

A Year With Free Textbooks

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Motivation

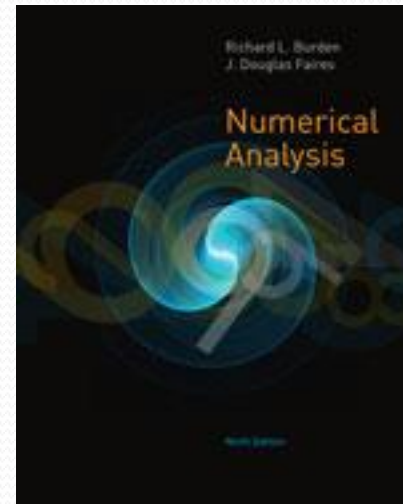
- Prices continue to rise
- Student aid is shrinking
- Digital readers are ubiquitous
 - And the students are very good with them, often prefer them to paper volumes
- I decided to try my best, observe and report
- As such, this presentation is laced with opinion and personal preferences
- Not trying to sell any particular volume

General Approach – First Run

- Upper level classes only
 - These seem to most closely resemble the commercial versions
 - Students are better at math & math books
- Single-section classes only
- Solicit testimonials from other users

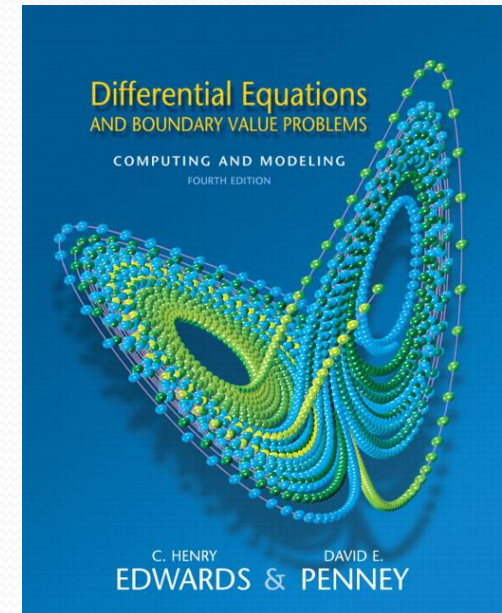
The Course Load For The Trial

- Numerical Analysis
 - 400-level
 - Math, Applied Math, Pre-teacher
 - Maple used for the codes
 - Previous commercial text
 - Burden & Faires
 - 9E
 - Cengage 2011
 - ~\$244/\$80



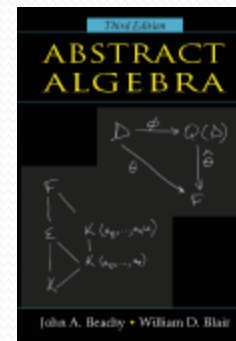
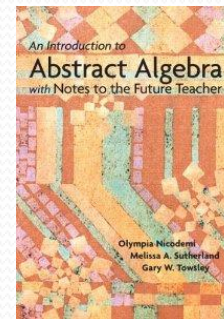
The Course Load (cont.)

- DiffEq
 - 200-level
 - Math, Applied Math, Pre-teacher
 - Maple used for the applications
 - Previous commercial text
 - Edwards & Penney
 - 4E
 - Pearson 2007
 - \$140/\$65



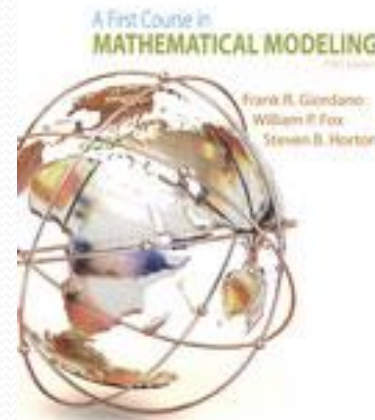
The Course Load (cont.)

- Abstract Algebra
 - 400-level
 - Math, Pre-teacher
 - Previous commercial text
 - Nicodemi/Sutherland/Towsley
 - Pearson 2006
 - ~\$83/50
 - Beachy/Blair
 - 3E
 - Waveland 2006
 - ~\$63/55



The Course Load (fin)

- Mathematical Modeling
 - 300-level
 - Math, Applied Math, Pre-teacher
 - Maple used for the applications
 - Previous commercial text
 - Giordano/Fox/Horton
 - 5E
 - Cengage 2012
 - ~\$241/147



Criteria For Adoption

- Completeness
 - Is my existing syllabus covered?
- Correct Level
 - Given the span of ability levels in our classes
- Matches my style
 - Daily work, notation, readability
- Ancillaries
 - Solution Manual
 - Student Solutions
 - Web Page
- Open Source

Alternatives

- Numerical Analysis
 - Pav (c. 2003 – open source)
 - Lambers (U So. MS - 2011)
 - Deturck/Wolf (Penn – 2002)
- DE
 - Dawkins (Lamar – ongoing. Paul has excellent library)
 - Finan (AR Tech – ongoing)
 - Lebl (UIUC – 2011)
 - Trench (Trinity – 2013)

Alternatives

- Abstract Algebra
 - Judson (U Puget Sound - 2013 – open source)
 - Arapura (Purdue - 2004)
 - Malik et. al (Creighton – 2007)
- Modeling
 - Dangelmayr/Kirby (CO St. U – c. 2010)

Selections/Adoptions

- Numerical Analysis - Pav
 - Very close to the level I need
 - ToC was a match for my usual syllabus
 - Root finding
 - Interpolation & Curve Fitting
 - Derivatives
 - Integration
 - DiffEq
 - A little terse (Pav calls it a *supplement* to B&F)
 - Open source let me replace Octave with Maple, add exercises (basic set was small)

Pav New Chapter

1	Maple Basics For Numerical Analysis	
1.1	Introduction	
1.2	Getting Started - The Maple Environment . .	
1.3	Basic Math Operations	
1.4	Assignment	
1.5	Built-In Functions and Constants	
1.6	Graphics And Plotting	
1.7	Formatted Output - the printf() Command .	
1.8	The Help Facility	
1.9	Loops, Decisions	
1.10	Programming In Maple	
1.10.1	The proc()	
1.10.2	Arguments	
1.10.3	The proc() command	
1.11	Useful Commands	
1.12	Programming and Control	
1.12.1	Logical Forks and Control	
1.13	Plotting	
	Exercises	

Differential Equations

- Spring 2013
 - Dawkins' syllabus closest to mine
 - No daily work (weekly problems, not part of the text proper)
 - Finan "missing" a topic or 2 (Marcel's text is actually 2 vol), but excellent problem set, with solution manual
 - Solution – Use both
- Spring 2014
 - I find Trench during a Google search
 - Seems to offer a complete fit

Still some snags

- A typical issue issue

- E&P:
$$\frac{d\mathbf{x}}{dt} = \begin{bmatrix} 4 & -3 \\ 6 & -7 \end{bmatrix} \mathbf{x} :$$

- Trench:
$$y' = \begin{bmatrix} -4 & -3 \\ 6 & 5 \end{bmatrix} y$$

- Since my lessons are ppt imported into SmartBoard and annotated, confusion arises
- So does the occasional copyright conflict

Adoption - Abstract

- Beachy & Blair my first few times
 - Very good book – readable, reasonably priced, correct level, complete two-semester ToC
- Nicodemi popped up on my radar
 - Pointed more at SHU typical Algebra student
 - One semester only
 - Early polynomials
 - Lots of materials for the pre-teacher

Adoption - Abstract

- I found Judson at the AIM site, contacted author
 - ToC Matches B&B
 - Two semesters (Used for independent study this semester)
 - Through intro to Galois and so forth
 - Instructor's solution guide
 - Student solutions
 - Open source

Adoption - Modeling

- The pickings here are slim (in comparison)
- These approaches vary greatly
- As does our syllabus from year to year
- Dangelmayr (CSU) has a usable volume that matches my needs
 - Topics are the standard ones
 - Can be used at various levels
 - Nice exercise set, with solutions in a separate file from the author
 - I supplement any text for this class anyway

Conclusions - Future

- A worthwhile endeavor for me
- Students appreciate the savings...
- I am able to get my work done
- E-books are the future anyway
- I will continue wherever possible

Some Links

- [American Institute Of Mathematics Book List](#)
- [Free Book Centre – Mathematics](#)
- [Paul Dawkins's Library](#)
- [My site – jckallenbach.weebly.com/work](#)