

Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

Writing Reports

Gathering Information

References: [PHYS 3870 Web Site](#)

[USU Library Web Site](#)

Intermediate Lab






PHYS 3870

CONVEYING INFORMATION

Writing Reports

References: [PHYS 3870 Web Site](#)

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Physics Intermediate and Advanced Laboratories PHYX 3870 and 3880		
	<p align="center">Intermediate Laboratory PHYX 3870 Fall 2015</p> <ul style="list-style-type: none"> Syllabus Assignment Sheet List of Experiments Experiment Schedule Pre-Lab Meeting Sign Ups Class Notes 	<p align="center">Advanced Laboratory PHYX 3880 Spring 2013</p> <ul style="list-style-type: none"> Syllabus Extended Investigations Notes List of Experiments Experiment Schedule
<p align="center">Reports and Presentation</p> <ul style="list-style-type: none"> Keeping a Notebook Report Writing—Class Notes (PDF) (PPT) Writing a Lab Report AIP Style Manual Notes on Undergraduate Research Poster Preparation USU Undergraduate Research Office—Great Posters USU Undergraduate Research Office—Great Presentations USU Undergraduate Research Office—Great Proposals Poster Presentations—Class Notes (PDF) (PPT) 	<p align="center">Experiment Descriptions</p> <ul style="list-style-type: none"> Brief List of Experiments Experiment Descriptions USU Experiments and the Nobel Prizes USU Experiments and the Physical Constants Equipment Manuals Experiment Set Up <p align="center">Lab News</p>	<p align="center">Tutorials</p> <ul style="list-style-type: none"> Intermediate Lab Electronic Workbook (MCD) Download ZIP file, place in Mathcad "HANDBOOK" directory and unzip. Science Workshop—How to Begin Science Workshop—Analog Tutorial (Download) Science Workshop—Digital Tutorial EndNote Web Tutorial (Library) EndNote Web Tutorial (PDF) Google Scholar Tutorial (web) Google Scholar Tutorial (PDF) Data Thief Tutorial Download DataThief III (Site) (File) DataThief Example Files (JPG) (TXT) (EXLN) Excel Tutorial (PDF instructions) (XLS worksheet) (TXT data) IGOR Pro Tutorial <p align="center">     </p>
<p align="center">Related Web Sites and Resources</p> <ul style="list-style-type: none"> Physics Home Page Class Syllabi Home Page USU Library Resource Page (PDF) (HTML) Instructor Home Page Lab Related Links Undergrad Research at USU Research Resources Mathcad™ Resources 	<p align="center">Lab Humor</p> <ul style="list-style-type: none"> Interferometry: The Real Story Fabry Perot and the Interferometers To Kill a Lion Jet Powered Cooler More Lab Humor 	<p align="center">General Lab References</p> <ul style="list-style-type: none"> AAPT Goals for Physics Labs Annotated Bibliography Error Analysis Glossary

Writing page

Poster page

But first...the most important page

INTERMEDIATE LABORATORY - PHYX 3870-3800 A GUIDE TO THE TERMINOLOGY OF SCIENTIFIC PAPERS

In each couplet, the first is the phrase as it appears in the scientific literature; the second is the translation as to what it really means:

It has long been known that...
I haven't bothered to look up the original reference. *Here comes some richly deserved character assassination.*

It is believed that...
I think... While it has not been possible to provide definitive answers to these questions...
The experiment didn't prove anything, but at least I can publish the data somewhere.

It is generally believed that...
A couple of other guys think so, too.

It is not unreasonable to assume...
If you don't believe this, you might as well stop reading here.

A preliminary examination revealed...
One of my grad students pointed this out to me.

Four samples were chosen for further study.
The others didn't make sense, so we ignored them.

Results from the third sample may be of somewhat lower confidence...
I dropped it on the floor.

...but are consistent with the data obtained from the other samples.
...but scooped most of it up.

Handled with extreme care during the entire procedure...
NOT dropped on the floor...

Typical results are shown.
The best results are shown.

Correct within an order of magnitude...
Wrong

It is clear that additional work will be required before complete understanding of the phenomenon occurs...
...I don't understand it.

Not inconsistent with other determinations, given our current limited understanding of this field...
Meaningless

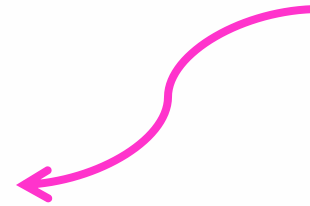
The significance of these results is unclear.
Look at the pretty artifact.

It might be argued that...
I have such a devastating rebuttal to this argument that I shall now deliberately raise it.

We are unable to reconcile our results with those of Hackenbush, but...

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The Real Story



<http://www.physics.usu.edu/dennison/3870-3880/Humor/science%20terminology%20humor.pdf>

It is hoped that this study will stimulate further investigation in this field...
...This is a lousy paper, but so are all the others on this miserable topic.

A careful analysis of the available data...
...Three pages of original notes were obliterated when I knocked over a beer.

A statistically oriented projection of the significance of the findings...
...Wild guess.

Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

Writing Styles

References: [PHYS 3870 Web Site](#)

PHYS 3870 Web Site

Grade
Rubric

Hints on Writing a Lab Report		
<u>How to Write Lab Reports</u>	<u>Library Reference Materials</u>	<u>Reference Materials</u>
Lab Report Grade Form	USU Libraries Techniques for On-Line Journal Searches	Lab Related Links
Contents of a Lab Report	<u>Journals Found in SER 109</u> <ul style="list-style-type: none">• American Journal of Physics• Physics Today• Scientific American• The Physics Teacher	Annotated Bibliography Error Analysis Glossary AIP Style Manual
Last Updated 1/8/04		

Notes on
contents
of a lab
report

The AIP
Style
Manual

AIP Style Manual: <http://www.aip.org/pubservs/style/4thed/toc.html>

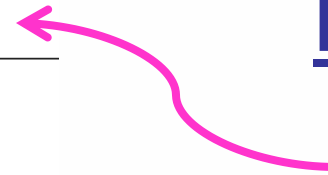
AIP Journals: <http://www.aip.org/pubservs/compuscript.html>

American Journal of Physics: <http://ajp.dickinson.edu/Contributors/manFormat.html>

Intermediate Laboratory – PHX 3870

PHYS 3870 Report Rubric

Laboratory Report Evaluation



Grade Rubric

Author: _____

Date: _____

Partner: _____

Grade: _____

Experiment: _____

Format: Full / Brief / Notebook

General Comments:

http://www.physics.usu.edu/dennison/3870-3880/References/Lab_Report_Rubric.pdf

Comments on Science:

Comments on Writing:

Other Comments:

A LAB REPORT SHOULD:

- ___ Identify the problem (system) to be studied.
- ___ Identify the input(s) and outputs(s) to be studied.
- ___ Describe the approach to use outputs to tell how the inputs affect the system and its outputs.
___ Propose a model to test.
- ___ Describe the results of your observations.
- ___ Describe the quality of the observations.
- ___ Determine the effectiveness of your model.
- ___ Discuss generalization of the model.

PHYS 3870 Report Rubric

Grade
Rubric

CONTENT OF A LAB REPORT

Title page:

- _____ Title of lab
- _____ Experimenter's and partner's names
- _____ Class name and number
- _____ Date of completion of experiment and report

Introduction:

- _____ Statement of purpose - What do you plan to accomplish? Why is the lab interesting or important?
- _____ What are the important physical principles explored in the experiment?

Theory:

- _____ Any appropriate scientific or historical background
- _____ Any appropriate discussions of theory
- _____ Any appropriate derivation of equations*

http://www.physics.usu.edu/dennison/3870-3880/References/Lab_Report_Rubric.pdf

Procedures:

- _____ List of apparatus*
- _____ Diagram of experimental setup*
- _____ Details of procedures you used; what was done and how it was done. Emphasize procedures different from those outlined in manual

Results:

- _____ List of data* (Tabular or graphical format is best)
- _____ Methods of analysis including sample calculations
- _____ Discussion of error analysis

Discussion and Conclusions:

- _____ Summary of results
- _____ Summary of error analysis
- _____ Significance of results - how does this verify the basic physical principles
- _____ Summary of what you learned

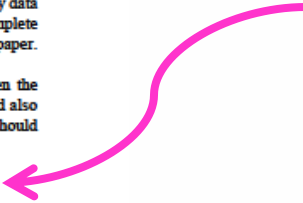
*May be appropriate to put these items in an appendix.

E-Excellent V-Very Good G-Good N-Needs Work X-Absent or Inadequate √-Satisfactory

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Content of a Lab Report

Notes on
contents
of a lab
report



NOTES ABOUT USE OF A LAB NOTEBOOK

- For these experiments which are graded solely on the notebook, you should be sure to complete all calculations and error analysis. You should also enter some summation and conclusions concerning your results. The presentation need not be polished, but the indications of your understanding must be there. Notebooks will be graded on the completeness of the data, correctness and clarity of the data and error analysis, and an understanding of physical concepts as conveyed in concluding remarks. The notebook need not be pristine; however, you should be neat, organized, and complete enough to be able to reconstruct your experimental results at some later date. *In addition, you should take mercy on your instructor and make the notebook coherent and legible enough that he has some hope of grading your work.*
- Use of your lab notebook is intended to help you develop good habits in the laboratory and help you organize your thoughts. Record all your data and comments directly into your notebook. It is permissible for you to photocopy data from your partner's notebook to avoid having to take duplicate notes, but each notebook should contain a complete record of all data taken. All material should be permanently attached in your notebook; there should be no loose paper.
- In addition to the data, you should record your procedure and any additional observations you made. Often the seemingly unimportant detail is the key bit of information you need to understand the experiment. You should also include notes about your experimental strategy. Preliminary calculations and results from analysis programs should also be kept in the notebook.

NOTES ABOUT WRITTEN LAB REPORTS:

- Write your lab reports with next year's students as your audience. Your report, together with the lab write-up, should provide these students with all the information necessary to perform the lab, analyze the data, and evaluate their results. In addition, your report should highlight the interesting aspects and physical principles of the lab topic.
- SI units should be used except under special circumstances.
- All measured quantities and those derived quantities included in the conclusions must quote an uncertainty (which has been justified in the text) and have units listed. **Pay attention to significant figures.**
- Data should be recorded in a lab notebook.
- You are encouraged to perform the experiments in pairs; however, lab reports should be written independently. It is a good idea to have your partner critique your report before it is submitted for grading.
- Grading of the written reports is based on the following:
 - Understanding of concepts conveyed in lab report
 - Data and error analysis procedures in lab report
 - Clarity and correctness of conclusions drawn on the basis of your data and analysis
 - Presentation of information (including spelling, grammar, and style) in lab report
- Formal written reports have no length limit, but are typically 7 to 10 typed pages. Not all experiments are appropriate for a written report; check with the instructor.
- Brief reports are limited to two typed pages including all data, figures, tables, and references. The emphasis is to convey the important points of the experiment in a concise manner. A typical brief report might contain one or two paragraphs for each of the sections listed above. Emphasis must be placed on the important physics and your results.

<http://www.physics.usu.edu/dennison/3870-3880/References/Content%20of%20Lab%20Report.pdf>

PHYS 3870 Web Site

Content of a Lab Report

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Use of a Lab Notebook

NOTES ABOUT USE OF A LAB NOTEBOOK

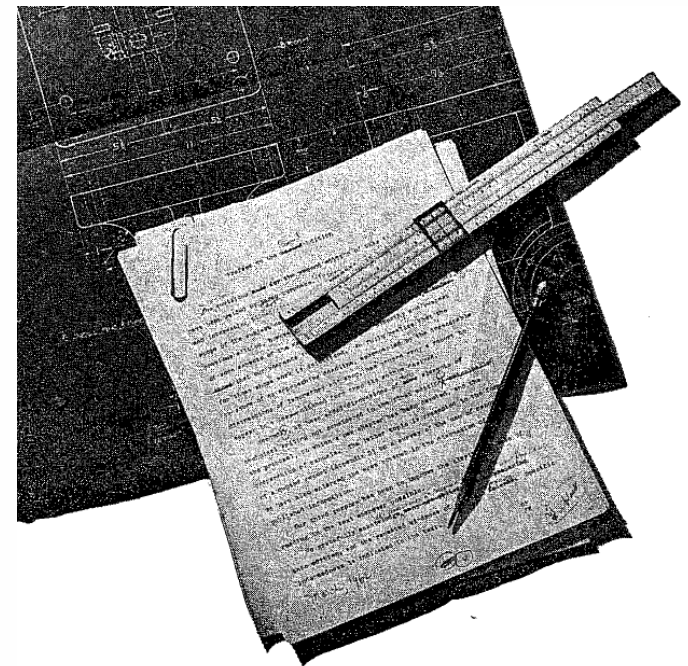
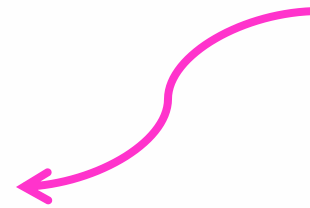
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Writing Resources

Notes on “Old School”
Technical Writing

“The Scientific Attitude”



TECHNICAL WRITING

Revised Edition

GORDON H. MILLS · *The University of Texas*

JOHN A. WALTER · *The University of Texas*

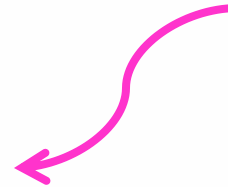
HOLT, RINEHART AND WINSTON
New York · Chicago · San Francisco
Toronto · London

HOW TO Write and Publish a Scientific Paper

ROBERT A. DAY

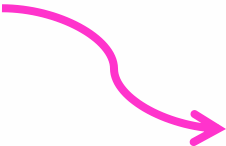
Notes on “Old School”
Technical Writing

Tense in Scientific Writing
Active Vs Passive Voice
Singulars and Plurals



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University City Science Center
Philadelphia, Pennsylvania 19104

Notes on Technical Writing



Engineers and scientists perform many complex and intricate tasks using the world's most sophisticated equipment. However, their performance as engineers and scientists is almost always related to their use of one of the oldest tools - the pen. In academia, the saying "publish or perish" often describes the process of acquiring tenure as well as credibility. In industry, both large and small organizations communicate everything through memos, reports, and short presentations. Product development decisions are often made by a committee of people far removed from the actual technology. The saying "he who has the most convincing viewgraphs and reports, wins..." can sometimes apply to industry. Therefore, it should be clear that an ability to concisely and efficiently prepare technical reports, research papers, and or viewgraph presentations can have a profound positive impact on an individual's career. Consider the following statement by anonymous Fortune 500 corporate vice president:

"... in any large organization, the person who decides whether you get a promotion, or who determines the size of a pay raise, does not know you personally. The only thing they have to go on is what other people write about you and what you write about you ..."

It can be seen that if one should write a lot of material to get ahead in one's career, it makes sense to write as objectively and concisely as possible. Objective writing is essential because good technical writing should not be seen as erroneous after new discoveries are made. A good technical report should present a clear milestone of what was done and understood at the time of the writing. Speculation about future research, or what might have gone wrong with the experiment or research, is acceptable so long as it is clearly labeled as speculation, rather than observation or fact. Objective reporting should be detailed enough to allow a technical peer to reproduce the experiment or research without difficulty. However, concise writing is also essential because everyone is short on time.

Every handbook on technical writing will emphasize the importance of knowing the audience to gauge the depth of details to present. It is also important to decide whether the report is for

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Wheeler's rules of writing

(These rules were assembled over several years by Edwin F. Taylor, one of many collaborators with John Archibald Wheeler (JAW). JAW has read these and generally approved them, but he has not edited them.)

Motivate! Motivate! Motivate! The text should read like a detective story, keeping the reader on the edge of her chair, gasping for the next handout. Every sentence quotable! Book design must contribute to the rich, headlong plunge.

Simplify! Simplify! Simplify! JAW: "Everything important is, at bottom, utterly simple." Einstein: "I want to know His [God's] thoughts, the rest are details."

The power and generality of the singular, the specific, the committed: Avoid plurals. "those designing Earth satellites" becomes "anyone designing an earth satellite." Use *the* rather than *a*: "Center of the black hole," not "center of a black hole." No "if," no "suppose," instead, use "when."

The power of the present: Avoid past tense unless talking about history. Avoid unnecessary future tense.

The power of the active: Avoid passives.

The dullness of simply being: Suppress the use of the verb "to be."

JAW: "Whenever I have an 'is' in a sentence, I know there is something wrong with that sentence."

"...is not a harmonic oscillator" becomes "...does not rate as an harmonic oscillator."

"He is happy" becomes "He beams happiness."

"Schwarzschild spacetime geometry is distinguished from all other conceivable geometrics..." becomes "Schwarzschild spacetime geometry distinguishes itself from all other conceivable geometries...."

Avoid the subjunctive ("We would like to express the metric as...") except in cases in which you are presenting something with which you do not agree ("Some would conclude incorrectly that...").

Avoid "ing" words. "before escaping or plunging" becomes "before it escapes or plunges"; "The Earth is rotating" becomes "The Earth rotates."

Put the key word first or early in the sentence or at the end of the sentence, not in the middle.

Rhetorical rule of threes. Use three descriptions to establish a triangle that spans the idea being presented: "proper time, interval, wristwatch time" or "Schwarzschild radial coordinate, r , reduced circumference." It is also a reminder of the different descriptors of the same thing.

Use "we" to include the student, rather than "you," which is not so friendly: "As we plunge into a black hole...."

However....

Use infinitive construction: "To find", "to learn", "to determine" rather than "we do so and so" or "let us do so and so," which is condescending because the author is going to do it anyway.

"We use the Principle of Relativity to derive the invariance of the interval." or "Let us use the Principle of Relativity to derive the invariance of the interval." or "Use the Principle of Relativity to derive the invariance of the interval." all become "To derive the invariance of the interval, use the Principle of Relativity."

Use commands to stir the blood—but sparingly.

"Find..."

"Determine..."

"Reckon..." (rather than "compute" or "calculate," which seem technical)

"Plunge..."

But not so much as to seem bossy.

Appeal to experiment or logic—not to the professions. Do not invoke "scientists" to enforce a point.

John A. Wheeler
Department of Physics
Princeton University

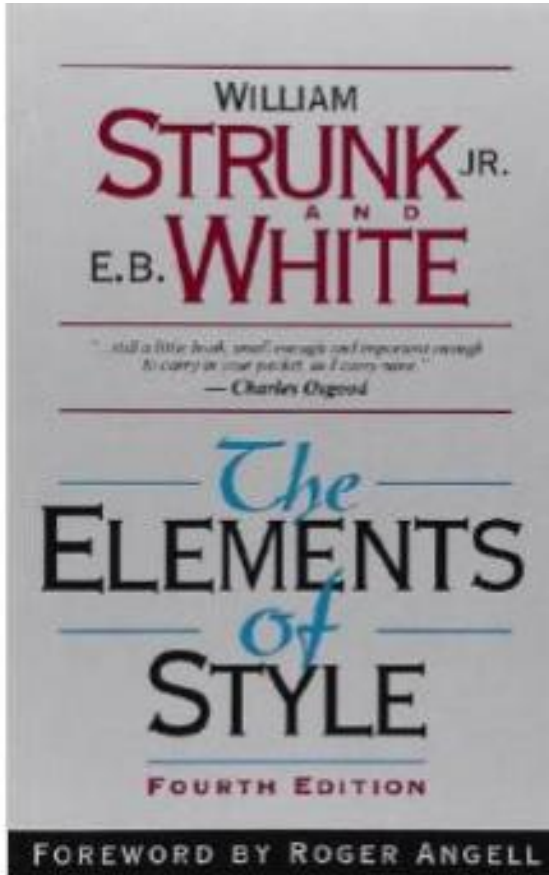
PHYS 3870 Web Site

Wheeler's Rules of Writing



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Writing Resources



Review

"...a marvellous and timeless little book... Here, succinctly, elegantly and without fuss are the essentials of writing clear, correct English."
John Clare, "The Telegraph"

From the Back Cover

Some acclaim for previous editions:

"Buy it, study it, enjoy it. It's as timeless as a book can be in our age of volubility."

— The New York Times

"No book in shorter space, with fewer words, will help any writer more than this persistent little volume."

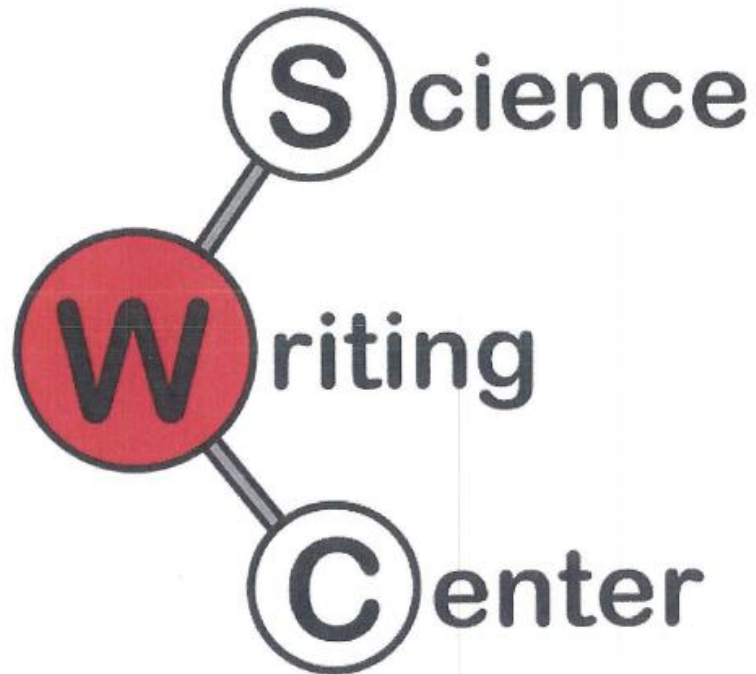
— The Boston Globe

"White is one of the best stylists and most lucid minds in this country. What he says and his way of saying it are equally rewarding."

— The Wall Street Journal

"The book remains a nonpareil: direct, correct, and delightful."

— The New Yorker



PHYS 3870 Web Site A New Writing Resource

Located in the STE²M Center

Need help with lab reports or scientific research papers?

Visit us on the second floor of the Edith Bowen Lab School.
Make sure you come in through the entrance off 700 East.

We're open Monday-Thursday, 5:00-7:00.

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Style Manuals

Grade
Rubric

Hints on Writing a Lab Report		
<u>How to Write Lab Reports</u>	<u>Library Reference Materials</u>	<u>Reference Materials</u>
Lab Report Grade Form	USU Libraries Techniques for On-Line Journal Searches	Lab Related Links
Contents of a Lab Report	<u>Journals Found in SER 109</u> <ul style="list-style-type: none">• American Journal of Physics• Physics Today• Scientific American• The Physics Teacher	Annotated Bibliography Error Analysis Glossary AIP Style Manual
Last Updated 1/8/04		

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The AIP
Style
Manual

AIP Style Manual: <http://www.aip.org/pubservs/style/4thed/toc.html>

AIP Journals: <http://www.aip.org/pubservs/compuscript.html>

American Journal of Physics: <http://ajp.dickinson.edu/Contributors/manFormat.html>

Intermediate Lab

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CONVEYING INFORMATION

Journal Style Manuals

References: PHYS 3870 Web Site

AJP web site <http://ajp.dickinson.edu/Contributors/contGenInfo.html>

AIP Style Manual: <http://www.aip.org/pubservs/style/4thed/toc.html>



American Journal of Physics Style

Audience and Mission

The mission of the American Journal of Physics (AJP) is to publish articles on the educational and cultural aspects of physics that are useful, interesting, and accessible to a diverse audience of physics students, educators, and researchers who are generally reading outside their specialties to broaden their understanding of physics and to expand and enhance their pedagogical toolkits at the undergraduate and graduate levels.

AJP web site

<http://ajp.dickinson.edu/Contributors/contGenInfo.html>



AIP Style Manual

Includes information on:

- Writing a paper
- Parts of a paper
- Headings
- Reference formats
- Grammar and punctuation
- Spelling and misspelled words
- “I” and “we”
- Capitalizations
- Accepted abbreviations
- Symbols
- Units
- Graph formats
- Figures and figure captions
- Tables and Table captions
- Equations
- Symbols

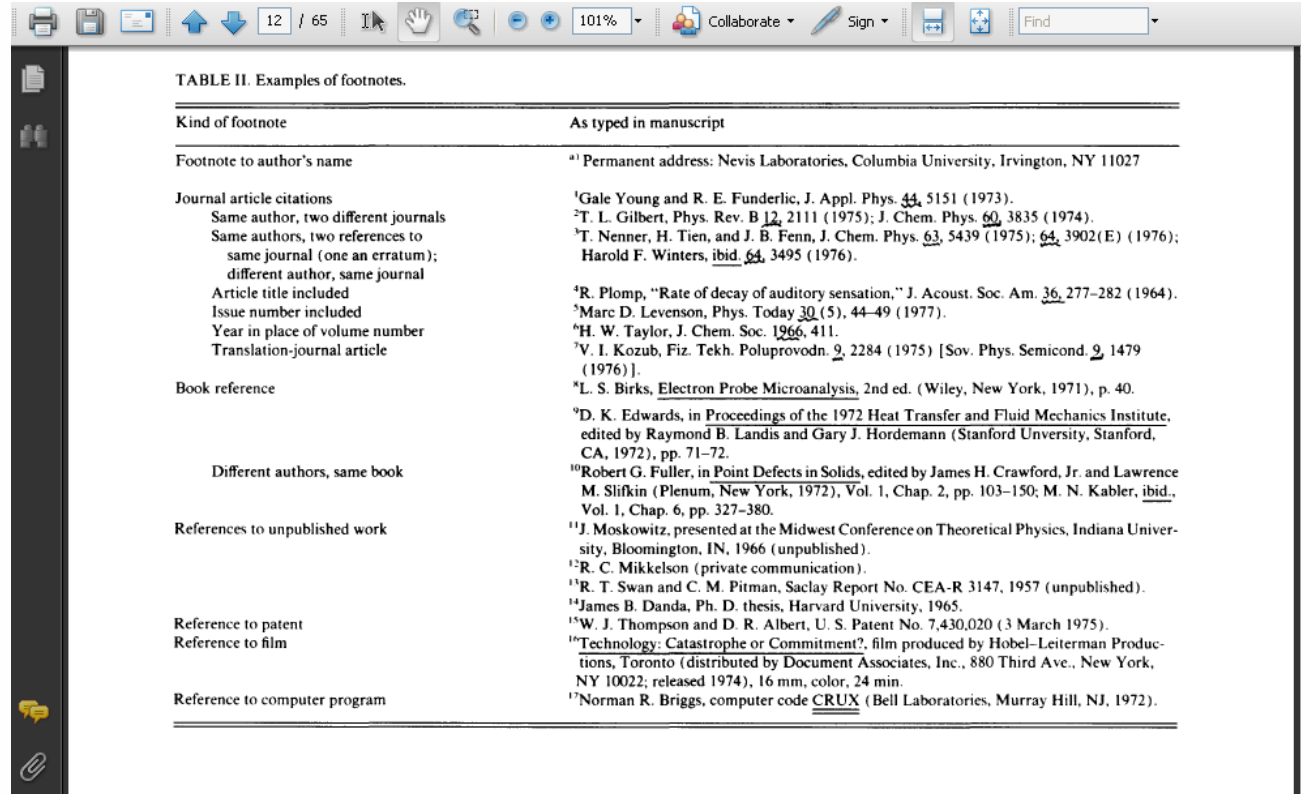


TABLE II. Examples of footnotes.

Kind of footnote	As typed in manuscript
Footnote to author's name	⁴¹ Permanent address: Nevis Laboratories, Columbia University, Irvington, NY 11027
Journal article citations	
Same author, two different journals	⁴ Gale Young and R. E. Funderlic, <i>J. Appl. Phys.</i> 44 , 5151 (1973).
Same authors, two references to same journal (one an erratum); different author, same journal	² T. L. Gilbert, <i>Phys. Rev. B</i> 12 , 2111 (1975); <i>J. Chem. Phys.</i> 60 , 3835 (1974).
Article title included	³ T. Nenner, H. Tien, and J. B. Fenn, <i>J. Chem. Phys.</i> 63 , 5439 (1975); 64 , 3902(E) (1976); Harold F. Winters, <i>ibid.</i> 64 , 3495 (1976).
Issue number included	⁴ R. Plomp, "Rate of decay of auditory sensation," <i>J. Acoust. Soc. Am.</i> 36 , 277–282 (1964).
Year in place of volume number	⁵ Marc D. Levenson, <i>Phys. Today</i> 30 (5), 44–49 (1977).
Translation-journal article	⁶ H. W. Taylor, <i>J. Chem. Soc.</i> 1966 , 411.
Book reference	⁷ V. I. Kozub, <i>Fiz. Tekh. Poluprovodn.</i> 9 , 2284 (1975) [<i>Sov. Phys. Semicond.</i> 9 , 1479 (1976)].
Different authors, same book	⁸ L. S. Birks, <i>Electron Probe Microanalysis</i> , 2nd ed. (Wiley, New York, 1971), p. 40.
References to unpublished work	⁹ D. K. Edwards, in <i>Proceedings of the 1972 Heat Transfer and Fluid Mechanics Institute</i> , edited by Raymond B. Landis and Gary J. Hordemann (Stanford University, Stanford, CA, 1972), pp. 71–72.
Reference to patent	¹⁰ Robert G. Fuller, in <i>Point Defects in Solids</i> , edited by James H. Crawford, Jr. and Lawrence M. Slifkin (Plenum, New York, 1972), Vol. 1, Chap. 2, pp. 103–150; M. N. Kabler, <i>ibid.</i> , Vol. 1, Chap. 6, pp. 327–380.
Reference to film	¹¹ J. Moskowitz, presented at the Midwest Conference on Theoretical Physics, Indiana University, Bloomington, IN, 1966 (unpublished).
Reference to computer program	¹² R. C. Mikkelson (private communication).
	¹³ R. T. Swan and C. M. Pitman, Saclay Report No. CEA-R 3147, 1957 (unpublished).
	¹⁴ James B. Danda, Ph. D. thesis, Harvard University, 1965.
	¹⁵ W. J. Thompson and D. R. Albert, U. S. Patent No. 7,430,020 (3 March 1975).
	¹⁶ <i>Technology: Catastrophe or Commitment?</i> , film produced by Hobel–Leiterman Productions, Toronto (distributed by Document Associates, Inc., 880 Third Ave., New York, NY 10022; released 1974), 16 mm, color, 24 min.
	¹⁷ Norman R. Briggs, computer code CRUX (Bell Laboratories, Murray Hill, NJ, 1972).

AIP Style Manual: <http://www.aip.org/pubservs/style/4thed/toc.html>

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CONVEYING INFORMATION

Gathering Information

References: PHYS 3870 Web Site
USU Library

The logo for Google Scholar, featuring the word "Google" in its multi-colored font followed by the word "scholar" in a grey sans-serif font.

Access the USU Library Home Web Page

The screenshot shows the Utah State University Library website. At the top left is the Utah State University logo. To its right are links for 'A-Z index', 'MyUSU', and 'Directory', along with a search bar and a 'Questions?' button. Below this is a horizontal menu with categories like 'About', 'Admission', 'Academics', 'Campus Life', 'Research', 'Campuses', 'Extension', and 'Info for'. The main content area features a large banner for 'MERRILL-CAZIER LIBRARY' with the text 'Open Today: 12:00 pm - 12:00 am'. A search bar is overlaid on the banner with the text 'Find books, articles, news, images, etc.' and a search icon. Below the banner are three columns of links: 'Ask A Librarian' (with a chat icon and contact info), 'Resources' (with links to 'Articles & Databases', 'Find Books (Catalog)', 'Electronic Journals List', and 'Find eBooks'), and 'Services' (with links to 'Study Rooms', 'My Account/Renew Materials', 'Request Materials (Interlibrary Loan)', 'Renewals, Borrowing & Circulation', and 'Course Reserves'). At the bottom, there are four icons: 'FAQs', 'Not on Campus?', 'Quick How-Tos' (circled in red), and 'Subject Guides'. A pink arrow points from the 'Library' link in the left sidebar to the 'Resources' column. Another pink arrow points from the 'Quick How-Tos' icon to the URL <http://library2.usu.edu/howto/>.

<http://library2.usu.edu/howto/>

Access the USU Library How-Tos



Quick How-Tos

<http://library2.usu.edu/howto/>

The screenshot shows the Utah State University Libraries website. At the top, there is a navigation bar with links for 'USU home', 'A-Z index', 'calendars', 'MyUSU', 'contact', and 'directory'. Below this is a secondary navigation bar with 'Library Catalog', 'Library Hours', 'Articles and Databases', 'Study Rooms', and 'Contact Library'. The main content area is titled 'QUICK HOW TO GUIDES' and 'do-it-yourself help guides'. On the left, there are links for 'Table of Contents' and 'Ask a Librarian'. The main area contains a grid of 8 guide cards, each with a title and a right-pointing arrow. A pink arrow points from the 'Table of Contents' link to the 'I need help with articles' card, and another pink arrow points from the 'I need help with articles' card to the list of links on the right side of the slide.

Utah State University
UNIVERSITY LIBRARIES

USU home A-Z index calendars MyUSU contact directory

Library Catalog Library Hours Articles and Databases Study Rooms Contact Library

QUICK HOW TO GUIDES
do-it-yourself help guides

Table of Contents
Ask a Librarian

- I need help with articles
- I need help with books
- I need help with websites
- I'm looking for a specific item...
- How do I cite & organize sources?
- I need help writing a research paper
- I'm not at the Logan Campus
- I'm having problems accessing material

USU Merrill-Cazier Library • 3000 Old Main Hill • Logan UT 84322-3000 • 435-797-2633

- **I need help with articles**
 - How do I get to the full article?
 - How do I find journal & magazine articles?
 - Finding a specific article in print
 - Finding newspaper & magazine articles
 - What kind of article am I looking at?
 - Can I browse e-journals?
 - Finding scholarly/peer reviewed articles
 - Search tips
 - Evaluating articles
 - Finding specific articles
 - You don't have my article
 - Finding articles in the BARN
- **I need help with books**
- **I need help with websites**
- **I'm looking for a specific item...**
 - I'm looking for a music score
 - I'm looking for a book.
 - I'm looking for an article.
 - Getting to the full article
 - Do you have my textbook?
 - I'm looking for a dissertation or thesis
 - I'm looking for a video
 - The library doesn't own it.
- I'm looking for books
- **How do I cite & organize sources?**
- **I need help writing a research paper**
 - Sources and your assignment
 - My topic is too narrow - how can I broaden it?
 - My topic is too broad - how can I narrow it?
 - I can't find enough on my topic
 - I need help integrating sources into my paper
 - I need help getting started & choosing a topic
 - Finding relevant things
 - Getting ideas and brainstorming
 - Reading for ideas
 - Is this a good topic?
 - Writing Center help
- **I'm not at the Logan Campus**
- **I'm having problems accessing material**

<http://library2.usu.edu/howto/sitemap.php>

Access the USU Library Home Web Page

<http://libguides.usu.edu/content.php?pid=246165>

USU Library / LibGuides / PHYS 2500 and 3870/3880 / Information Resources In Physics

PHYS 2500 and 3870/3880: Information Resources In Physics

Information Resources for Physics 2500 [PHYS]2500/3870/3880]

Information Resources In Physics

Journals

Databases

Citing Your Sources

Finding the Information

The Basics

Part of your work in this class will require you to search the physics literature to identify journal articles that support work you are doing in your labs or other assignments. The "Databases" tab lists good sites for you to use to find journal articles. The "Journals" tab lists information about journals in the Merrill-Cazier Library.

You will be expected to read and cite peer reviewed articles. The authors of these articles submitted their work to be read and critiqued by other experts in the field prior to being accepted for publication in a journal. This is done to insure the published work is reliable and sound.

Sometimes it is not easy to tell if a journal publishes peer-reviewed articles. You can use the table below to help determine if the article is from a peer-reviewed journal. Alternatively, you can always contact your friendly librarian (email the article or citation to the address in this guide) and they can usually tell you very quickly if it is a peer review journal.

One common measure of the reputation and utility of various peer reviewed journals is the impact factor. This is based on the average number of times articles from a given journal are cited by other authors.

Scholarly vs. Popular

	Scholarly	Popular
Bibliography	yes	usually none present
Author	noted expert or professional and credentials are provided	journalist, student, or no name provided
Reading Level	advanced, often with specialized vocabulary or jargon	easy to read
Purpose	to provide information in a specific field and/or report research findings	provides an overview, opinions, or general information
Article submission	articles are reviewed by professional peers; editor and editorial staff are experts in the field and may work at a variety of institutions	articles are written by staff of the magazine or newspaper; editor and editorial staff work for the magazine/newspaper
Article format	structured with sections such as abstract, introduction, methods, results, and discussion	articles do not necessarily follow a set structure or format

Subject Guide



Betty Rozum

[Email Me](#)

Subjects:
Physics

Last Updated: Jul 13, 2015 6:04 PM | URL: <http://libguides.usu.edu/physics2500> | [Print Page](#)

[Login to LibApps](#)

Setting Up Google Search at USU

Good information on electronic journals, Endnote and Google Scholar <http://libguides.usu.edu/c.php?g=52461&p=338450>

Databases

- **Google Scholar**

Google Scholar searches very broadly across the literature, but if you utilize the advanced search features you can hone your search nicely. Google Scholar offers a "cited by" feature, similar to what Web of Science does, but the two cannot be compared side by side due to differences in indexing practices.

- **Web of Science**

The Web of Science contains three citation indexes that are searched simultaneously: Science, Social Sciences, and Arts & Humanities. The Science Citation Index indexes only 6,650 journals, but only those journals considered to be the top journals are included. The greatest strength of the database is that it includes cited references and it allows you to perform cited reference searching. For example, you can identify authors who have cited a particular paper. Coverage goes back to 1975.

USU set up instructions:

<http://libguides.usu.edu/c.php?g=52461&p=338450>

Google Scholar Home Page:

<http://scholar.google.com>

Settings in Google Scholar for USU Resources

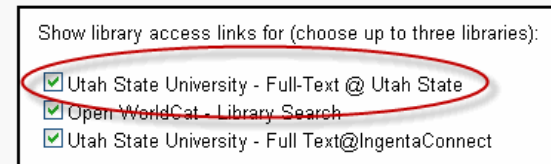
1. Open **Google Scholar**.
2. Click the **Scholar Preferences** link.



3. Scroll down the resulting page to **Library Links**.



4. Type **Utah State University** and click **Find Library**.
5. Check to make sure that "Utah State University - Full-Text @ Utah State" appears and the box is checked.



6. After you run a search, on your results page you should see a link titled Full Text @ USU to the right of any articles for which the USU libraries have an electronic subscription. Clicking this link will take you a page with links to the full text and the option to enter your A number and banner password to gain access to the article from off-campus.



Please contact a librarian if you have any questions.

Searching with Google Scholar

My library My Citations My updates Alerts Metrics Settings

Find articles ×

with all of the words

with the exact phrase

with at least one of the words

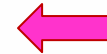
without the words

where my words occur

Return articles authored by
e.g., "PJ Hayes" or McCarthy

Return articles published in
e.g., J Biol Chem or Nature

Return articles dated between —
e.g., 1996



Google Scholar Home Page:
<http://scholar.google.com>

Search Criteria

1. Select words
2. Select authors
3. Select journal
4. Select date
5. Select fields

Google

Scholar 1 result (0.07 sec)

Articles **Small-Scale Simulation Chamber for Space Environment Survivability Testing**
RH Johnson, LD Montierth, JR Dennison... - Plasma Science, ..., 2013 - ieeexplore.ieee.org

Case law ... The SST chamber can also be Fig. ... reconfigured as a radiation source for other test chambers by removing the same sample stage flange and bolting the upper source components to other SDL and USU test chambers using the lower 36-cm flange. ...

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Articles **Spectral Momentum Density of Amorphous Carbon from (e, 2 e) Spectroscopy** [PDF] from usu.edu
AL Ritter, **JR Dennison**, R Jones - Physical Review Letters, 1984 - APS Full-Text @ Utah State

Case law Abstract The spectral momentum density of the valence band of an amorphous carbon film has been measured by (e, 2 e) spectroscopy. Two "bands," energy as a function of momentum, are resolved. One extends from 23 eV below the Fermi energy to about 10 eV ...

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AR Frederickson, **JR Dennison** - Nuclear Science, IEEE ..., 2003 - ieeexplore.ieee.org Full-Text @ Utah State

Since 2015 Abstract—Improved experimental methods are discussed for laboratory measurement of conductivity and electric field in insulating spacecraft material intended for space radiation and plasma environments. These measurement techniques investigate the following ...

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Since 2011

Custom range...

Sort by relevance **Multilayer structure of nitrogen adsorbed on graphite** [PDF] from umsystem.edu
SK Wang, JC Newton, R Wang, H Taub, **JR Dennison**... - Physical Review B, 1989 - APS Full-Text @ Utah State

Sort by date Abstract Elastic neutron diffraction has been used to study the structure and layering of nitrogen films adsorbed on the (002) surfaces of an exfoliated graphite substrate. The neutron-diffraction pattern of the fully compressed monolayer at a coverage $\Theta = 1.67$ layers ...

include patents Cited by 60 Related articles All 9 versions Web of Science: 50 Import into EndNote Save More

include citations

Nature of Carbon-Carbon Bonding in Evaporated and Ion-Sputtered (Diamondlike) Amorphous [PDF] from usu.edu

Cited by

Related articles

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Getting the Article

allintitle: chamber radiation OR chamber OR test "space survivability" -spect

1 result (0.07 sec)

Small-Scale Simulation Chamber for Space Environment Survivability Testin
RH Johnson, LD Montierth, J R Dennison... - Plasma Science, ..., 2013 - ieeeexplore.ieee.org
... The SST chamber can also be Fig. ... reconfigured as a radiation source for other test chamber
by removing the same sample stage flange and bolting the upper source components to
other SDL and JSU test chambers using the lower 36-cm flange. ...
Cited by 2 Related articles All 7 versions Import into EndNote Save More

Create alert

About Google Scholar Privacy Terms Provide feedback

[PDF] from usu.edu
Full-Text @ Utah State

Access article

Access Journal

Small-Scale Simulation Chamber for Space Environment Survivability Testing

Robert H. Johnson, Lisa D. Montierth, J. R. Dennison, James S. Dyer, and Ethan R. Lindstrom

Abstract—A vacuum chamber was designed that simulates the space environment to facilitate tests of material modification due to space environment interactions. Critical environmental elements to be simulated include an ultrahigh vacuum, a far ultraviolet (FUV)/ultraviolet/VIS/NIR solar spectrum, an electron plasma flux, temperature extremes, and long duration exposure. To simulate the solar electromagnetic spectrum (EMS), a solar simulator was used with a range 200–2000 nm. A Krypton lamp

altogether. For example, changes in reflectivity and emissivity of surface materials due to exposure to ultraviolet (UV) radiation [1], temperature fluctuation [2], charged particle flux [3], contamination [4]–[6], or surface modifications [7] can lead to changes in optical, thermal, and charging properties of the materials. Alternately, exposure to higher fluence radiation can generate atomic scale defects in materials leading to changes in

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Enter Search Term

Search

Basic Search Author Search Publication Search

Advanced Search Other Search Options

Browse Journals & Magazines → Plasma Science, IEEE Transact... → Volume:41 Issue:12

Small-Scale Simulation Chamber for Space Environment Survivability Testing

Full Text as PDF

Full Text in HTML

5 Author(s)
Johnson, R.H. ; Phys. Dept., Utah State Univ., Logan, UT, USA ; Montierth, L.D. ; Dennison, J.R. ; Dyer, J.S.

Abstract Authors References Cited By Keywords Metrics Similar

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A vacuum chamber was designed that simulates the space environment to facilitate tests of material modification due to space environment interactions. Critical environmental elements to be simulated include an ultrahigh vacuum, a far ultraviolet (FUV)/ultraviolet/VIS/NIR solar spectrum, an electron plasma flux, temperature extremes, and long duration exposure. To simulate the solar electromagnetic

Article as PDF

Intermediate Lab

PHYS 3870

An Exercise in Reference Management and Use

Use Google Scholar to find:

- A physics related article by an author with your last name
- An article in American Journal of Physics related to this topic
- An article from within the last 2 years related to this topic
- An article from before you were born related to this topic

(See additional parts to this Exercise related to EndNote Web below)

Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

Gathering Information

References: PHYS 3870 Web Site
USU Library

The logo for EndNote Web, featuring the word "EndNote" in a bold, red, sans-serif font with a registered trademark symbol, followed by the word "Web" in a smaller, black, sans-serif font. The logo is set against a light beige rectangular background.

Introduction to EndNote and EndNote Basic

EndNote is a software program that program that stores and organizes citations, and enables you to import citations directly into a Word document.



Endnote Basic is a version of this freely accessible to USU students, with almost all of the functionality of the main program.



Create Citation Library

Stores and organizes figures and equations

Can link papers to citations.

Can search bibliographic databases

Tutorials

<http://www.endnote.com/training/>

<http://libguides.usu.edu/usingendnoteweb>

Log On

<http://www.endnoteweb.com/>

Easy bibliography

http://endnote.com/training/WMV/ENX2/enx2tutorial_download.asp

Importing Articles from Google Scholar to EndNote Basic

The screenshot shows the Google Scholar interface. At the top, the search bar contains 'comte de buffon' and 'american journal of p'. Below the search bar, there are filters for subject areas: 'Chemistry and Materials Science', 'Engineering, Computer Science, and Mathematics', and 'Physics, Astronomy, and Planetary Science', all of which are checked. The search results section shows 'Scholar' with filters for 'Articles excluding patents', the years '1960 - 2010', and 'include citations'. The results show one article: 'Statistical estimation of π using random vectors' by SC Bloch, R Dressler, published in the 'American Journal of Physics' in 1999. A pink arrow points from a yellow callout box to the 'Import into EndNote' link in the article's metadata.

Google scholar comte de buffon american journal of p Search Advanced Scho

Search only in: Chemistry and Materials Science
 Engineering, Computer Science, and Mathematics
 Physics, Astronomy, and Planetary Science
 Search in all subject areas.

Scholar Articles excluding patents 1960 - 2010 include citations Results 1 - 1 of 1. (0.12 sec)

[Statistical estimation of \$\pi\$ using random vectors](#) Full-Text @ Utah S

SC Bloch, R Dressler - **American Journal of Physics**, 1999 - link.aip.org
... Georges Louis Leclerc **Comte de Buffon** reported his experiment in 1777. **Buffon** probably raised some people's eyebrows during the experiment, because he stood on a tiled floor and threw loaves of French bread back over his shoulders. ...
[Cited by 5](#) - [Related articles](#) - [BL Direct](#) - [All 2 versions](#) - [Import into EndNote](#)

comte de buffon Search

[Go to Google Home](#) - [About Google](#) - [About Google Scholar](#)

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Import into Endnote
Import to RefMan

Importing Articles from Google Scholar to EndNote Web

Set up Goggle Scholar to Work with EndNote Web.

PHYS 2500 and 3870/3880: Citing Your Sources

Information Resources for Physics 2500 [PHYS]2500/3870/3880]

Information Resources In Physics

Journals

Databases

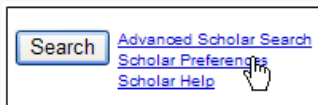
Citing Your Sources

Finding the Information

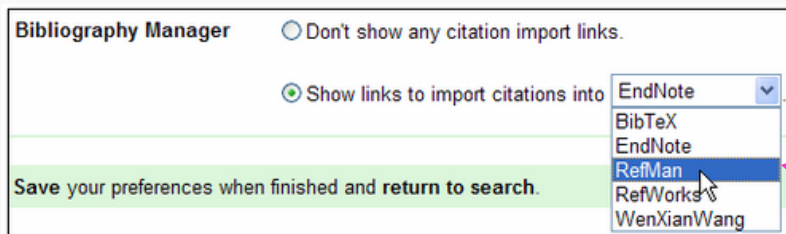
Importing Citations from Google Scholar to EndNote Web

Import References from Google Scholar:

1. Open the Google Scholar website: <http://scholar.google.com>
2. Click Scholar Preferences.



3. Scroll to the bottom of the page. In the Bibliography Manager section, choose the **Show link to import** radio button and choose **RefMan** from the drop-down box.



A screenshot of the 'Bibliography Manager' section. It shows two radio buttons: 'Don't show any citation import links.' (unselected) and 'Show links to import citations into' (selected). To the right of the second radio button is a dropdown menu with the following options: 'EndNote', 'BibTeX', 'EndNote', 'RefMan', 'RefWorks', and 'WenXianWang'. The 'RefMan' option is highlighted, and a hand cursor is pointing at it. Below the dropdown menu, there is a green bar with the text 'Save your preferences when finished and return to search.'

4. Click **Save Preferences**.

Managing Your Citations

One of the challenges you will face is how to manage need to cite. There are several tools available to you Note Web and Zotero. The links below will take you process of how to use these powerful resources.

NOTE: For Zotero, you will need to download the AI according to AIP style.

- Citations: EndNote Desktop for Organizing Citati
by Connie Woxland Last Updated Jul 13, 2015 128 vi

Import into Endnote
Import to RefMan

Importing Articles from Google Scholar to EndNote Web

Saving with
Goggle Scholar

The screenshot shows the Google Scholar Settings page. The Google logo is at the top left. Below it is the title "Scholar Settings". The page is divided into several sections:

- Search results**: Includes links for Languages, Library links, Account, and Button.
- Collections**: Has two radio buttons: "Search articles (checked) include patents." and "Search case law."
- Results per page**: A dropdown menu is set to "10". Below it, text says "Google's default (10 results) provides the fastest results."
- Where results open**: A checkbox "Open each selected result in a new browser window." is unchecked.
- Bibliography manager**: Has two radio buttons: "Don't show any citation import links." and "Show links to import citations into". A dropdown menu is open next to the second option, showing the following choices: BibTeX, EndNote, RefMan, and RefWorks. "EndNote" is currently selected.

At the bottom right, there are "Save" and "Cancel" buttons. Below them, a note says "To retain settings, you must turn on cookies". At the very bottom, there are links for "About Google Scholar", "Privacy", "Terms", and "Provide feedback".

Importing Articles from Google Scholar to EndNote Web

Saving into EndNoteWeb

Additional Help

- Contact a librarian.
- Access EndNote Help by clicking the HELP link in the upper right corner of the EndNoteWeb page. A series of short tutorials to help you learn about and use the features of EndNote Web can be found at: <http://www.endnoteweb.com/training>.

<http://libguides.usu.edu/endnote>

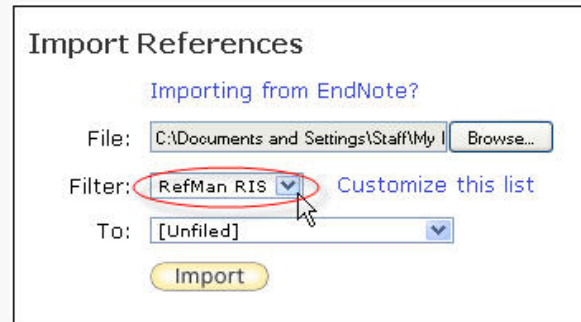
7. Log into EndNote Web.
8. Within EndNote Web, click the **Collect** tab at the top of the page.



9. Click the **Import References** link.



10. **Browse** to the file you saved from your Google Scholar search, and select the file.



11. Choose RefMan RIS format from the **Select** drop-down box (you can choose "Customize this list" to make this option your default option).
12. Click Import to bring your citation list into EndNote Web.



13. The citations will be placed in the **Unfiled** folder. Click the My Reference tab and choose the Unfiled link.



Importing Articles from Google Scholar to EndNote Web

Citations on EndNoteWeb



Managing Your Citations

One of the challenges you will face is how to manage the citations to the journal articles you read and need to cite. There are several tools available to you to assist with this. Two popular options are End Note Web and Zotero. The links below will take you to in-dept guides that will step you through the process of how to use these powerful resources.

NOTE: For Zotero, you will need to download the AIP style from [here](#) and install it in order to format according to AIP style.

- [Citations: EndNote Desktop for Organizing Citations](#)
by [Connie Woxland](#) Last Updated Jul 13, 2015 128 views this year

<http://libguides.usu.edu/EndNoteBasic>

<http://libguides.usu.edu/endnote>

<http://www.endnoteweb.com/training>

Additional Help

- [Contact a librarian.](#)
- Access EndNote Help by clicking the HELP link in the upper right corner of the EndNoteWeb page. A series of short tutorials to help you learn about and use the features of EndNote Web can be found at: <http://www.endnoteweb.com/training>.

Help for EndNote Online

http://www.myendnoteweb.com/help/en_us/ENW/help.htm

EndNote® Online

[Contents](#) | [Index](#) | [Glossary](#) | [Search Help](#)

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Cite While You Write™

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- [Editing Citations](#)
- [Unformatting Citations](#)
- [Export Travelling Library](#)
- [Removing Field Codes](#)
- [Converting Word 2007 Citations](#)
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- [Using EndNote online without Plug-ins](#)

<http://endnote.com/sites/en/files/m/pdf/en-online-qrc.pdf>

QUICK REFERENCE GUIDE – ENDNOTE

ENDNOTE

ONLINE

Importing Articles from Google Scholar to EndNote Web

Citations on EndNote Basic



USU Library / LibGuides / Citations: EndNote Basic Home

Citations: EndNote Basic: Home

Home	Citation Library	Using Citation Records	Create a Bibliography	Cite While You Write	Frequently Asked Questions
------	------------------	------------------------	-----------------------	----------------------	----------------------------

What can this libguide do for me?

EndNote Basic is a free, web-based program that stores and organizes citations, and enables you to import citations directly into a Word document. It can be used on its own, or with EndNote Desktop, a more expansive application available for purchase.

See the differences between **EndNote** and **EndNote Basic** [here](#).

Citation Library: Learn how to build, organize and quickly find citations for your research

Using Citation Records: See how to easily view, search and share your citations with fellow researchers

Create a Bibliography: Explore how you can build a bibliography and easily change the citation style in seconds.

Cite While You Write: Insert references, and format citations and bibliographies automatically while you write papers in Word

Frequently Asked Questions: Still having trouble? Check out this tab to find some quick answers

Create An Account

[Sign Up For an Account](#)

1. Log in to EndNote Basic at <https://www.myendnoteweb.com>
2. Click 'Create An Account'
3. Enter the required information and select "I Agree"

Last Updated: Jul 13, 2015 6:04 PM | URL: <http://libguides.usu.edu/EndNoteBasic> | [Print Page](#)

[Login to LibApps](#)

Subjects: [Research Tips](#)

<http://libguides.usu.edu/EndNoteBasic>

<http://www.endnoteweb.com/training>

Citations: EndNote Basic: Citation Library

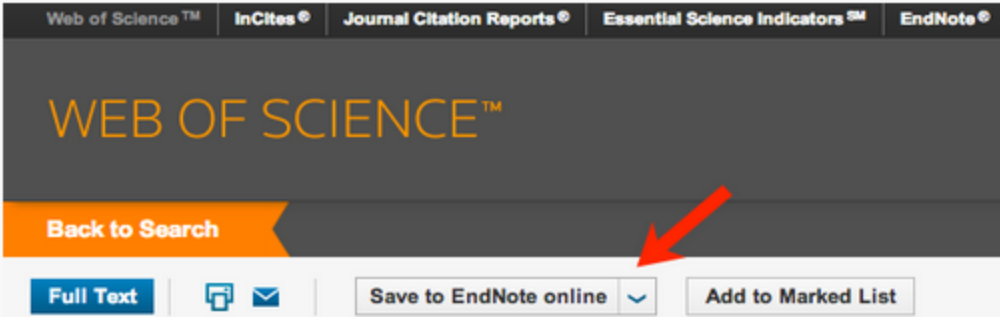
Home
Citation Library
Using Citation Records
Create a Bibliography

Import Citation into your Library

Import articles into your EndNote online library to find them quickly and easily from anywhere you have Internet access.

From...	... Into EndNote Basic
Web of Science	1. Select Record 2. Click Send to: my.endnote.com Importing reference to EndNote Basic (FAQS: EndNote Basic)
Google Scholar	Importing references from Google Scholar
Pub Med	Importing reference from PubMed
Other Article Databases	Importing from other databases

Example of import options from Web of Science:



The screenshot shows the Web of Science interface with a navigation bar at the top containing 'Web of Science™', 'InCites®', 'Journal Citation Reports®', 'Essential Science Indicators™', and 'EndNote®'. Below the navigation bar, the text 'WEB OF SCIENCE™' is displayed in large orange letters. At the bottom of the interface, there is a row of buttons: 'Full Text', a printer icon, an email icon, 'Save to EndNote online' (with a dropdown arrow), and 'Add to Marked List'. A red arrow points to the 'Save to EndNote online' button.

Cite While You Write

<http://libguides.usu.edu/c.php?g=52841&p=339445>

Cite While You Write

Citations: EndNote Basic: Cite While You Write

<http://libguides.usu.edu/c.php?g=52841&p=339449>

- Home
- Citation Library
- Using Citation Records
- Create a Bibliography
- Cite While You Write
- Frequently Asked Questions

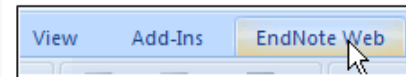
Cite While You Write (CWYW)

Use the EndNote Basic Cite While You Write plug-in to insert references, and format citations and bibliographies automatically while you write papers in Word. To download this plug-in, log into the EndNote Basic site in a web browser (preferably Firefox), and click Download Installers link at the bottom of any page.

Inserting cited references in your Word document

1. With your Word document open, place the cursor in the location where you would like the citation to appear
2. Select **EndNote Web** at the top of the screen (some Word processors will place it under the **Tools** menu)
3. Click **Find Citations** (this tool searches your entire EndNote Basic library)
4. Enter a search term in the **Find Citations** box to find the citation record to insert.
5. Click **Search**
6. Select the desired reference. More than one record can be selected at any given time - simply hold the Ctrl key while clicking each reference.
7. Click **Insert**

Skiing is a fabulous sport, especially when one lives in Utah |



The citation appears at the location of the cursor, formatted according to the bibliographic style specified. The reference information is also automatically added to the bibliography at the end of your manuscript

Need more assistance? See the EndNote tutorial video [here](#)

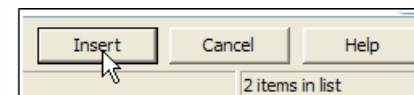
Last Updated: Jul 13, 2015 6:04 PM | URL: <http://libguides.usu.edu/EndNoteBasic> | [Print Page](#)

Subjects: [Research Tips](#)

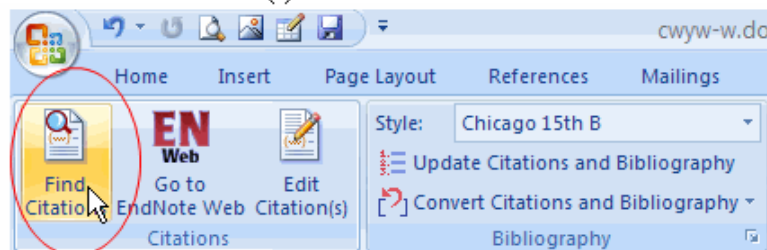
Find: powder Search

Example: Enter **Biloski dinosaur extinction** to search for these terms in all fields

Author	Year	Title
Aschwanden		2007 Nordic Gear Guide
Fox	2006	Powder Trip



Skiing is a fabulous sport, especially (Fox, 2006) when one lives in Utah
Fox, P., 2006, Powder Trip, New York Times.



Cite While You Write

<http://libguides.usu.edu/c.php?g=52841&p=339445>

Organize Citations within your Library

Create "groups" - which work similarly to folders - to keep citations from different research projects separate, and then add references to those groups to stay organized:

Creating groups in EndNote Basic:

1. Click the yellow **Organize** tab
2. Click **New Group** under **Manage My Groups**
3. Name your group and click **OK**

Putting references in groups:

When citation records are imported in EndNote Basic they are automatically placed in the Unfiled group

1. Click the box to the left of the desired records OR click **All** or **Page**
2. Select the **Add to Group** drop-down menu near the top of the page. Select the desired group. All selected citation records will be moved to that group.

The screenshot shows the EndNote Basic interface. On the left, the 'Organize' tab is selected, and the 'Manage My Groups' section is visible. A red arrow points to the 'My Groups' section, which currently shows 'no groups have been created' and a 'New Group' button. On the right, the 'All My References' list is displayed. A red arrow points to the 'Add to group...' dropdown menu at the top of the list. Another red arrow points to the first reference in the list, which is selected. The reference details are as follows:

Author	Year	Title
Higdon, J. V.	2003	Tea catechins and polyphenols: Health effects functions Critical Reviews in Food Science and Nutrition Added to Library: 06 Mar 2014 Last Updated: 06 Mar 2014 WEB OF KNOWLEDGE™ Source Record, Related Records

Cite While You Write

The screenshot shows Microsoft Word with the EndNote Web ribbon tab active. The EndNote Web Find & Insert My References dialog box is open, displaying search results for the author 'swain'. The main document text reads: Exoplanet Paragraph
The coolest thing about exoplanets is discussed by Swain

EndNote Web Find & Insert My References

swain Find

Author	Year	Title
Swain	2010	A ground-based near-infrared emission spectrum of the exoplanet HD 189733b
Swain	2010	A ground-based near-infrared emission spectrum of the exoplanet HD 189733b
Swain	2010	A ground-based near-infrared emission spectrum of the exoplanet HD[thinsp]189733b
Swain	2010	Exoplanet Spectroscopy: a bright present, a brilliant future

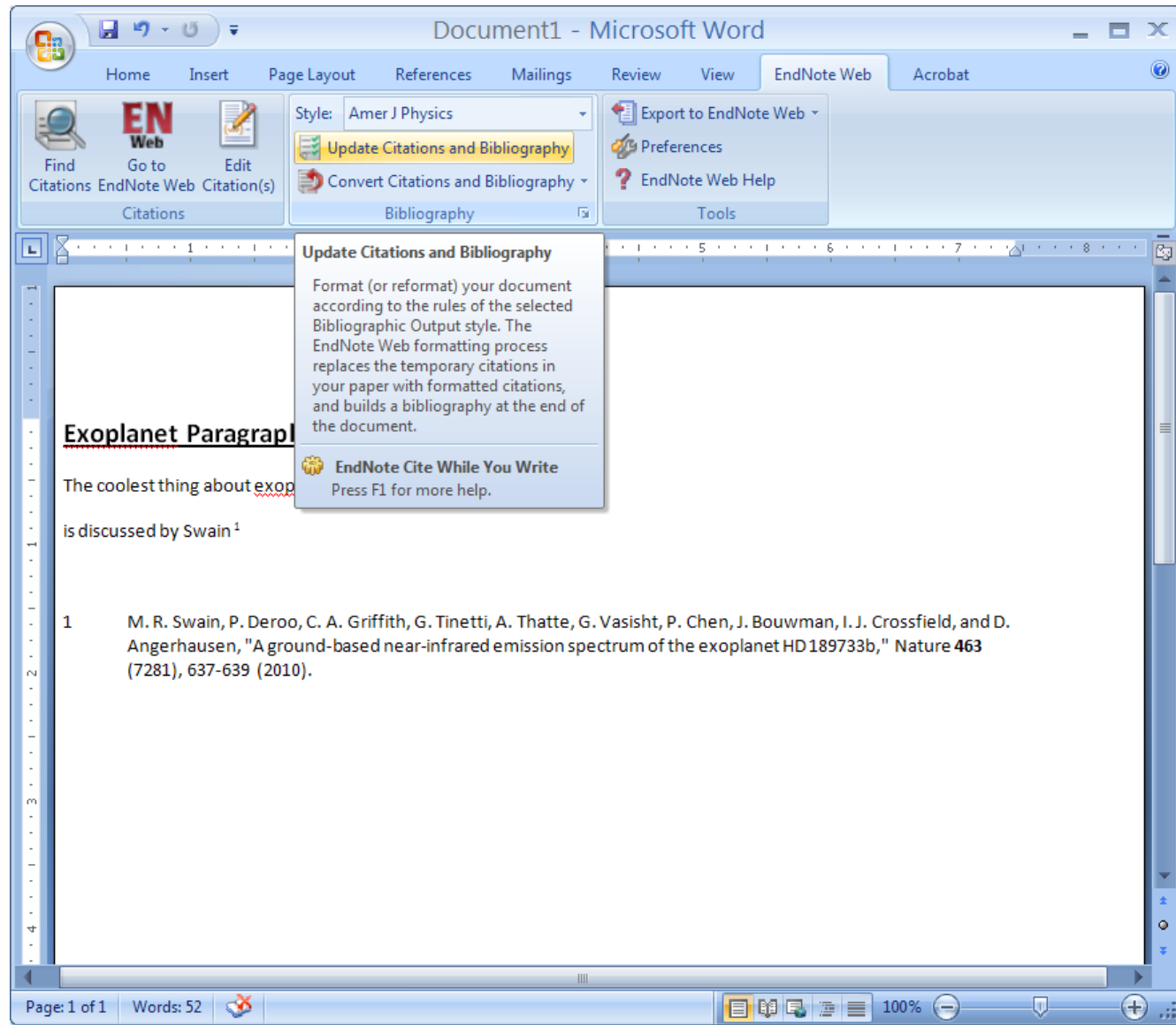
Reference Type: Journal Article
Author: Swain, M. R.
Deroo, P.
Griffith, C. A.
Tinetti, G.
Thatte, A.
Vasisht, G.
Chen, P.
Bouwman, J.
Crossfield, I. J.
Angerhausen, D.
Year: 2010

Page: 1 of 1 Words: 11

Library: EndNote Web 4 items in list

Format Bibliography

<http://www.endnote.com/training/tutorials/enweb2/English/EndNoteWeb-English/EndNoteWeb.asp>



Document1 - Microsoft Word

Home Insert Page Layout References Mailings Review View EndNote Web Acrobat

Find Citations EN Web Go to EndNote Web Edit Citation(s)

Style: Amer J Physics

Update Citations and Bibliography

Convert Citations and Bibliography

Export to EndNote Web

Preferences

EndNote Web Help

Tools

Update Citations and Bibliography

Format (or reformat) your document according to the rules of the selected Bibliographic Output style. The EndNote Web formatting process replaces the temporary citations in your paper with formatted citations, and builds a bibliography at the end of the document.

EndNote Cite While You Write
Press F1 for more help.

Exoplanet Paragraph

The coolest thing about exoplanets is discussed by Swain¹

1 M. R. Swain, P. Deroo, C. A. Griffith, G. Tinetti, A. Thatte, G. Vasisht, P. Chen, J. Bouwman, I. J. Crossfield, and D. Angerhausen, "A ground-based near-infrared emission spectrum of the exoplanet HD 189733b," *Nature* **463** (7281), 637-639 (2010).

Page: 1 of 1 Words: 52

100%

Intermediate Lab

PHYS 3870

An Exercise in Reference Management and Use

Use Google Scholar to find:

- A physics related article by an author with your last name
- An article in American Journal of Physics related to this topic
- An article from within the last 2 years related to this topic
- An article from before you were born related to this topic

Use Google Scholar and EndNote to:

Use Google Scholar to save citations to these 4 articles in EndNote format

Write a sort paragraph about the physics topic.

Use EndNote Cite-While-You-Write to provide citations for your paragraph.

Use EndNote to create a bibliography for your paragraph using the AIP Style

Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

Gathering Information

Installing and Using DataThief

References: [PHYS 3870 Web Site](#)

[USU Library](#)

[DataThief Manual](#)

[DataThief Web Site](#)



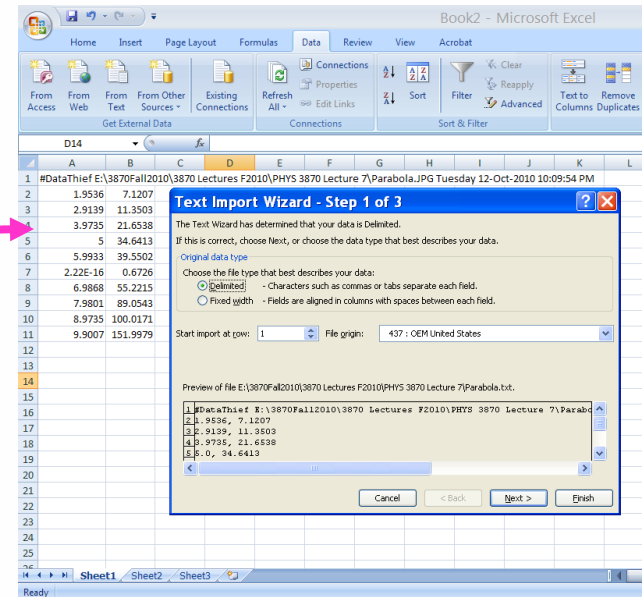
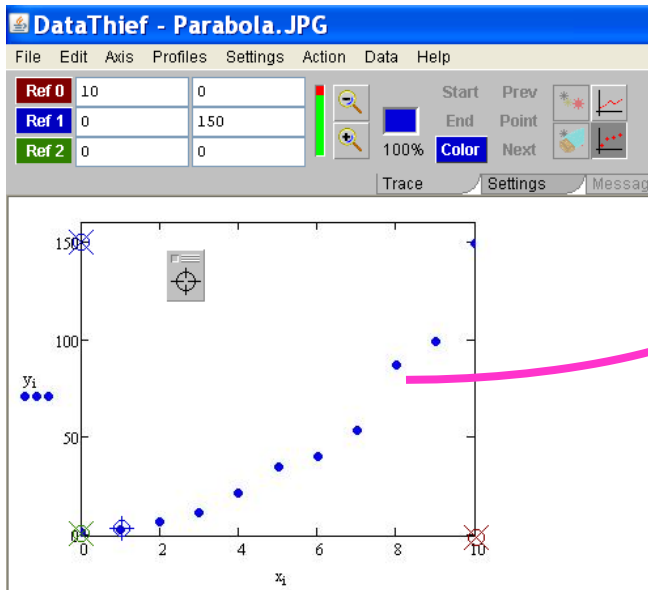
DataThief

DataThief III is program to digitize data in various forms for subsequent plotting and analysis. It is often used to “borrow” data from scanned graphs in articles. DataThief is a “free” shareware program and is very easy to use.

The presentation includes:

- *Instructions on how to download and install the program and where to get supporting documentation.*
- *A detailed set of instruction on how to use the program to digitize data from a picture of a graph.*
- *A simple example of acquiring digitized data from a photograph .*

A simple exercise in use of DataThief is described in the file **PHYS 2500 Sec5-Graphing DataThief Exercise.ppt.**



Acquiring DataThief III

DataThief III is already installed and running on the PHYS 2500 CITRIX page.

To acquire and install your own copy of the shareware program DataThief III and its accompanying documentation, simply follow the numbered steps listed here.

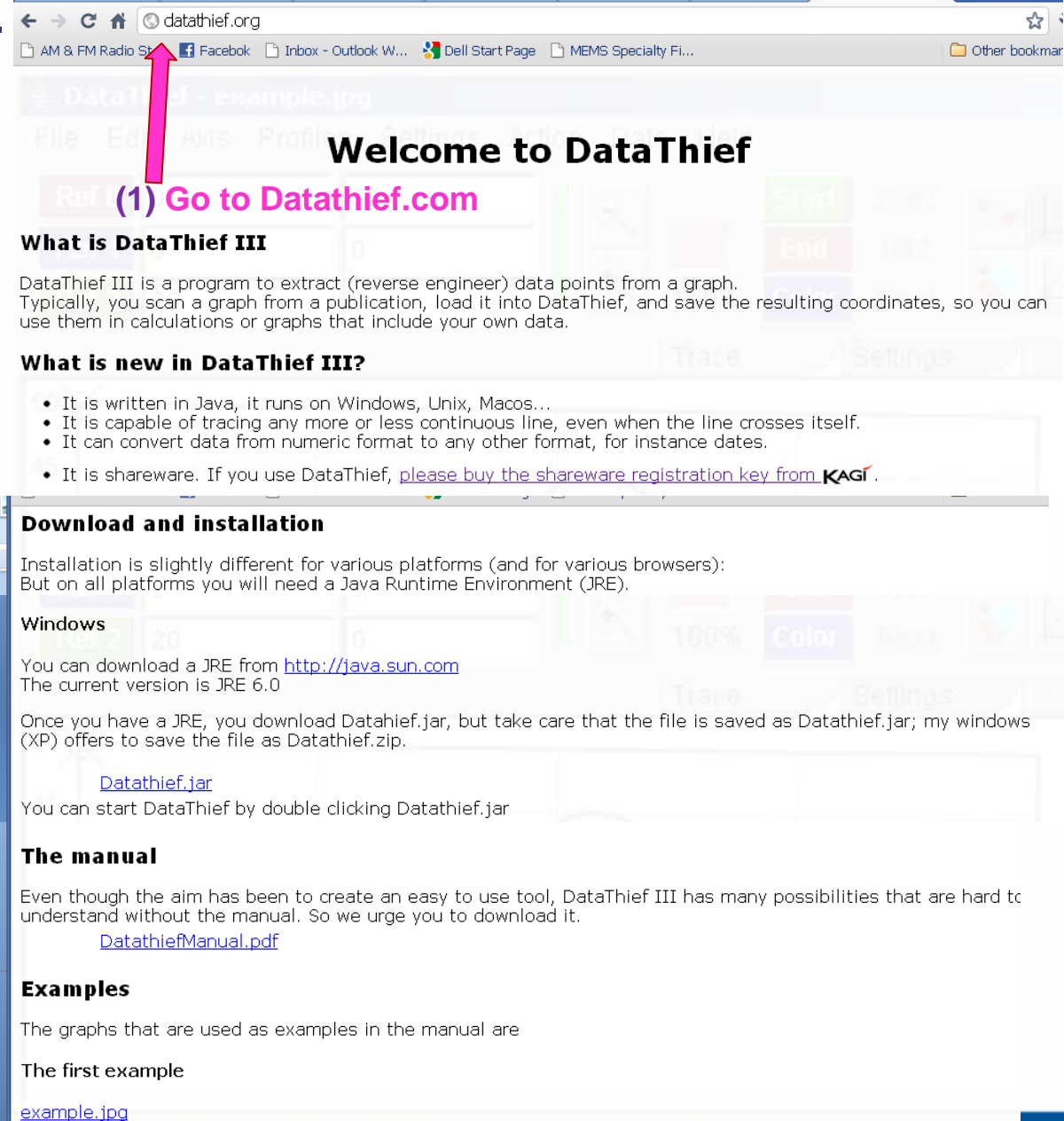
(2) Review the program Description

(3) (Download Java as well, if you need it.)

Download the executable program file Datathief.jar by Clicking here

(4) Download the manual

(5) Review some examples, if you like.



The screenshot shows the DataThief website at datathief.org. The page title is "Welcome to DataThief". A pink arrow points to the address bar with the text "(1) Go to Datathief.com". Below the title, there is a section "What is DataThief III" which describes the program as a reverse engineering tool for extracting data points from graphs. Another section, "What is new in DataThief III?", lists features such as being written in Java, capable of tracing complex lines, and being shareware. A "Download and installation" section provides instructions for various platforms, including Windows, and links to download the Java Runtime Environment (JRE) from <http://java.sun.com>, the DataThief.jar file, and the manual ([DatathiefManual.pdf](#)). The page also includes a section for "Examples" with a link to [example.jpg](#).

Orientation to DataThief III

DataThief III is written in Java. This means, that apart from the "executable" called *Datathief.jar*, you will have to have the Java Virtual Machine. The Java Virtual Machine can be downloaded from www.java.com. Follow the instructions that are appropriate for your machine.

Once the virtual machine is installed, you may start DataThief.

- On Windows, double click the *Datathief.jar* icon.
- On Macintoshes with MacOS 8 or MacOS 9, double click the *Datathief* application icon.
- On Macintoshes with MacOS X and on Linux or Unix either double click the *Datathief* icon, or go to the directory where you installed DataThief and type *Datathief*.

Once you have a running DataThief, select "Open..." from the File menu, and select the file you want to take data from. In this example, we used "example.png". Key features of DataThief are shown below.

3 point indicators used to find the corresponding coordinate indicator

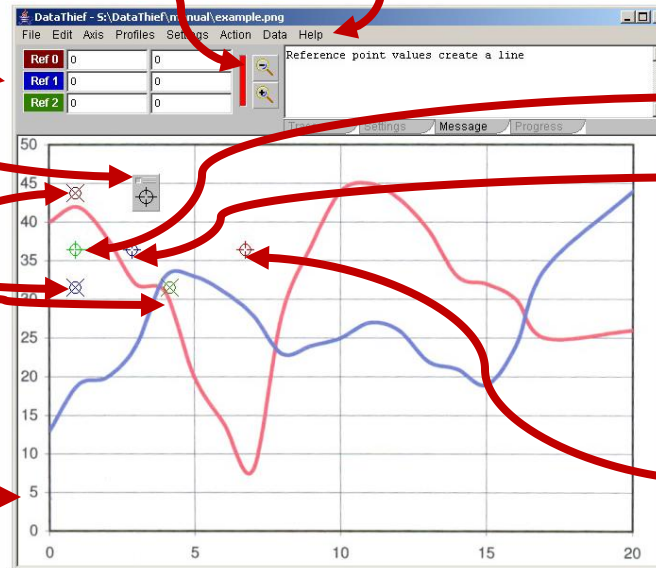
"Dump", used to define data points

3 coordinate indicators have an X through there center

White area with the image in it is the image area

tool bar

menu bar



Start location indicator (green with a + through its center)

Color location indicator (blue with a + through its center)

Stop location indicator (red with a + through its center)

DataThief in Action

To use DataThiefIII to digitize data from a graph:

(1) Open DatathiefIII.

(2) Select an image file using Open from the File menu.

Allowed file types include gif, jpg, and png.

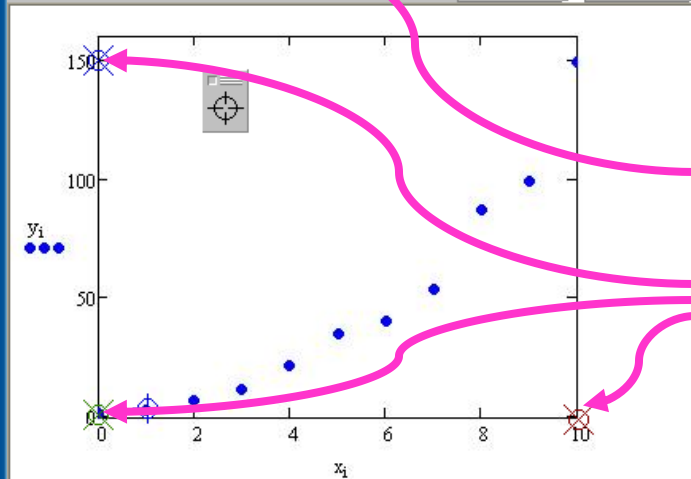
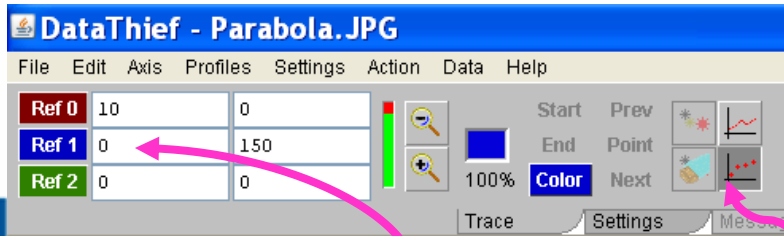
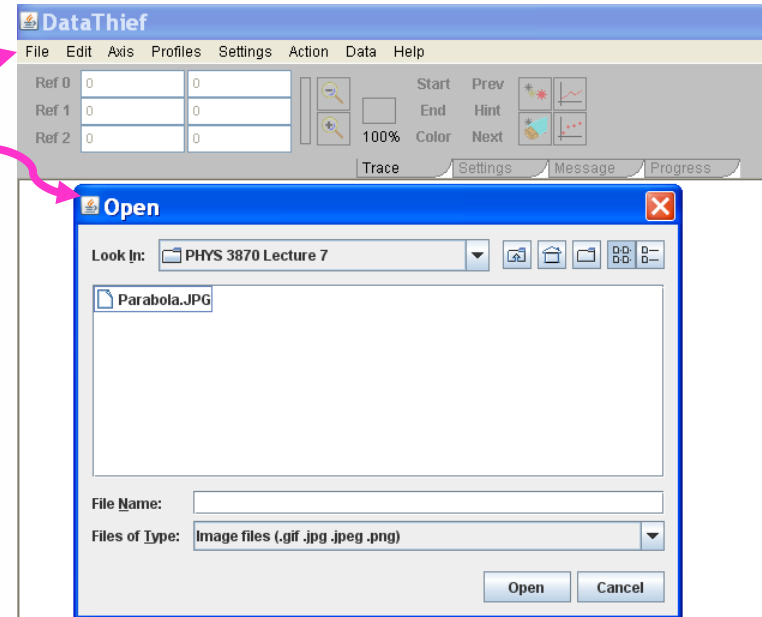
(3) Select whether to digitize a point graph or line graph

(4) Define the graph axes by tagging 3 axis coordinate indicators by dragging and dropping the 3 circled X icons onto the axes points and entering the corresponding numerical values.

Note: If the 3 axes points are not visible on the graph, select Reset from the Actions menu. Click a colored button (e.g., Ref 0) to flash the corresponding axis point

Note: For pictures you can use this to put the digitized values in the correct units if you know the values of these three points.

Note: This can correct for skewed axes by selecting non-orthogonal axes.

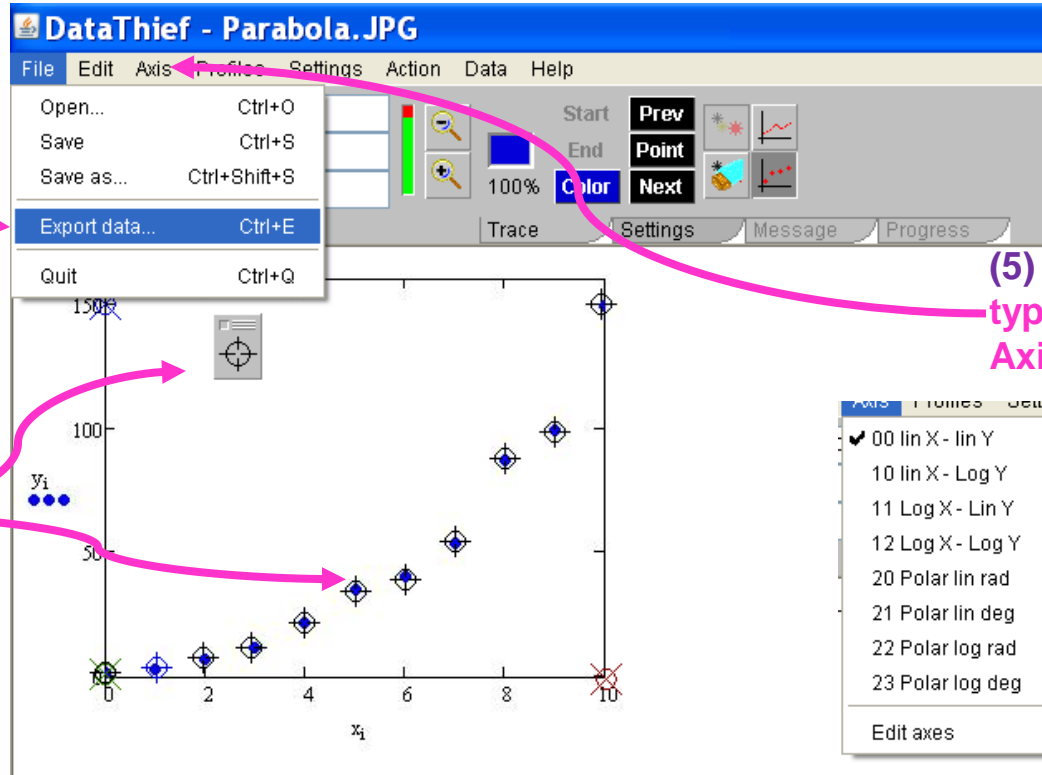


Setting DataThief

Simply follow the remaining numbered steps listed here.

(7) Export

The data to a file using the File menu



(5) Select axes type using the Axis menu

(6) To "borrow" discrete data points, select the Point mode icon and then tag each data point by dragging crosshairs from the "Dump" on top of the point

(5 Alternate) To "borrow" data from traces (lines):

- Select the Trace mode icon,
- Tag the beginning and end of the trace to "steal" with the green and red icons, respectively
- Set the color of the line by dropping the blue icon on a well isolated portion of the trace
- Use the three point indicators "Start", "End" and "Color" to locate the icons to drag.
- The density of data points digitized can be adjusted using the "Output Distance" selection from the Settings tab.

Reading DataThief Txt Files

(8) Read into an Excel file as comma delimited text using the Excel Text Import Wizard called up from the “From Text” icon on the Data ribbon in Excel.

The screenshot shows the Microsoft Excel interface with the 'Data' ribbon selected. The 'From Text' icon in the 'Get External Data' group is highlighted with a pink arrow. A pink box on the left contains the instruction: '(8) Read into an Excel file as comma delimited text using the Excel Text Import Wizard called up from the “From Text” icon on the Data ribbon in Excel.' The 'Text Import Wizard - Step 1 of 3' dialog box is open, showing the 'Delimited' option selected under 'Original data type'. The preview window shows the following data:

1	#DataThief E:\3870Fall2010\3870 Lectures F2010\PHYS 3870 Lecture 7\Parabola.JPG	Tuesday 12-Oct-2010 10:09:54 PM
2	1.9536	7.1207
3	2.9139	11.3503
4	3.9735	21.6538
5	5	34.6413

Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

Gathering Information

An Example of Using DataThief and Mathcad

References: [PHYS 3870 Web Site](#)

[USU Library](#)

[DataThief Manual](#)

[DataThief Web Site](#)

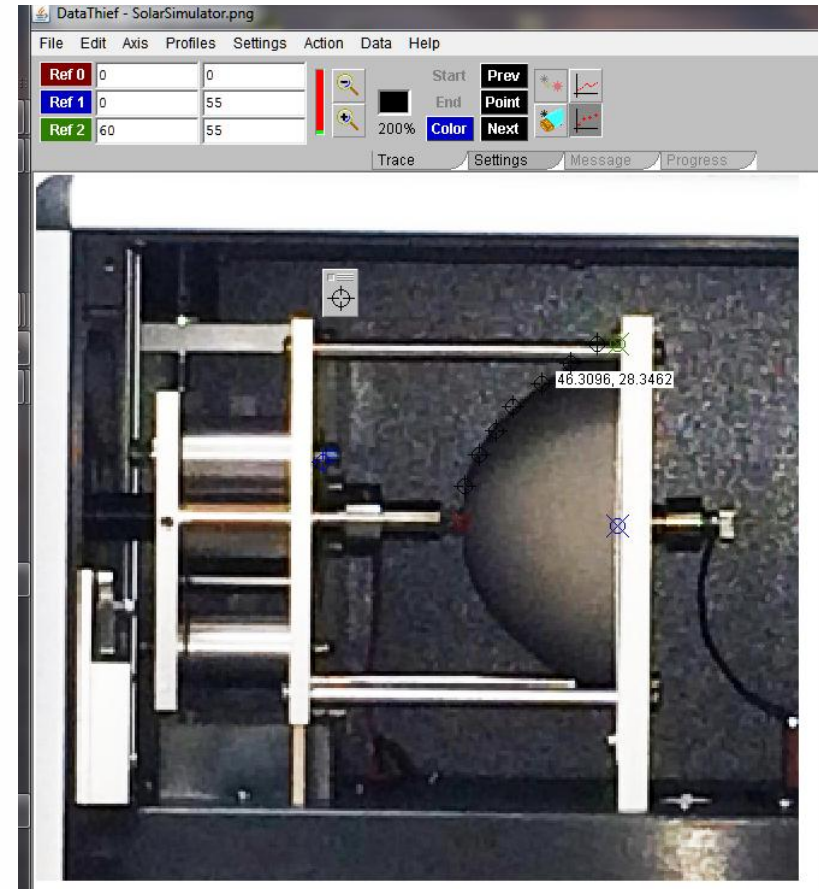


DataThief--Fitting Example

This example uses *Mathcad* to fit the digitized coordinates of a photograph to a mathematical model, leading to an analytical expression used for further analysis. The digitized results were produced using *DataThiefIII*.

An ellipsoidal mirror used in a Class AAA Solar Simulator needed to be adjusted to provide better focusing. This required a mathematical model of the mirror surface in terms of foci and radii. Direct measurement of the 3D mirror was difficult and was made even harder by the surrounding support structure and enclosure.

- A photograph of the system was taken and the JPG file imported in to *DataThiefIII* (right).
- The axes were identified. (The image was cropped in Photoshop to create a cleaner image. This step was not strictly necessary.)
- Points on the mirror were then digitized using *DataThief*
- Data were written to a two column, tab delimited text file.
- The data file was then read in to *Mathcad*.



Data Thief-- Fitting Example

Read In
Data
from File

Mirror :=



I:\...\mirror data points.txt

Define offsets to the
measured data:

$x_{\text{Offset}} := 0\text{-mm}$

$y_{\text{Offset}} := 1\text{-mm}$

Parse x and y data
and add units:

$\text{MirrorData}^{\langle 0 \rangle} := \text{Mirror}^{\langle 0 \rangle} \cdot \text{mm} - \min(\text{Mirror}^{\langle 0 \rangle}) \cdot \text{mm} - x_{\text{Offset}}$

$\text{MirrorData}^{\langle 1 \rangle} := \text{Mirror}^{\langle 1 \rangle} \cdot \text{mm} - y_{\text{Offset}}$

Separate data into
positive and negative
limbs of the ellipse:

For $i := 12, 11 \dots 0$

$\text{MirrorData}_{p,i,0} := \text{MirrorData}_{i,0}$

$\text{MirrorData}_{p,i,1} := \text{MirrorData}_{i,1}$

For $j := 12 \dots 24$

$\text{MirrorData}_{n,j,0} := \text{MirrorData}_{j,0}$

$\text{MirrorData}_{n,j,1} := \text{MirrorData}_{j,1}$

Data Thief-- Fitting Example

Fit the Data

List a general form of an ellipse and define fitting functions for the positive and negative limbs of the ellipse:

$$\text{General Form: } y^2 - 2R \cdot x + (K + 1) \cdot x^2 = 0$$

$$\text{Positive limb: } y_p(x, R, K) := \sqrt{2R \cdot x - (K + 1) \cdot x^2}$$

$$\text{Negative limb: } y_n(x, R, K) := -\sqrt{2R \cdot x - (K + 1) \cdot x^2}$$

Define initial guesses for the fitting function parameters, radius and focus:

$$\text{Radius: } \underline{R} := 35 \cdot \text{mm}$$

$$\text{Focus: } \underline{K} := -0.8$$

Put these parameters in a single unitless vector for use with `genfit`

$$\text{param}_{in} := \begin{pmatrix} \frac{R}{\text{mm}} \\ K \end{pmatrix} = \begin{pmatrix} 35 \\ -0.8 \end{pmatrix}$$

Define the values to plot:

$$x := 0 \cdot \text{mm}, 1 \cdot \text{mm}.. 60 \cdot \text{mm}$$

Use the *Mathcad* function `genfit(X, Y, paramin, yfit)` to fit these data for the separate limbs to obtain the best values for the fitting parameters, y_{p_fit} and y_{n_fit}

$$y_{p_fit} := \text{genfit}\left(\frac{\text{MirrorData}_p \langle 0 \rangle}{\text{mm}}, \frac{\text{MirrorData}_p \langle 1 \rangle}{\text{mm}}, \text{param}_{in}, y_p\right) = \begin{pmatrix} 36.75 \\ -0.87 \end{pmatrix}$$

$$y_{n_fit} := \text{genfit}\left(\frac{\text{MirrorData}_n \langle 0 \rangle}{\text{mm}}, \frac{\text{MirrorData}_n \langle 1 \rangle}{\text{mm}}, \text{param}_{in}, y_n\right) = \begin{pmatrix} 38.73 \\ -0.84 \end{pmatrix}$$

Average the radii and foci from the two separate fits for the positive and negative limbs to obtain the best values.

$$R_{\text{mean}} := \text{mean}(y_{p_fit_0}, y_{n_fit_0}) \cdot \text{mm} = 0.04 \text{ m}$$

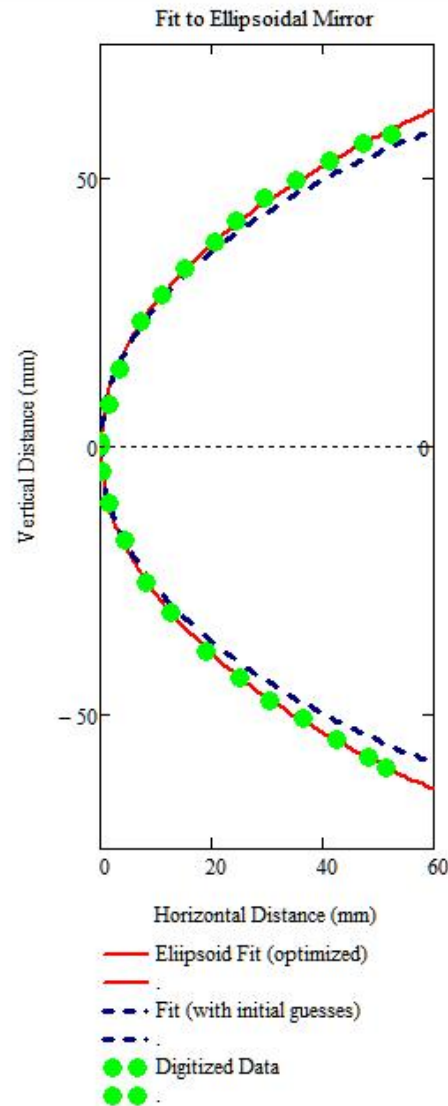
$$K_{\text{mean}} := \text{mean}(y_{p_fit_1}, y_{n_fit_1}) = -0.86$$



Non-linear curve fits: `genfit` function

Data Thief-- Fitting Example

Plot the
Data



Summary

The mirror can be modeled well by the ellipsoid equation $y^2 - 2R \cdot x + (K + 1) \cdot x^2 = 0$ with the fitting parameters of radius $R = 35 \text{ mm}$ and focus $K = -0.8$.

Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

Analyzing and Plotting Data with Excel

References: [PHYS 3870 Web Site](#)



Instructions for an Excel Tutorial Exercise

Instruction for Data Analysis with EXCEL

Overview of Excel Spreadsheets

We begin by reviewing some basic concepts for spreadsheet programs, starting from the full program and gradually zooming in to the details. But first, open the Excel *Workbook* file named “Excel Data Analysis” and save your *Workbook* with a new name by selecting **File>Save As** from the Menu Bar and giving the file the name “Your_Last_Name-Excel Data Analysis”.

Follow the detailed (if boring) instructions to create an Excel worksheet to analyze and plot a sample data set and prepare a simple report.

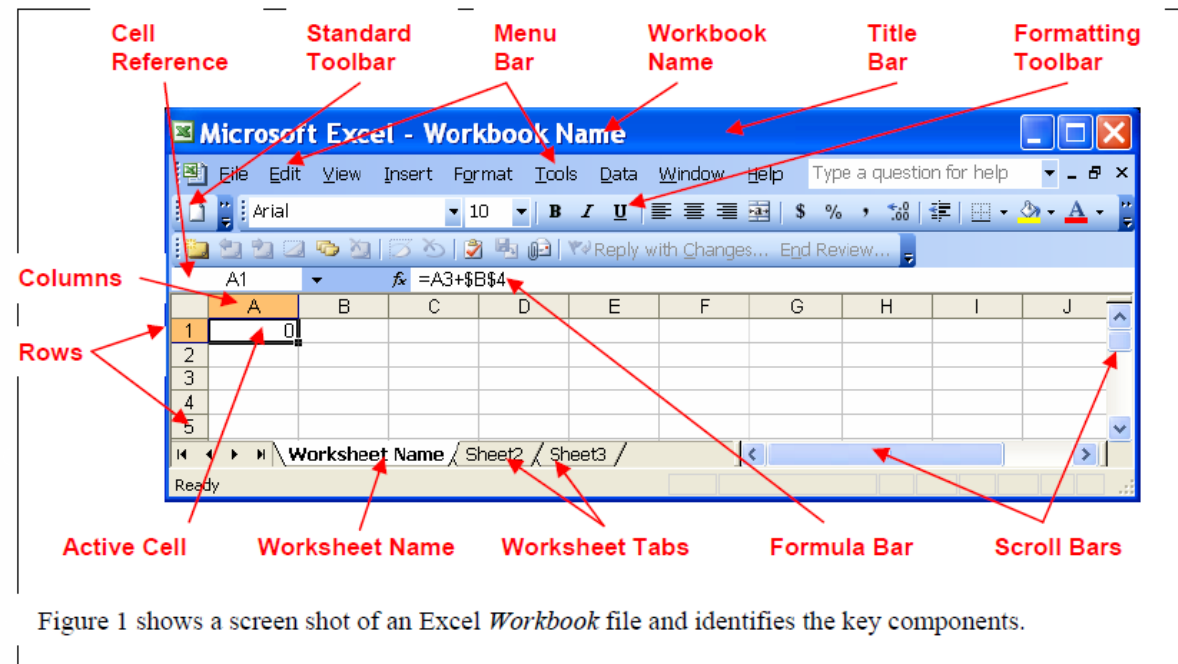


Figure 1 shows a screen shot of an Excel *Workbook* file and identifies the key components.

Report from an Excel Tutorial Exercise

PHYS 2500 EXCEL DATA ANALYSIS PROJECT REPORT

Name: Enter name here
Date: Enter current date here

Experiment Description

Add a paragraph describing the experiment performed.

Summary of Results

Add a paragraph describing the results of your experiment.

Summary of Fit

#####

Fitting Function

$$y(t) = A \cdot \sin(\omega t + \theta) + y_0$$

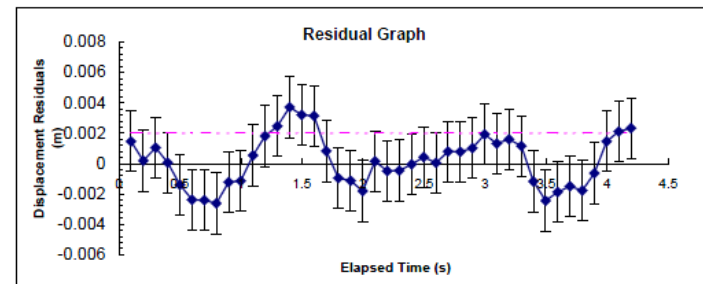
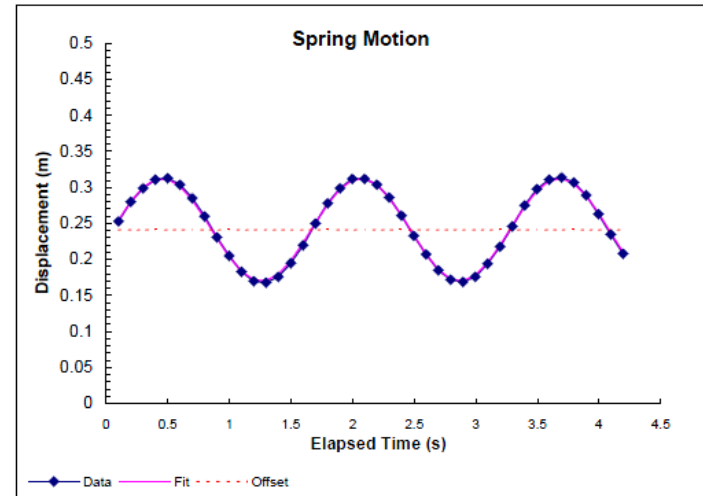
Fitting Parameters

Parameter	Symbol	Value	Units
Amplitude	A	0.0715 m	
Angular frequency	ω	3.9026 Hz	
Phase	θ	-0.21	
Offset	y_0	0.2412 m	

Goodness of Fit

Number of Data Points	41
Number of Fitting Parameters	4
Degrees of Freedom	37
Chi Squared Value for Fit	29.24653
Reduced Chi Squared Value	0.790447

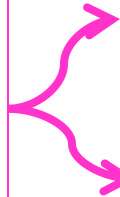
Excel File for 2500 Ch 11-JR.xls



Project Report

1 11/23/2009

Follow the detailed (if boring) instructions to create an Excel worksheet to analyze and plot a sample data set and prepare a simple report.



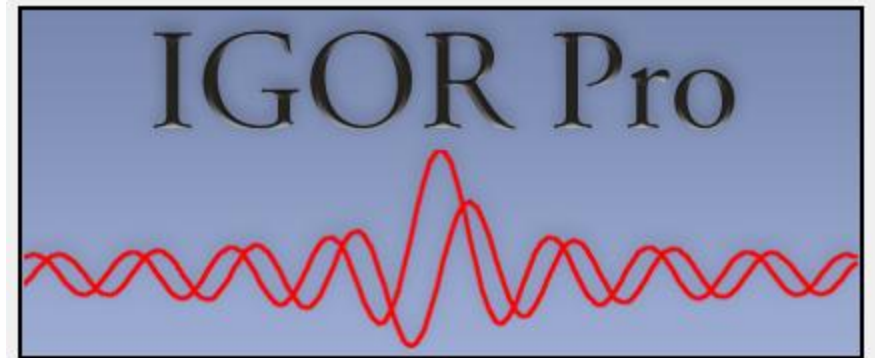
Intermediate Lab

PHYS 3870


CONVEYING INFORMATION

Analyzing and Plotting Data with IGOR Pro

References: [PHYS 3870 Web Site](#)



IGOR Pro Tutorials

 Getting Started.ihf

- **Getting Started**

This help file contains overview and guided tour material and constitutes an essential introduction to Igor Pro. The main sections are:

- [Introduction to Igor Pro](#)
- [Guided Tour 1 - General Tour](#)
- [Guided Tour 2 - Data Analysis](#)
- [Guided Tour 3 - Histograms and Curve Fitting](#)

We strongly recommend that you read at least the first two sections.

The material in this help file is duplicated in Volume I of the Igor Pro PDF manual which is accessible through the Help menu.

- **Introduction to Igor Pro**

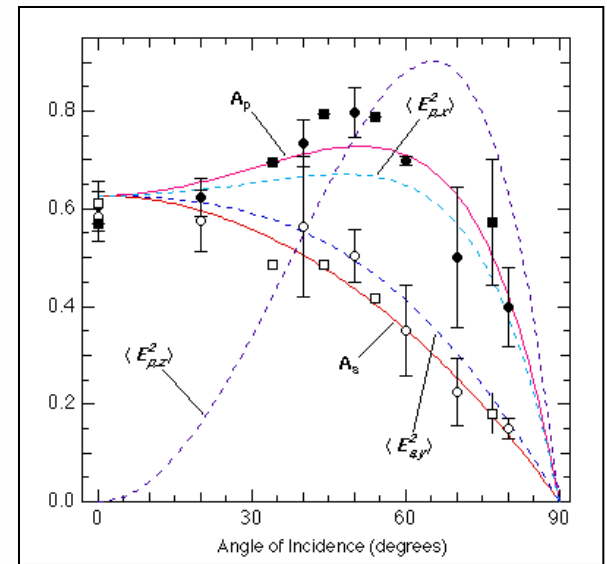
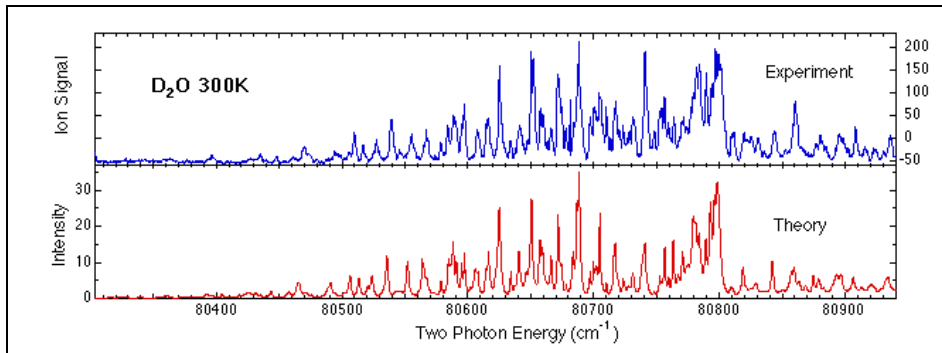
Igor is an integrated program for visualizing, analyzing, transforming and presenting experimental data.

Igor's features include:

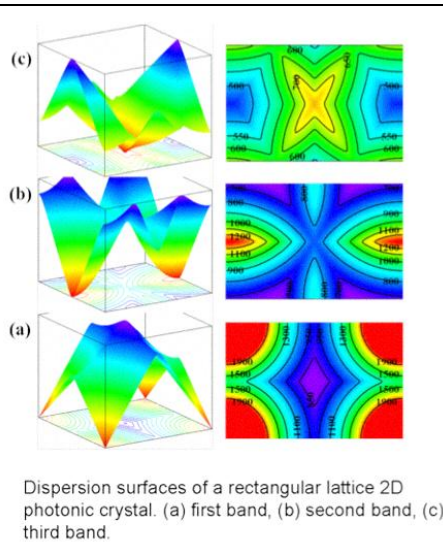
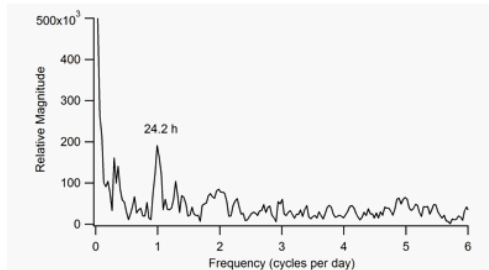
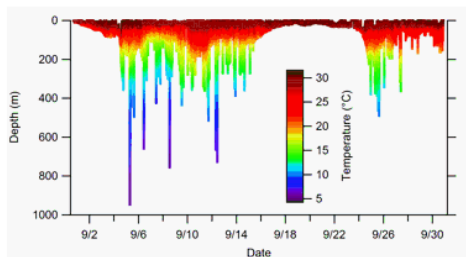
- Publication-quality graphics
- High-speed data display
- Ability to handle large data sets
- Curve-fitting, Fourier transforms, smoothing, statistics and other data analysis
- Waveform arithmetic
- Image display and processing
- Combination graphical and command-line user interface
- Automation and data processing via a built-in programming environment
- Extensibility through modules written in the C and C++ languages

Some people use Igor simply to produce high-quality, finely-tuned scientific graphics. Others use Igor as an all-purpose workhorse to acquire, analyze and present experimental data using its built-in programming environment. We have tried to write the Igor program and this manual to fulfill the needs of the entire range of Igor users.

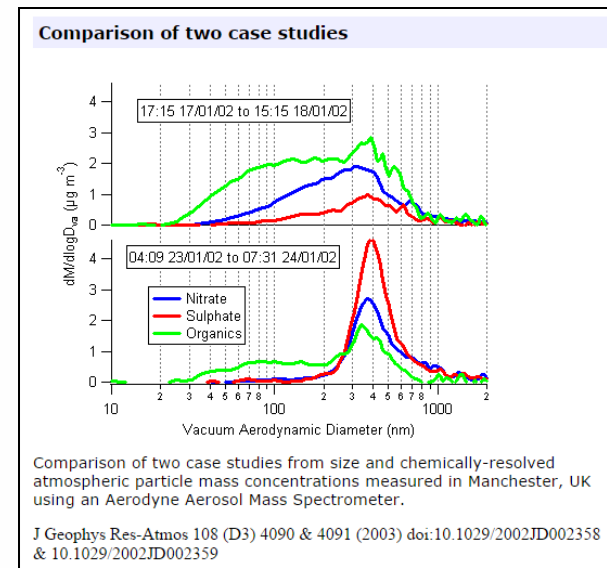
Example of Publication Quality Graphs with IGOR Pro



Whale sharks diving behavior results



Results from a recovered pop-up satellite archival tag attached to a 6 m male whale shark (*Rhincodon typus*) off the Yucatan Peninsula, Mexico. Ambient temperature and depth data recorded by the tag are shown for the entire 31-day track (top). The fast Fourier transform-generated periodogram from an analysis of these same fine-scale depth data are also demonstrated (bottom). The high amplitude peak at 1 cycle per day is indicative of a significant diel rhythm in the vertical movements of this shark.



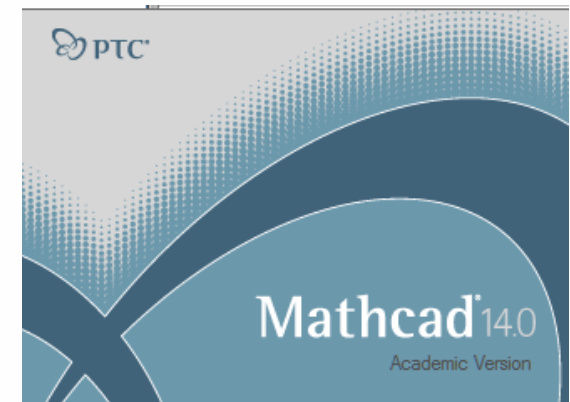
Intermediate Lab

PHYS 3870

CONVEYING INFORMATION

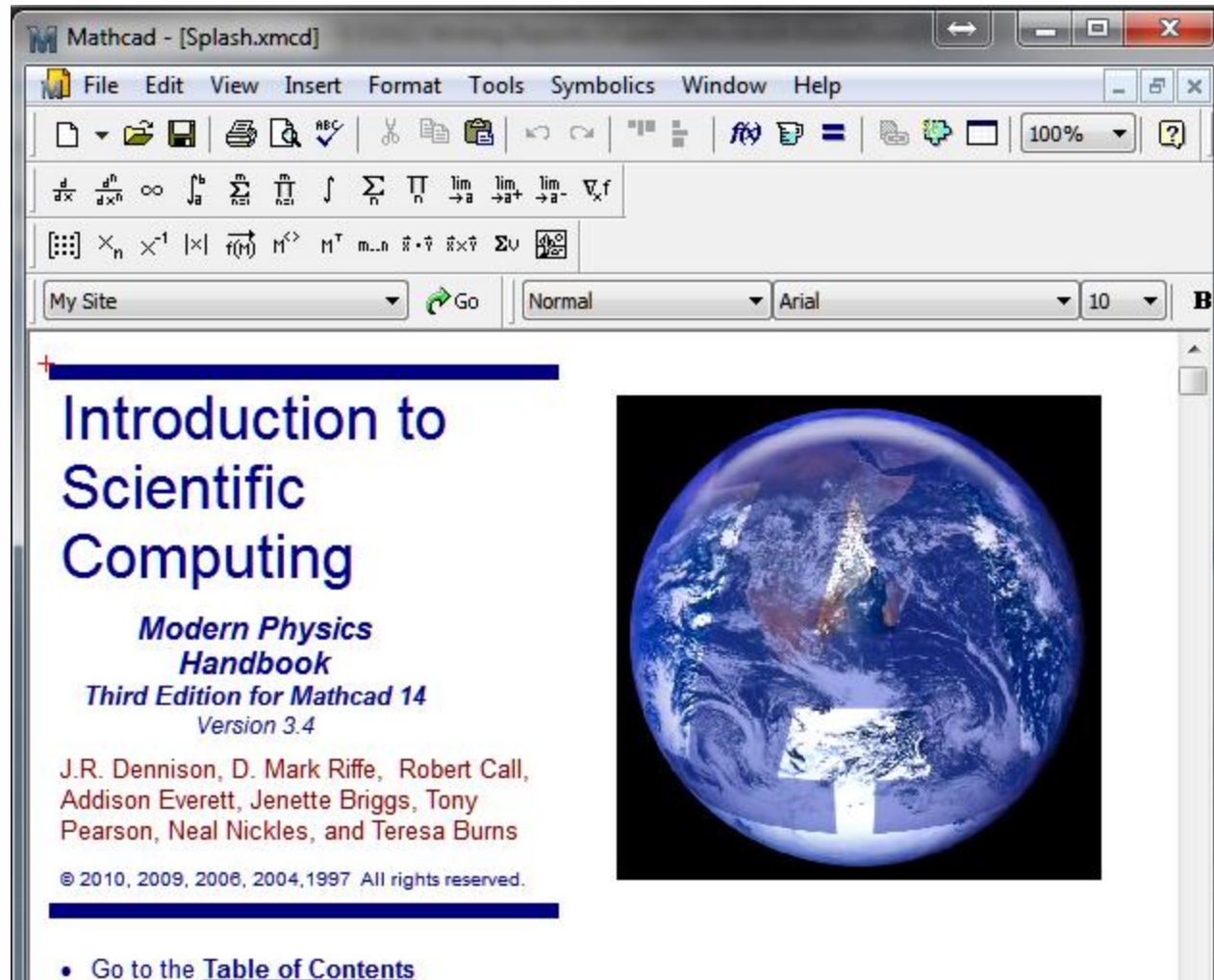
Analyzing and Plotting Data with Mathcad

References: [PHYS 3870 Web Site](#)
[PHYS 2500 Tutorial](#)



PHYS 2500 Introduction to Scientific Computing

Mathcad Tutorials



The screenshot shows the Mathcad software window titled "Mathcad - [Splash.xmcd]". The interface includes a menu bar (File, Edit, View, Insert, Format, Tools, Symbolics, Window, Help), a toolbar with various icons, and a toolbar with mathematical symbols such as $\frac{d}{dx}$, $\frac{d^n}{dx^n}$, ∞ , \int_a^b , $\sum_{n=1}^N$, $\prod_{n=1}^N$, $\lim_{x \rightarrow a}$, $\lim_{x \rightarrow a^+}$, $\lim_{x \rightarrow a^-}$, $\nabla \cdot f$, $\begin{bmatrix} \cdot \\ \cdot \\ \cdot \end{bmatrix}$, \times_n , \times^{-1} , $|\times|$, $f(x)$, M^x , M^T , $m..n$, $\# \cdot \#$, $\# \times \#$, ΣU , and $\frac{d}{dt}$. Below the toolbar is a search bar with "My Site" and a "Go" button, and a font settings area with "Normal", "Arial", and "10". The main content area displays the splash screen for "Introduction to Scientific Computing" with the following text:

Introduction to Scientific Computing

Modern Physics Handbook


Third Edition for Mathcad 14

Version 3.4

J.R. Dennison, D. Mark Riffe, Robert Call, Addison Everett, Jenette Briggs, Tony Pearson, Neal Nickles, and Teresa Burns

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Mathcad Tutorials

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CONVEYING INFORMATION

Gathering Information

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References: [PHYS 3870 Web Site](#)

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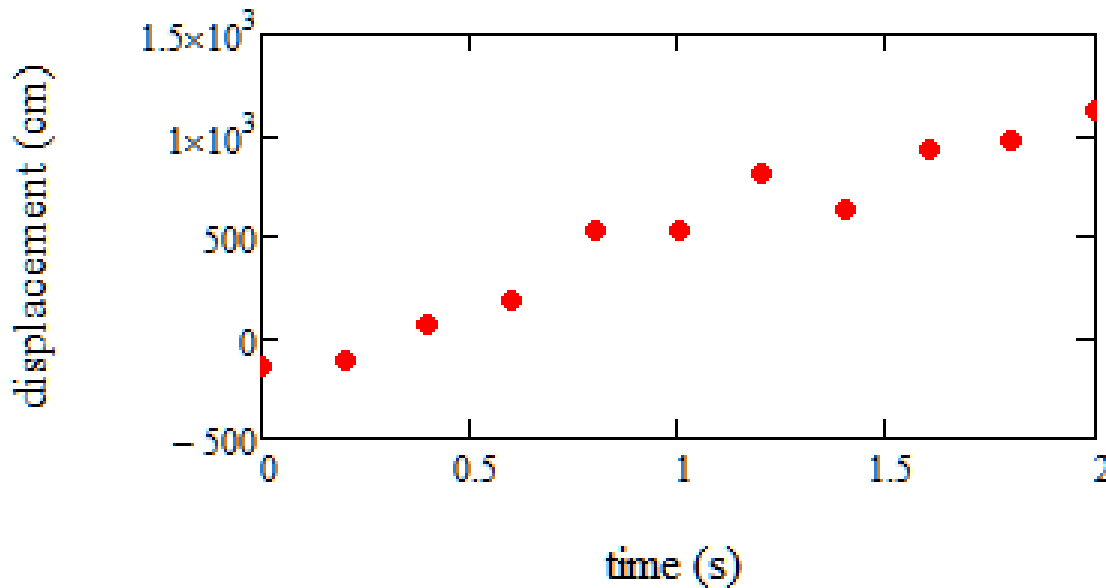
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An Exercise In Data Analysis

- Use *DataThief* to “steal” data from the graph in *DennisonInFreefall.jpg* and save the data in the file *YOURNAMEInFreefall.txt*:
- In your favorite plotting and curve fitting program:
 - Import the data from *DennisonInFreefall.jpg* stored in *YOURNAMEInFreefall.txt*
 - Import the data from *FreefallLab.txt*
 - Create a single graph of position vs time with:
 - Data points and error bars from *FreefallLab.txt*
 - Data points (the slacker has no error estimates here!) from *DennisonInFreefall.jpg*
 - A mathematical model for free fall plotted as a line
 - List your best estimates for values and errors for you model fitting parameters
 - BONUS:
 - Linearize your model, that is plot the dependant variable versus some function (e.g., square, square root) of the dependant variable such that the plot yields a straight line
 - Plot both data sets (with appropriate errors) and your linear model on a linearized graph
 - Do an automated fit with your linear model to the *FreefallLab* data. List your best estimates of the slope and intercept (with errors) and from these the best estimates (with errors) for you original model fitting parameters.

Data for An Exercise In Data Analysis

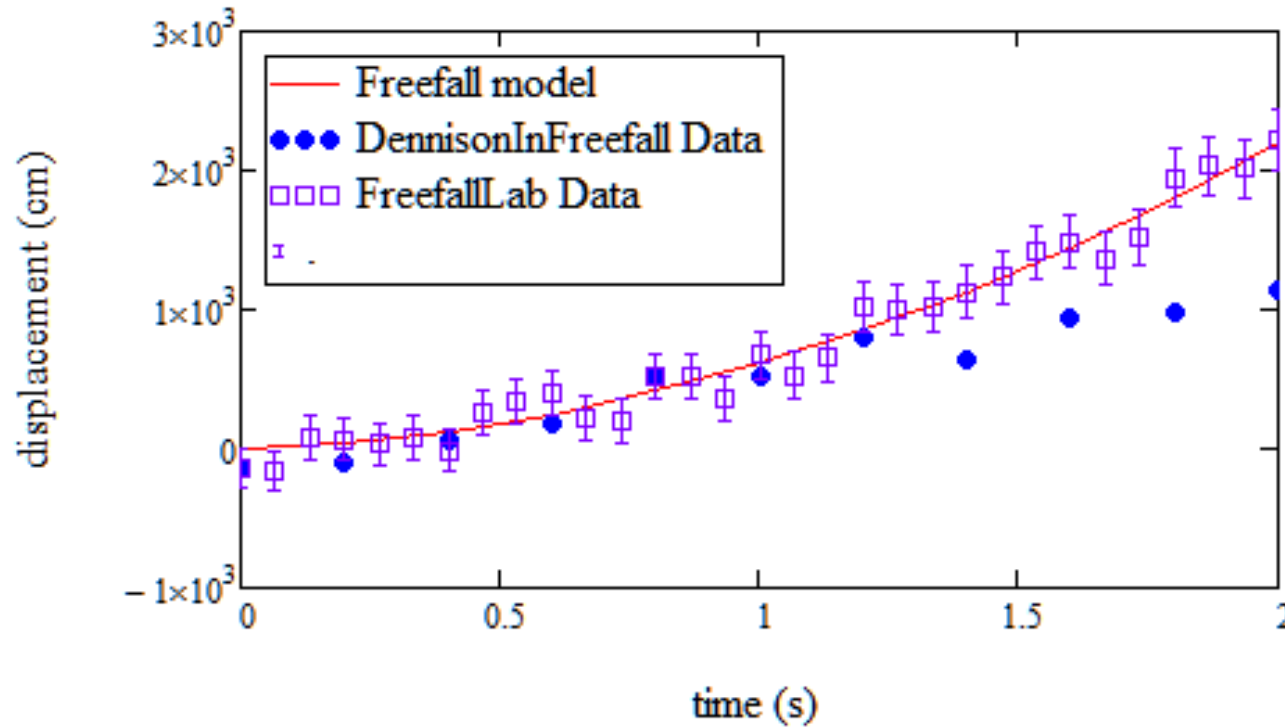
DennisonInFreefall.jpg



Freefall.txt

time(s)	disp(m)	error(m)
0	-137.5	145.9
0.06667	-157.6	145.3
0.13333	81.61	152.4
0.2	62.14	151.9
0.26667	30.93	150.9
0.33333	81.17	152.4
0.4	-12.04	149.6
0.46667	258.4	157.8
0.53333	334.6	160
0.6	398.2	161.9
0.66667	218.3	156.5
0.73333	202.9	156.1
0.8	524.1	165.7
0.86667	516.4	165.5
0.93333	368.3	161
1	672	170.2
1.06667	527.9	165.8
1.13333	656.7	169.7
1.2	1018	180.5
1.26667	1004	180.1
1.33333	1029	180.9
1.4	1128	183.8
1.46667	1234	187
1.53333	1412	192.4
1.6	1489	194.7
1.66667	1364	190.9
1.73333	1521	195.6
1.8	1949	208.5
1.86667	2031	210.9
1.93333	2016	210.5
2	2222	216.6

Results for An Exercise In Data Analysis



Model is $y(t) = (1/2)at^2 + v_0t + y_0$

Intermediate Lab

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An Exercise in Reference Management and Use

Use Google Scholar to find:

- A physics related article by an author with your last name
- An article in American Journal of Physics related to this topic
- An article from within the last 2 years related to this topic
- An article from before you were born related to this topic

Use Google Scholar and EndNote to:

Use Google Scholar to save citations to these 4 articles in EndNote format

Write a sort paragraph about the physics topic.

Use EndNote Cite-While-You-Write to provide citations for your paragraph.

Use EndNote to create a bibliography for your paragraph using the AIP Style