

Overcoming Barriers to Undergraduate Research in Logic

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These slides are available at:
www.mathsci.appstate.edu/~jlh

Daunting prospects for undergraduates

How can I choose a topic?

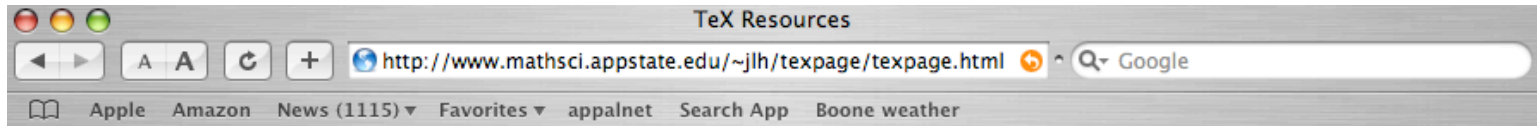
How do I find sources?

You mean there are sources other than *Wikipedia*?

How can I ever type this up?

Overcoming mundane barriers

Create a T_EX page



TeX Resources

TeX is a program for typesetting mathematics. If you have a version of TeX installed on your computer, you can try it out by downloading any of the following example files and double clicking on them. All the examples are LaTeX files; be sure to select LaTeX in the menu when you typeset the file. The computers in the lab in 205 Walker have TeXShop with AMSrefs installed, and should work nicely for this.

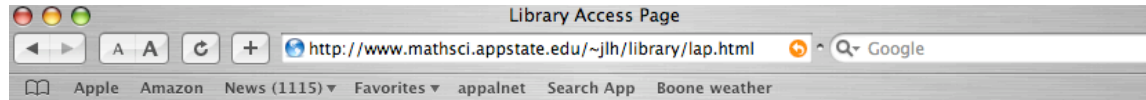
- [simple.tex](#) prints a simple page suitable for short notes and quizzes.
- [problems.tex](#) is a format for typing up problems and their solutions.
- [slideheader.tex](#) is a good format for producing landscape transparencies.
- [withbib.tex](#) provides a format for printing articles using the AMSrefs bibliography system.

Here are pointers to some additional resources:

- The site for the [MacTeX](#) distribution, a free TeX installation for Macintoshes.
- The site for the [MiKTeX](#) distribution, a free TeX installation for Windows.
- How to install the [AMSrefs](#) package for easy typesetting of math bibliographies. (Put the files with the other Latex input files in your TeX installation.)
- The TeX and LaTeX site at the [University of Colorado at Boulder](#) has a lot of useful information, including a nice [symbol list](#).

Back to: [Jeff Hirst's Homepage](#)

Do a MathSciNet demonstration



Library Access Page

Frequently used links

- [Mathscinet](#)
- [ASU library card catalog](#)
- [Research guide for mathematics](#) by Miles Efron, ASU librarian.
- Titles of [math journals](#) held at ASU
- [Holdings information](#) for math journals
- The AMS [Math on the Web](#) page.

Appalachian State University Libraries

- [ASU Libraries' Home Page](#)
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- How to establish [proxy service](#) for off-campus electronic access.

Document Delivery

- [Books and articles](#) can be ordered through ABC or Interlibrary loan.
- Articles can be retrieved via fax via from [Ingenta](#). Charges are paid by the library. (This service was previously provided by CARL.) The library has prepared [instructions](#) on using this service. (If you had a CARL account, your Login ID is your SSN and your password is the password for your CARL profile.)

Indices

- [Mathscinet](#) offers access to the Mathematical Reviews and Current Mathematical Publications. For instructions on using MathSciNet, click on [help](#) in the lower right corner of the main MathSciNet page.
- The [MATHSCI](#) database (database 239) at [Dialogweb](#) includes the [Current Index to Statistics \(CIS\)](#). [Index to Statistics and](#)

Trolling for researchers

Bridge courses

Usually include at least some propositional calculus

Special topics

One time courses on math logic topics

Set theory, computability, fuzzy logic, etc.

These courses could include a short “research assignment.”

An alternative: a one credit hour undergrad colloquium.

Topics for projects

Bridge courses:

\mid and \downarrow are complete connectives in classical propositional calculus.

What binary connectives of Łukasiewicz logic are complete?

Find all minimal complete sets of binary connectives in Łukasiewicz logic.

Repeat with Kleene strong 3-valued logic.

What about four valued logics?

What about tri-nary connectives?

Topics for projects

From a computability course:

Instances of Church's thesis

Show that some graph rewriting scheme is Turing complete.

Computable problems with no computable solution

There is a computable infinite partial latin square problem that is solvable, but has no computable solution.

Topics for projects

From a fuzzy logic course:

Typically, what are the characteristics of t -norms used in applications?

Design a fuzzy control system for carrying out “this task.”

Describe all Archimedean t -norms with piece-wise linear generators. How are the non-differentiable points of the generating function manifested in the t -norm?