communities
Partner Benefits
News & Info
About MERLOT
SkillsCommons
Log In
Sign Up
The MERLOT system provides access to curated online learning and support materials and content creation tools, led by an international community of educators, learners and researchers.
Sign Up
SmartSearch
Search the MERLOT Collection, Other Libraries, and the Web
Search
What is SmartSearch?
Advanced Search by: ISBN | Materials | Members
97,074
Learning Resources
190,093
Registered Members
4,353
Member Institutions
1,027
Recent Contributions

Connexions → OpenStax CNX 1999-2022



Open Textbook Library 2012 - ...

LibreTexts 2018 - ...

Disappointments

- We do not see lower prices.
- OER awareness is still not universal.
- Faculty inertia remains strong.
- Our discipline based approach has not spread to other disciplines.

Challenge: homework systems

- Cost and university rules about fees
- IT requirements
- Privacy concerns
- LMS integration

Players

- WeBWorK
- Edfinity
- MyOpenMath
- XYZ Homework
- Runestone

Opportunity: Make textbooks better not just affordable!

- Students should own, not rent, textbooks.
- Students should not have to deal with digital rights management.
- Authors should find it easy to produce digital, online, print formats.
- Authors should find it easy to use interactive capabilities of online format.

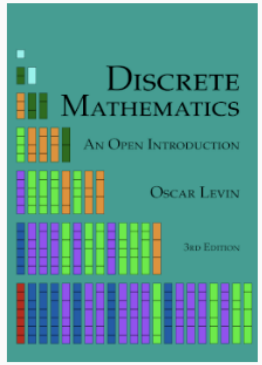
PreTeXt

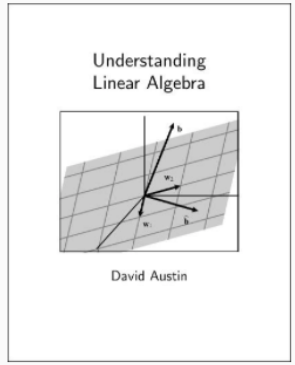
Write Once, Read Anywhere

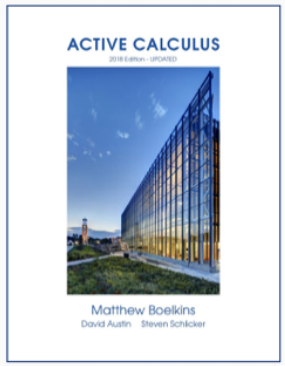
Gallery

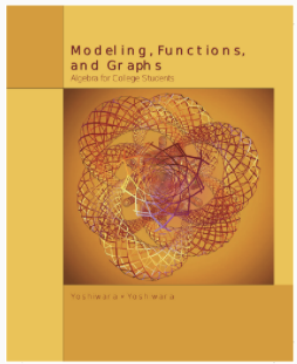
- Home
- Gallery
- Catalog
- Examples
- Documentation
- Newsletters
- Conversions TO PreTeXt
- Tools
- Quickstart
- Talks and Articles
- FAQ
- Other Projects
- Contact

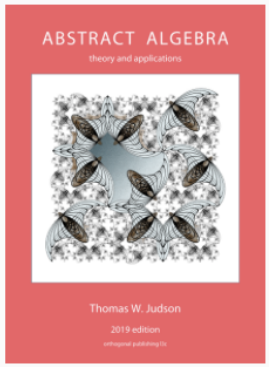
Supporters and Partners

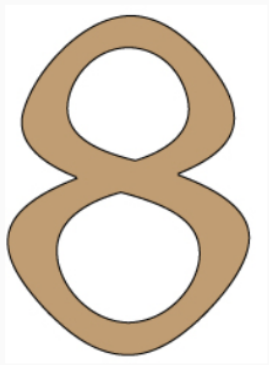


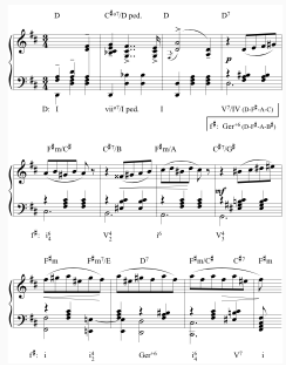












URL References

- aimath.org/textbooks
- utmost.aimath.org
- pretextbook.org
- pretextbook.org/gallery.html
- pretextbook.org/catalog.html
- open.umn.edu/opentextbooks
- libretexts.org
- myopenmath.com
- edfinity.com
- xyzhomework.com
- webwork.runestone.academy/webwork2