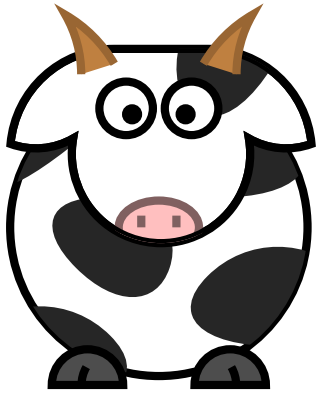

MOOCulus

massive open online calculus

Jim Fowler

OSU Mathematics Department

coursera

Calculus One

Jim Fowler

Calculus One is a first introduction to differential and integral calculus, emphasizing engaging examples from everyday life.

Current Session:

Jan 7th 2013 (15 weeks long) Sign Up

Workload: 6-10 hours/week

About the Course

Calculus is about the very large, the very small, and how things change. The surprise is that something seemingly so abstract ends up explaining the real world. Calculus plays a starring role in the biological, physical, and social sciences. By focusing outside of the classroom, we will see examples of calculus appearing in daily life.

This course is a first and friendly introduction to calculus, suitable for someone who

About the Instructor

Jim Fowler
Ohio State University

coursera

THE OHIO STATE UNIVERSITY

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85k enrollments

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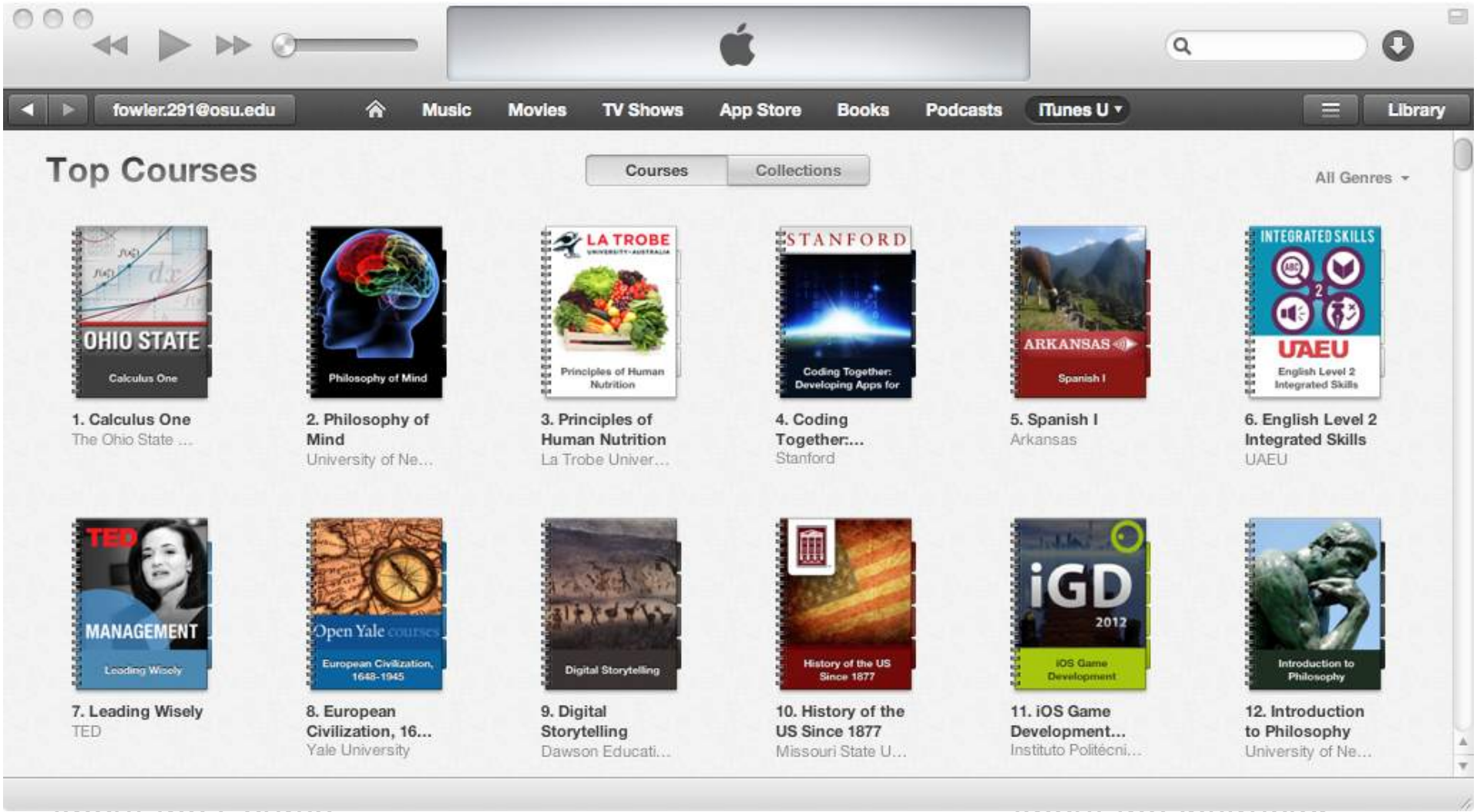

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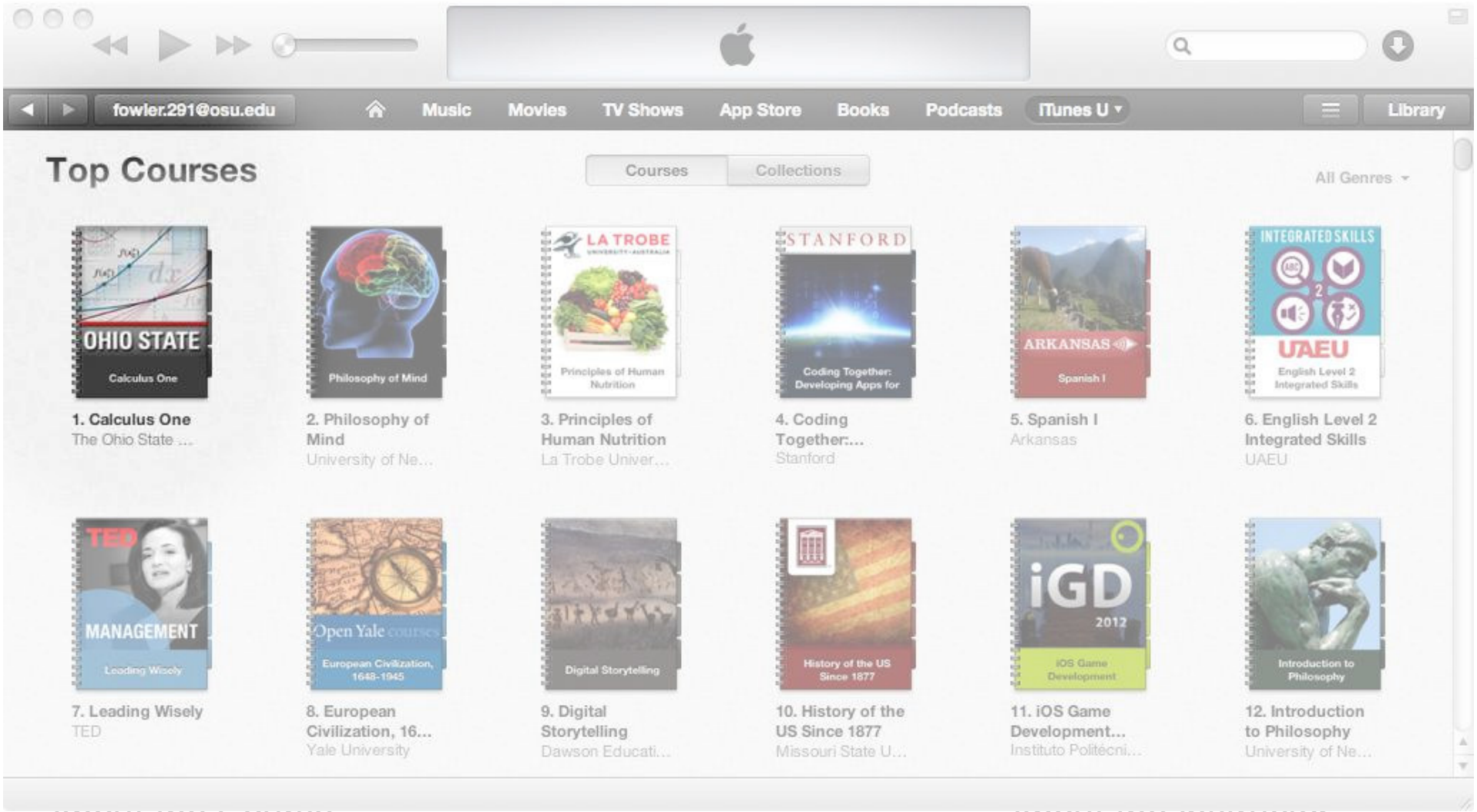

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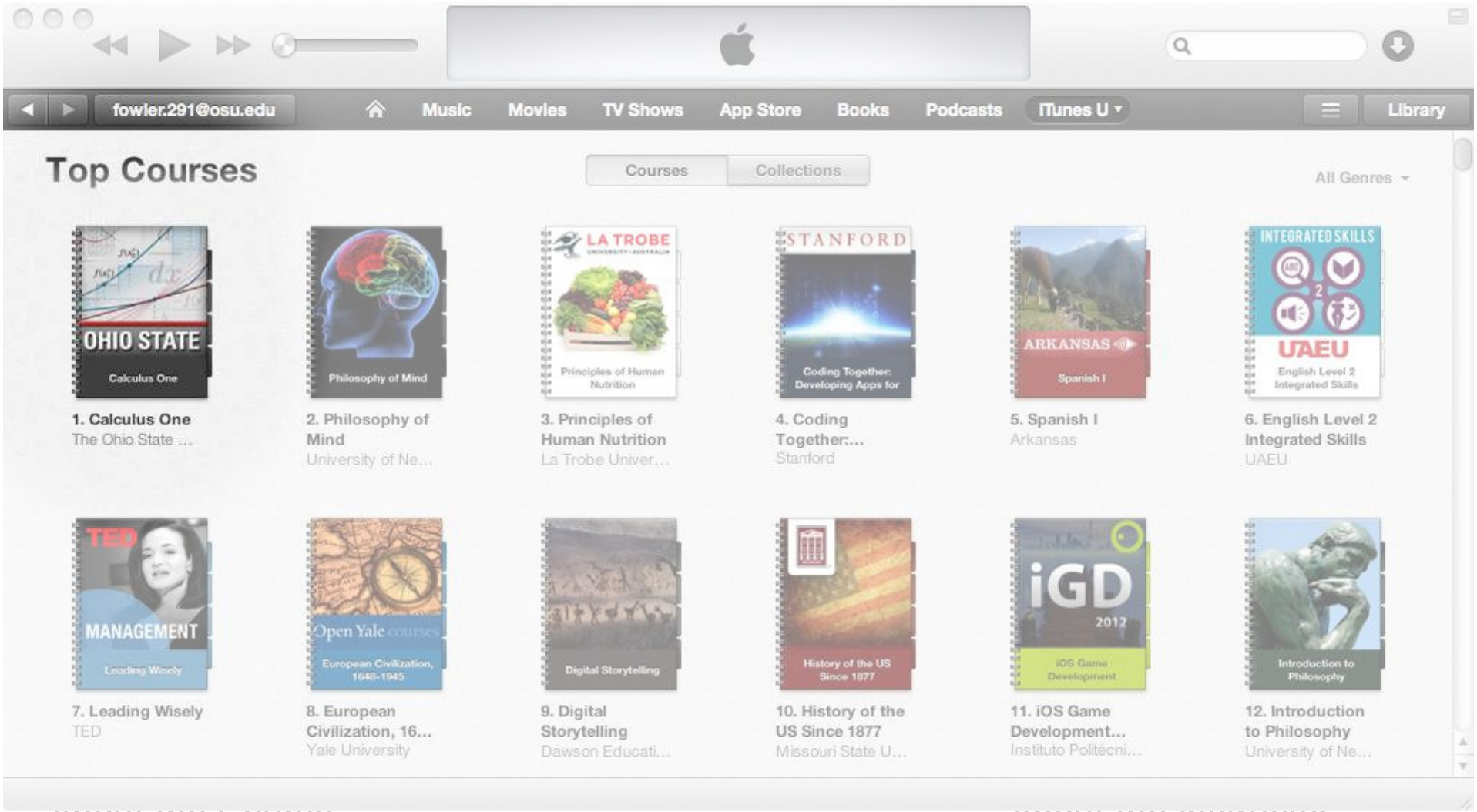

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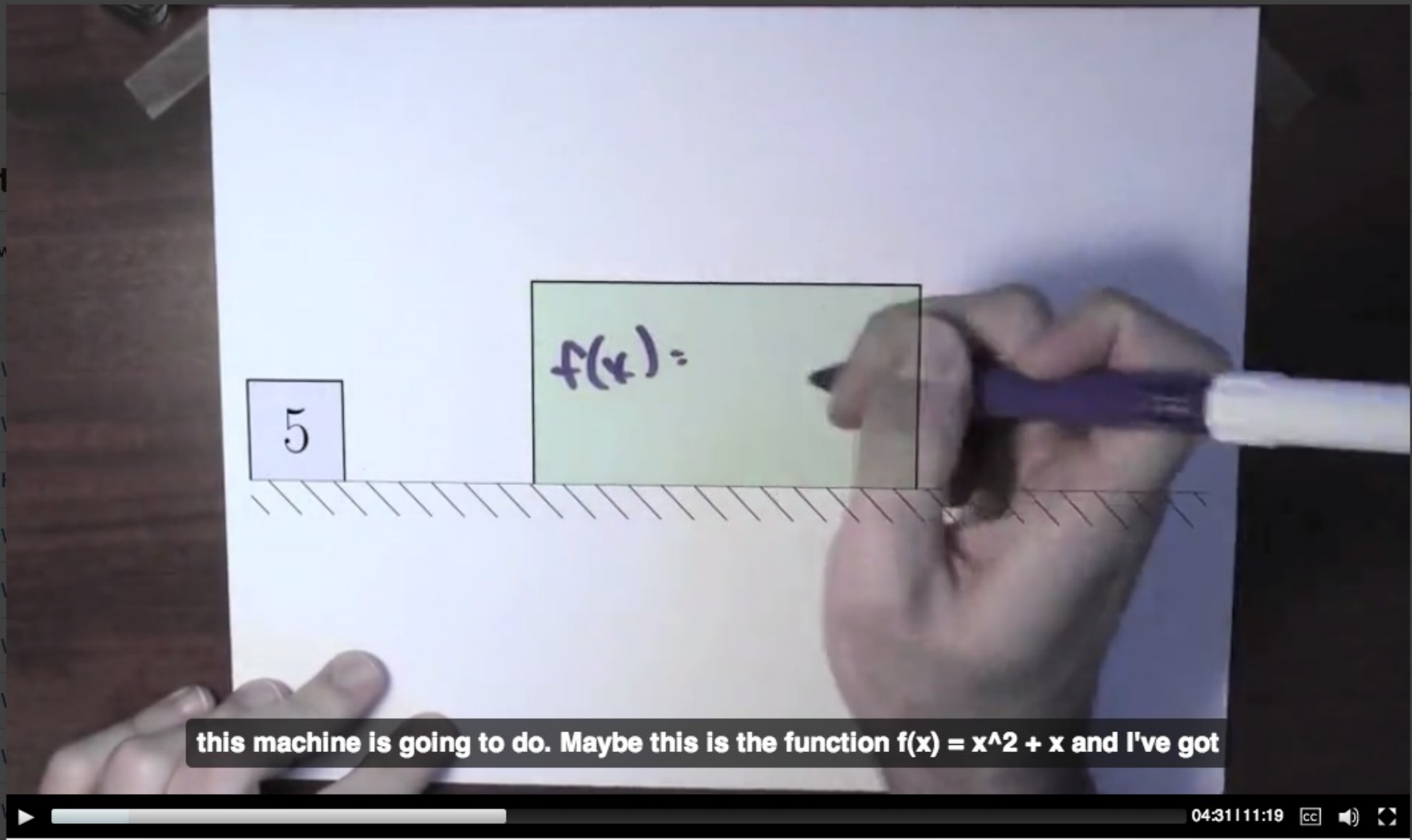


« Previous | Press H for shortcuts | 1.01 What is a function? [11:19] | - | Speed: 1.75x | + | Next »

12.10 What is the sum of n^4 for n = 1 to n = k? [9:24]

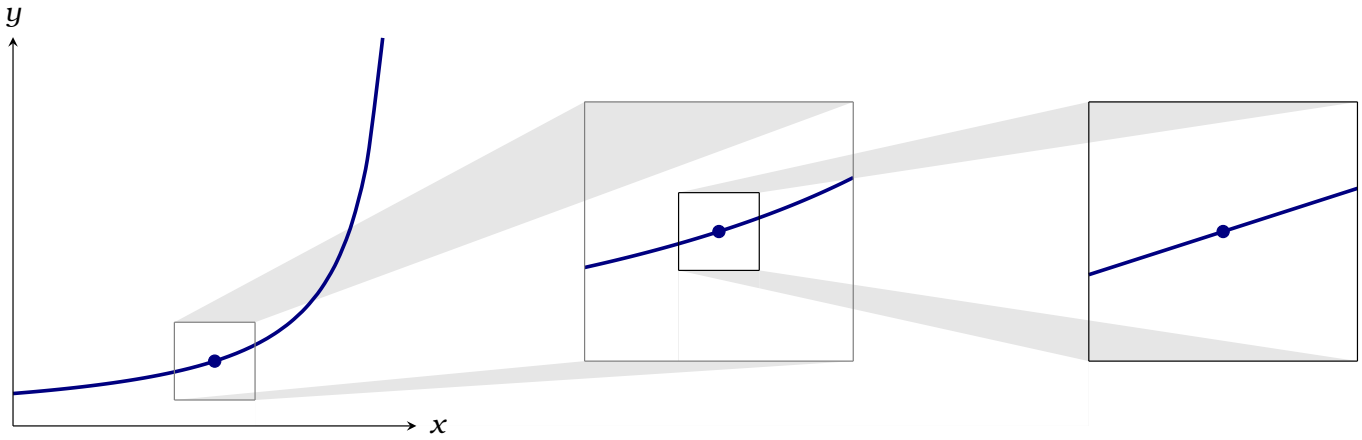


Figure 2.1: Given a function $f(x)$, if one can "zoom in" on $f(x)$ sufficiently so that $f(x)$ seems to be a straight line, then that line is the **tangent line** to $f(x)$ at the point determined by x.

at two points. The slope of any secant line that passes through the points $(x, f(x))$ and $(x+h, f(x+h))$ is given by

$$\frac{\Delta y}{\Delta x} = \frac{f(x+h)-f(x)}{(x+h)-x} = \frac{f(x+h)-f(x)}{h},$$

see Figure 2.2. This leads to the *limit definition of the derivative*:

Definition of the Derivative The **derivative** of $f(x)$ is the function

$$\frac{d}{dx}f(x) = \lim_{h\to 0}\frac{f(x+h)-f(x)}{h}.$$

If this limit does not exist for a given value of x, then $f(x)$ is not **differentiable** at x.

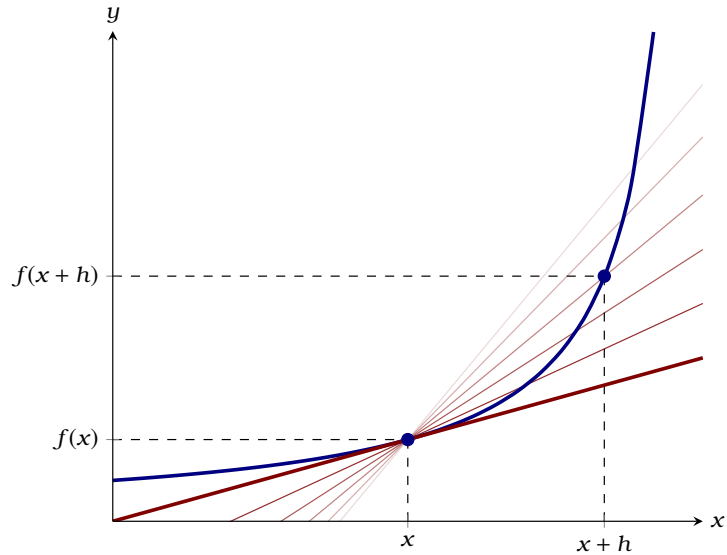
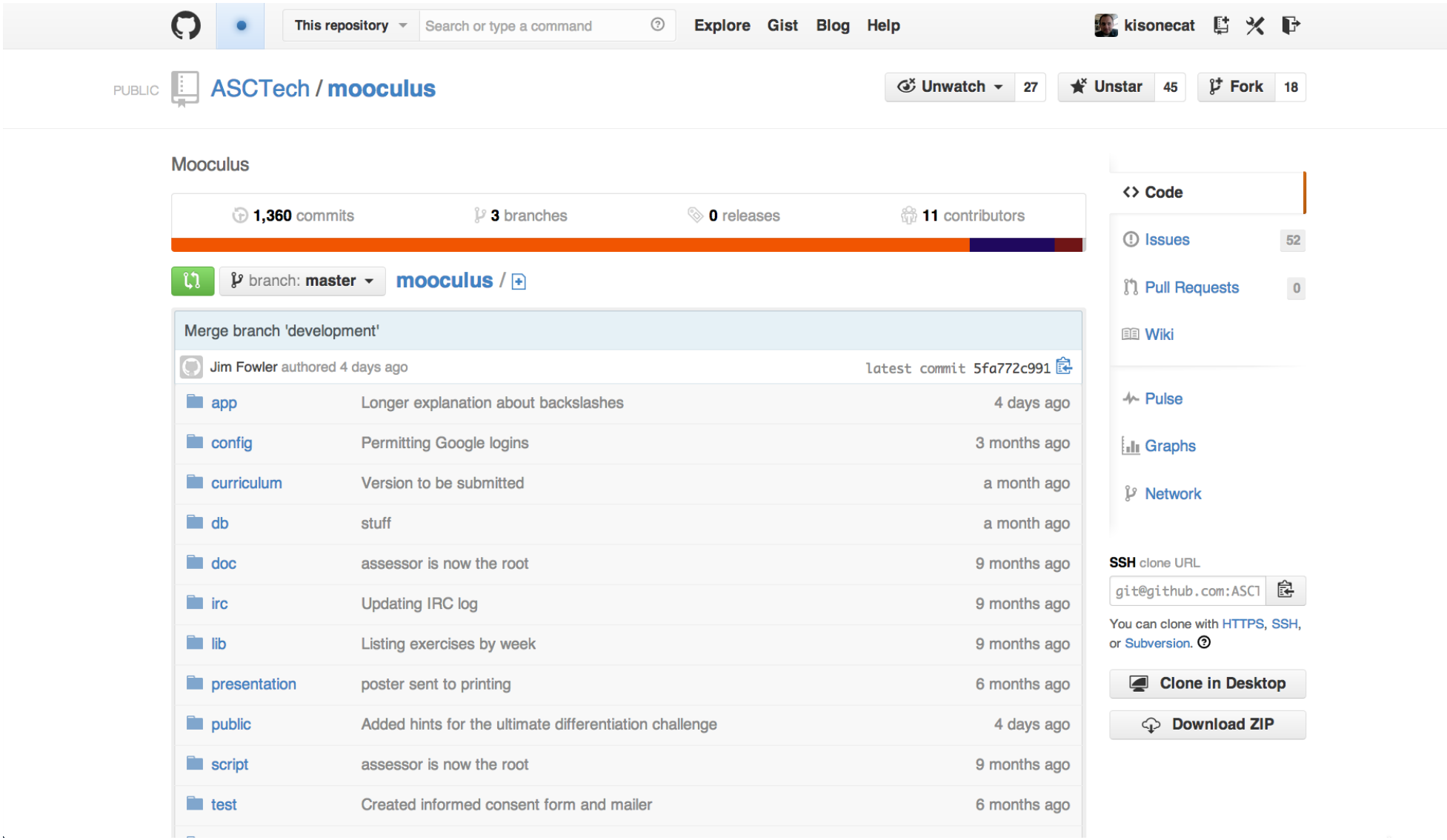


Figure 2.2: Tangent lines can be found as the limit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3 branches
0 releases
11 contributors
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db stuff a month ago
doc assessor is now the root 9 months ago
irc Updating IRC log 9 months ago
lib Listing exercises by week 9 months ago
presentation poster sent to printing 6 months ago
public Added hints for the ultimate differentiation challenge 4 days ago
script assessor is now the root 9 months ago
test Created informed consent form and mailer 6 months ago
Code
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Pull Requests 0
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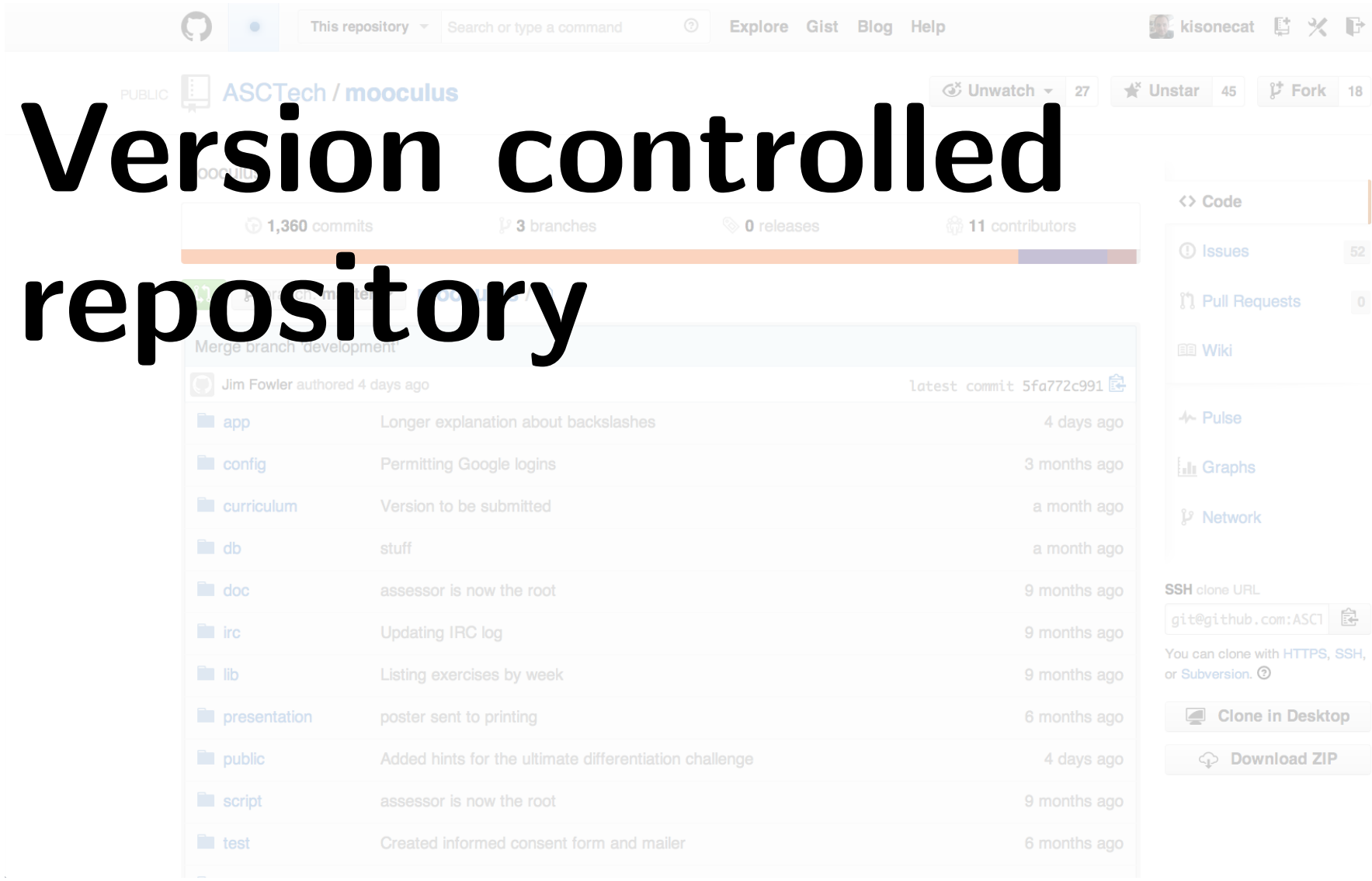


Version controlled repository

https://github.com/ASCTech/mooculus

PUBLIC ASCTech / mooculus

Unwatch 27 | Unstar 45 | Fork 18

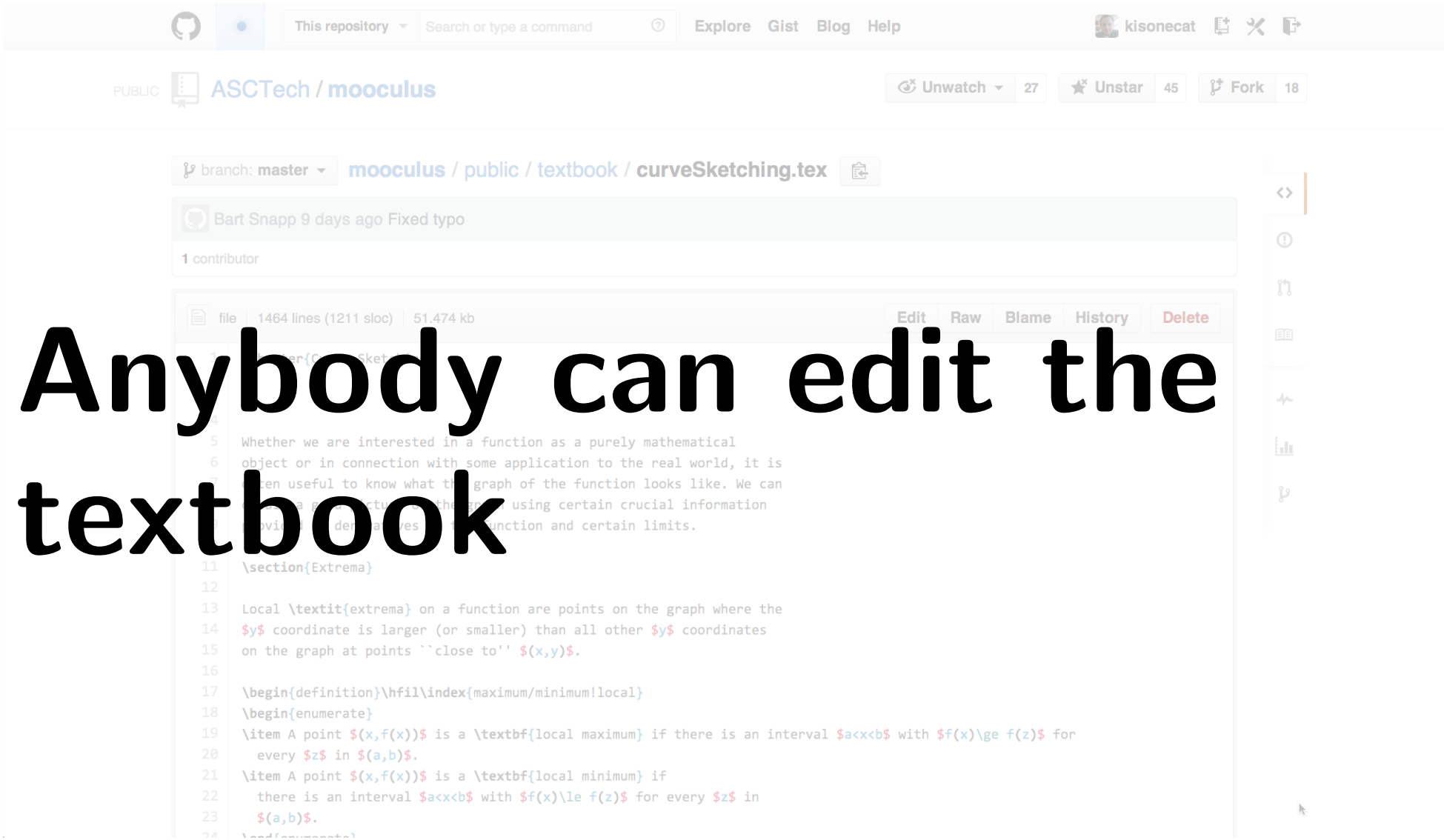
branch: master | mooculus / public / textbook / curveSketching.tex

Bart Snapp 9 days ago Fixed typo

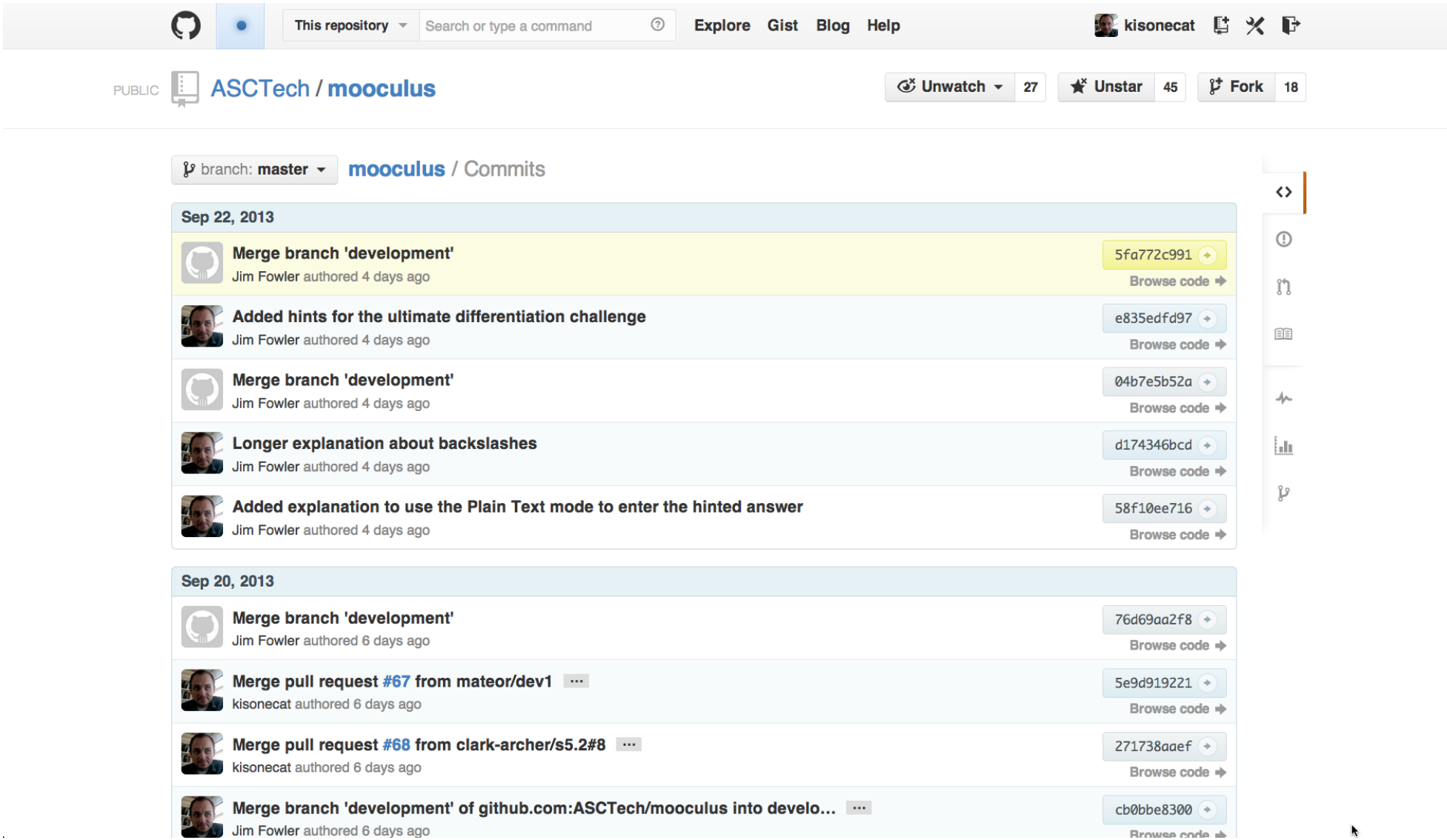
1 contributor

file | 1464 lines (1211 sloc) | 51.474 kb | Edit | Raw | Blame | History | Delete

```
\chapter{Curve Sketching}



Whether we are interested in a function as a purely mathematical
object or in connection with some application to the real world, it is
often useful to know what the graph of the function looks like. We can
obtain a good picture of the graph using certain crucial information
provided by derivatives of the function and certain limits.

\section{Extrema}

Local \textit{extrema} on a function are points on the graph where the
$y$ coordinate is larger (or smaller) than all other $y$ coordinates
on the graph at points ``close to'' $(x,y)$.

\begin{definition}\hfil\index{maximum/minimum!local}
\begin{enumerate}
\item A point $(x,f(x))$ is a \textbf{local maximum} if there is an interval $a<x<b$ with $f(x)\ge f(z)$ for
  every $z$ in $(a,b)$.
\item A point $(x,f(x))$ is a \textbf{local minimum} if
  there is an interval $a<x<b$ with $f(x)\le f(z)$ for every $z$ in
  $(a,b)$.
```



Anybody can edit the textbook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Sep 22, 2013
Merge branch 'development'
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5fa772c991
Browse code
Added hints for the ultimate differentiation challenge
Jim Fowler authored 4 days ago
e835edfd97
Browse code
Merge branch 'development'
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Browse code
Longer explanation about backslashes
Jim Fowler authored 4 days ago
d174346bcd
Browse code
Added explanation to use the Plain Text mode to enter the hinted answer
Jim Fowler authored 4 days ago
58f10ee716
Browse code
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Jim Fowler authored 6 days ago
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Merge pull request #67 from mateor/dev1
kisonecat authored 6 days ago
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Browse code
Merge pull request #68 from clark-archer/s5.2#8
kisonecat authored 6 days ago
271738aaef
Browse code
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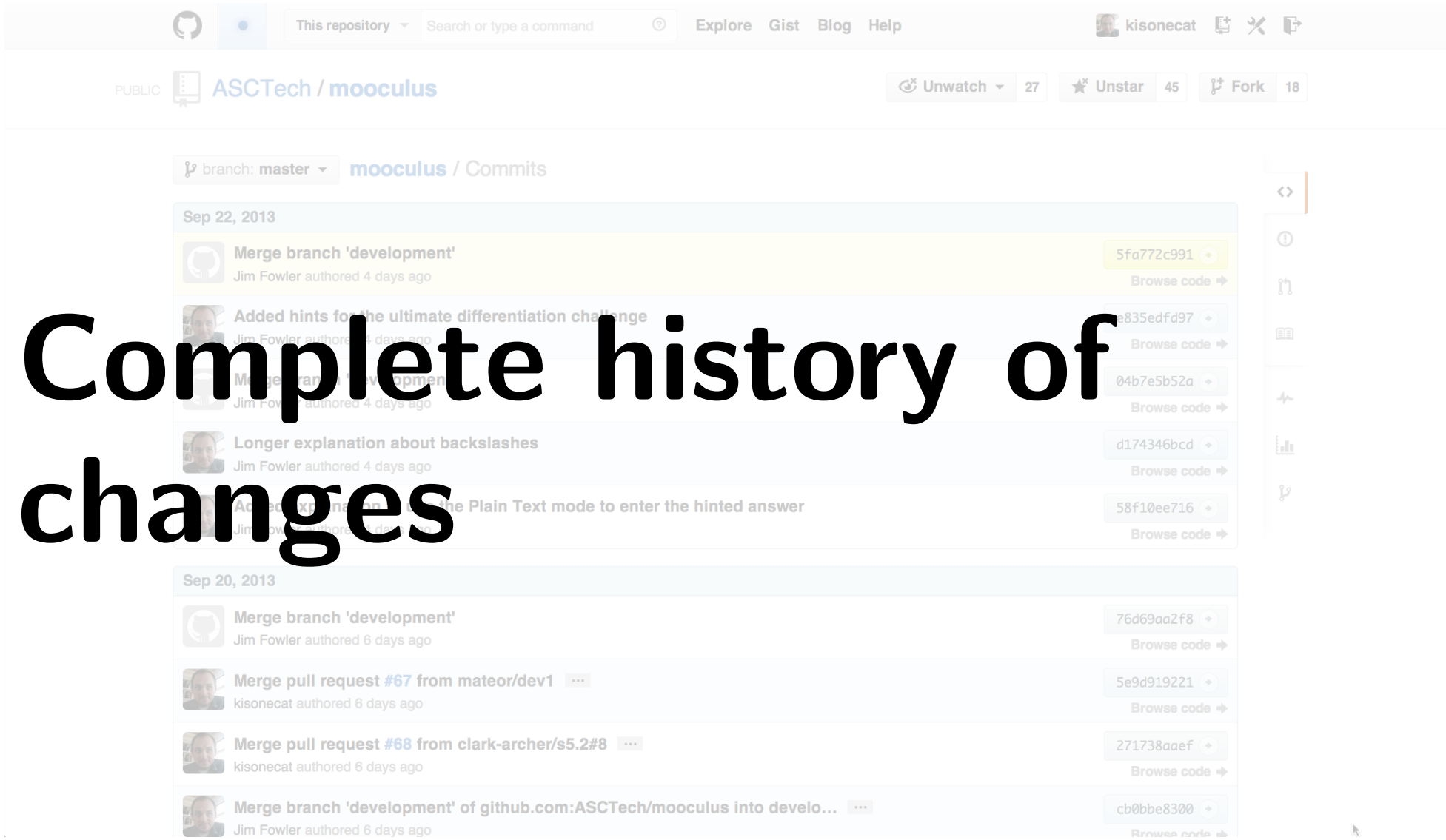
cb0bbe8300
Browse code



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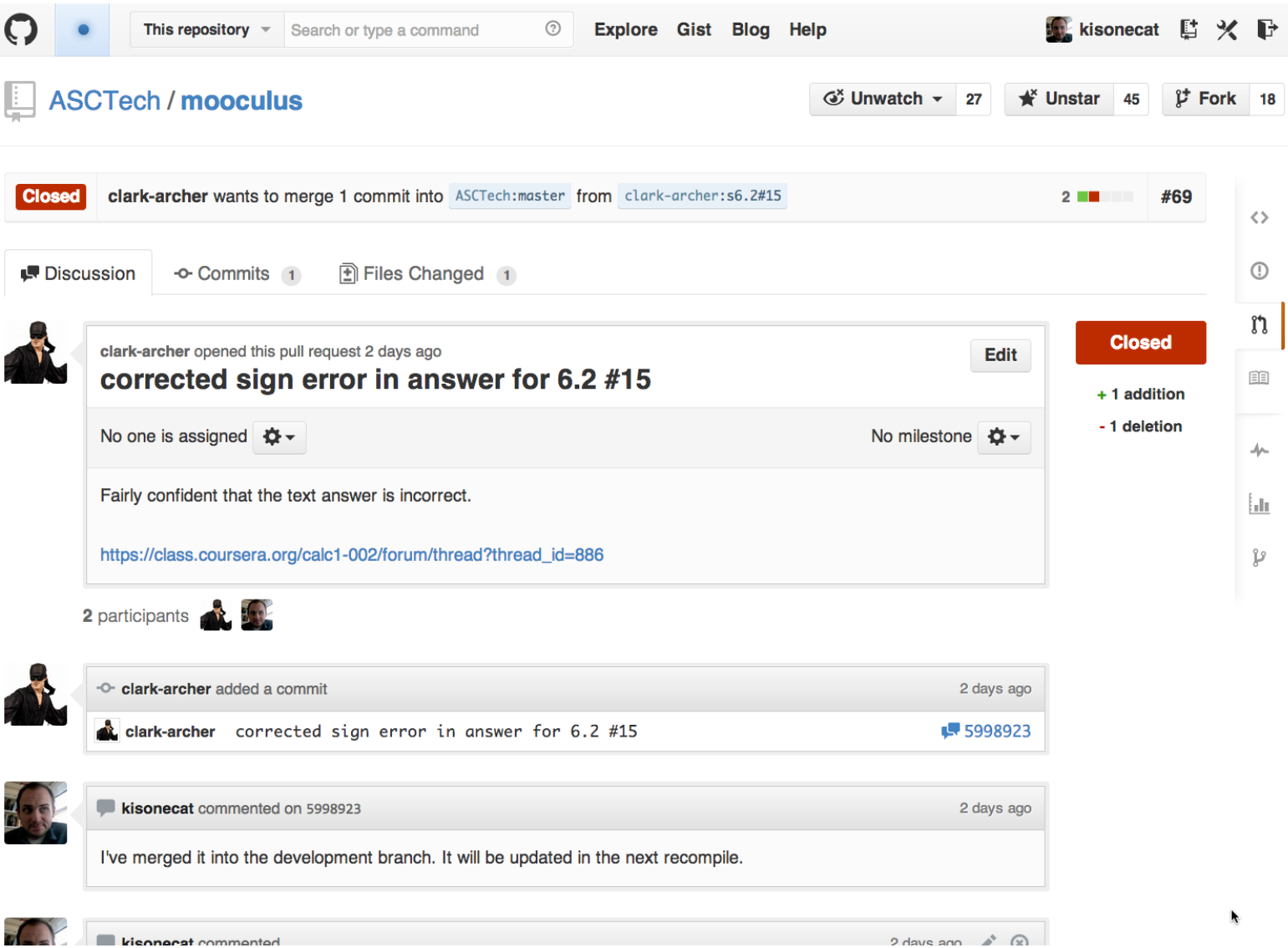
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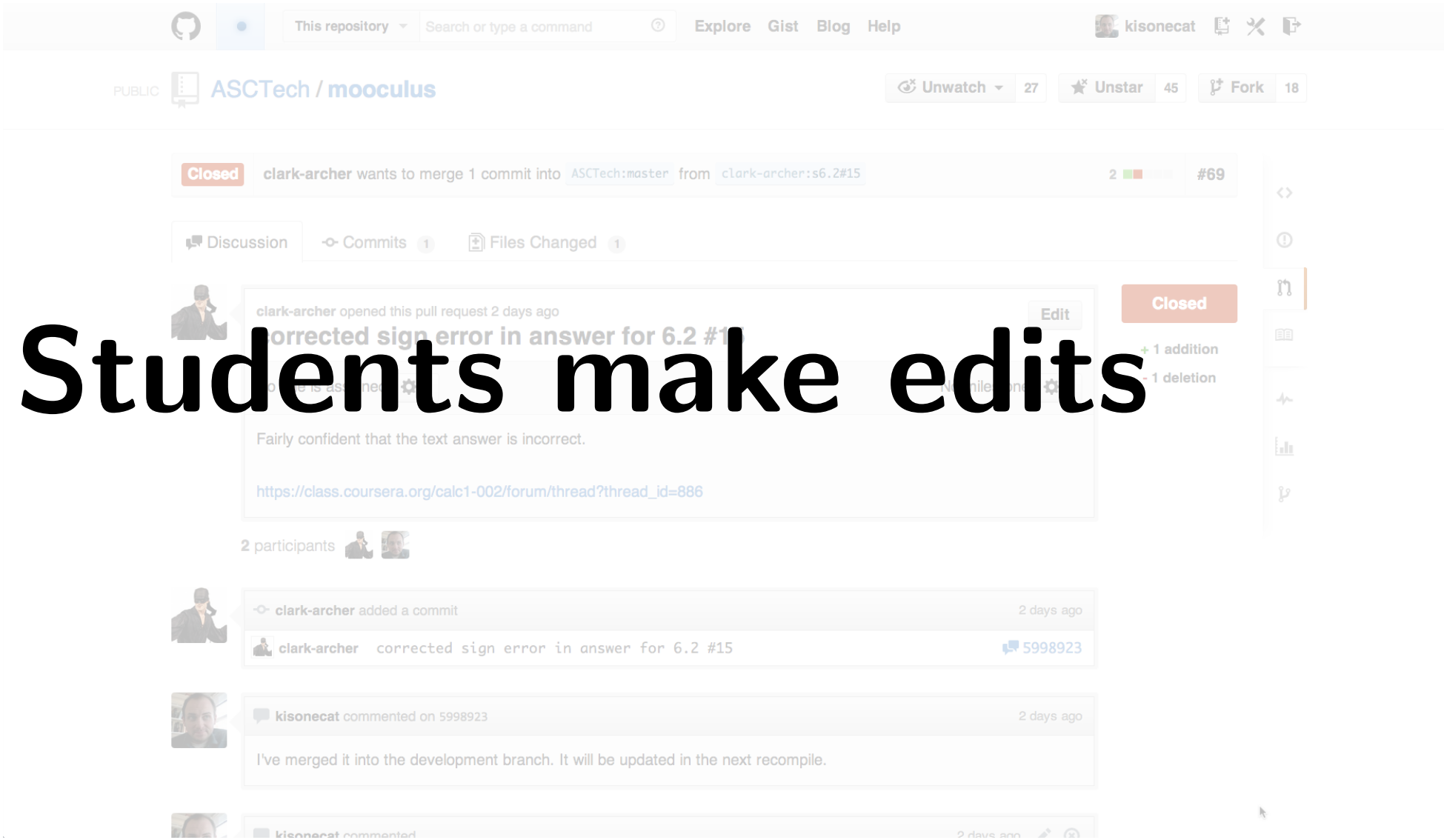
clark-archer wants to merge 1 commit into ASCTech:master from clark-archer:s6.2#15
2
#69
Discussion
Commits 1
Files Changed 1
clark-archer opened this pull request 2 days ago
corrected sign error in answer for 6.2 #15
Edit
No one is assigned
No milestone
Fairly confident that the text answer is incorrect.
https://class.coursera.org/calc1-002/forum/thread?thread_id=886
2 participants
Closed
+ 1 addition
- 1 deletion
clark-archer added a commit
2 days ago
clark-archer corrected sign error in answer for 6.2 #15
5998923
kisonecat commented on 5998923
2 days ago
I've merged it into the development branch. It will be updated in the next recompile.



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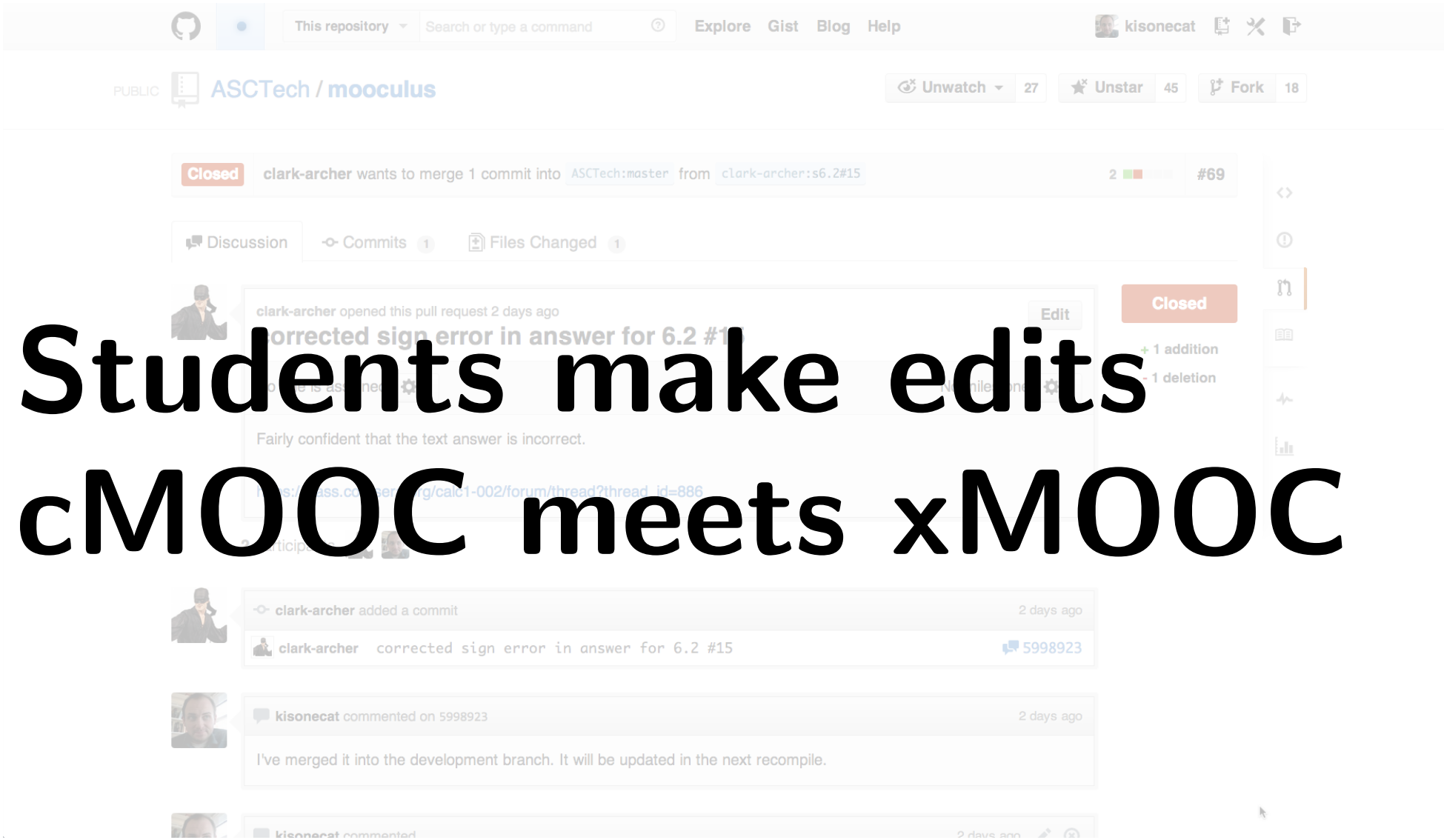


Students make edits

cMOOC meets xMOOC

What's the benefit?

What's the benefit?

Cheaper?

What's the benefit?

~~Cheaper?~~ Better!

THE OHIO STATE UNIVERSITY

Calculus Two: Sequences and Series

Jim Fowler, PhD

Calculus Two: Sequences and Series is an introduction to sequences, infinite series, convergence tests, and Taylor series. The course emphasizes not just getting answers, but asking the question "why is this true?"

Workload: 6-8 hours/week

Taught In: English

Subtitles Available In: English

Sessions:

Sep 27th 2013 (6 weeks long) You are enrolled!

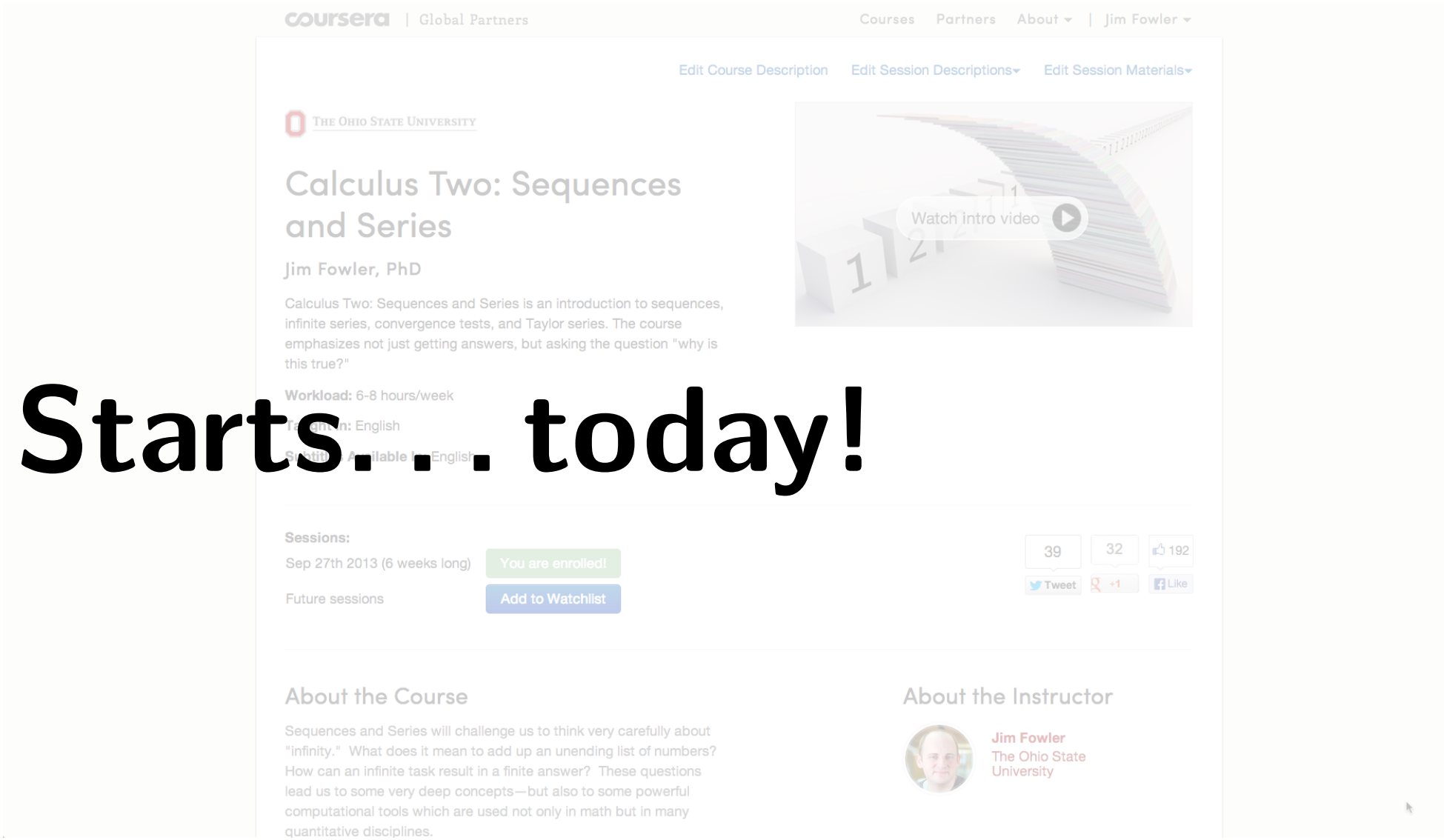
Future sessions Add to Watchlist

About the Course

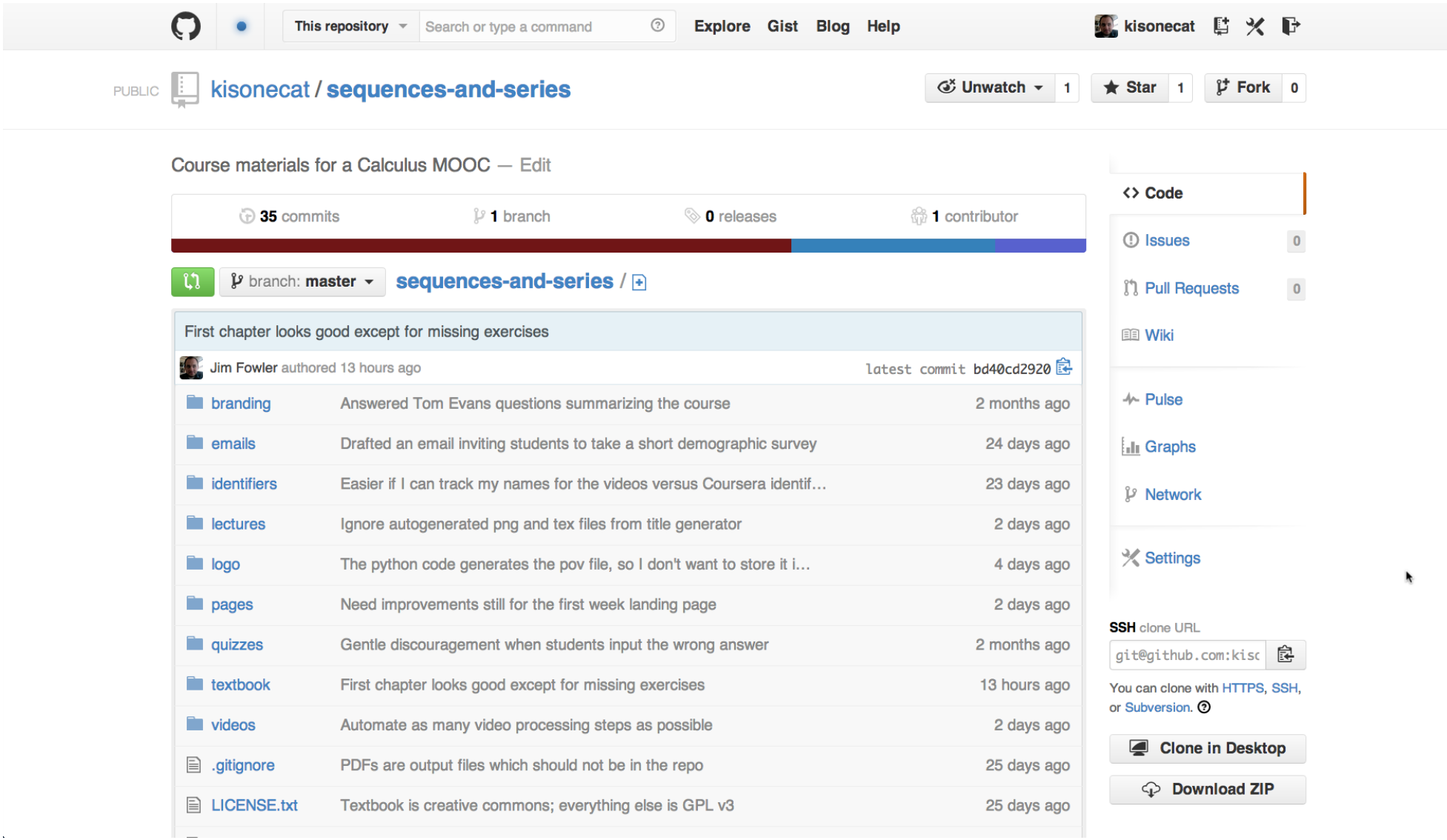
Sequences and Series will challenge us to think very carefully about "infinity." What does it mean to add up an unending list of numbers? How can an infinite task result in a finite answer? These questions lead us to some very deep concepts—but also to some powerful computational tools which are used not only in math but in many quantitative disciplines.

About the Instructor

Jim Fowler
The Ohio State University



Starts... today!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0 releases
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Pull Requests 0
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git@github.com:kisc
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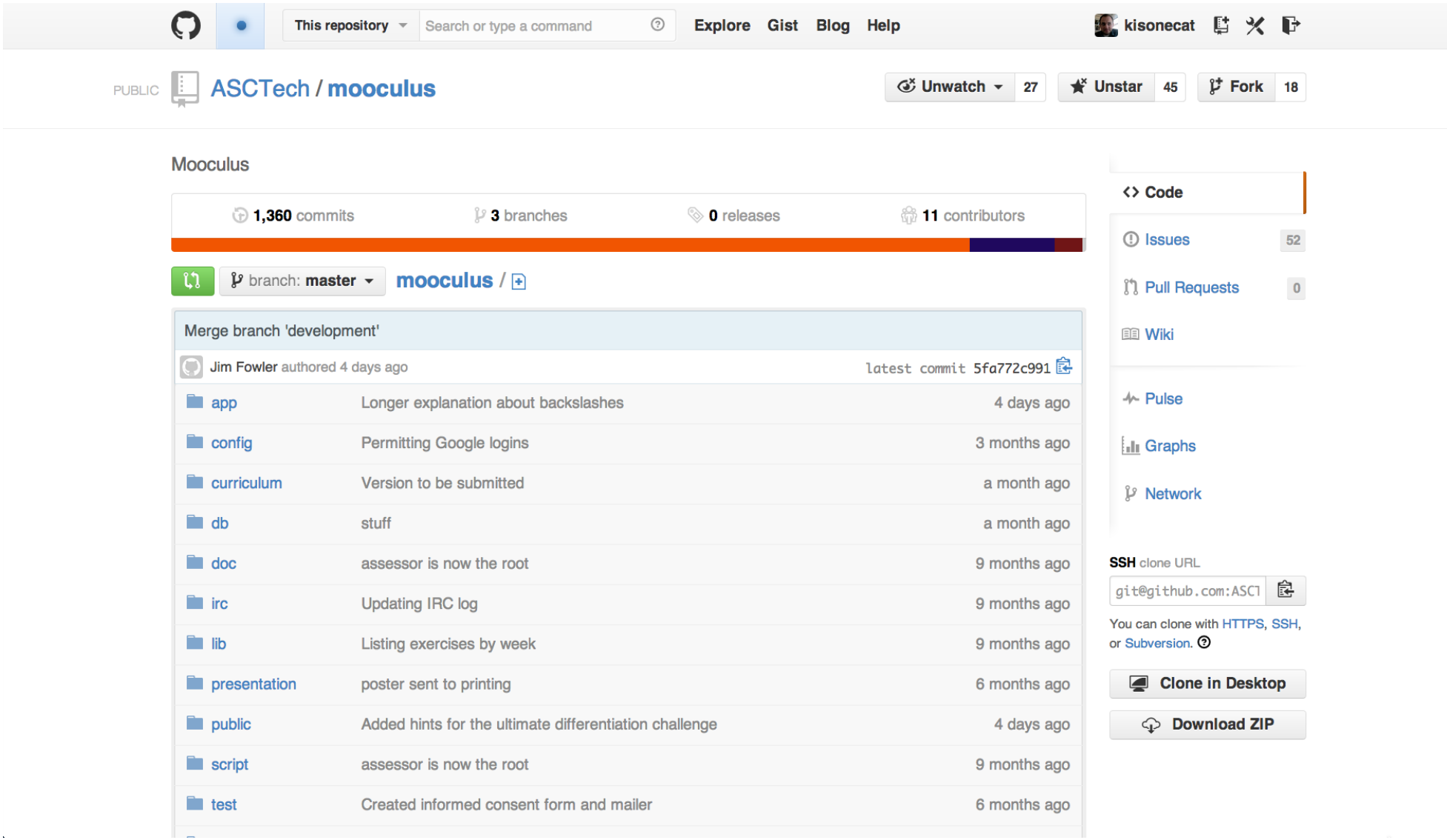
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config Permitting Google logins 3 months ago
curriculum Version to be submitted a month ago
db stuff a month ago
doc assessor is now the root 9 months ago
irc Updating IRC log 9 months ago
lib Listing exercises by week 9 months ago
presentation poster sent to printing 6 months ago
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script assessor is now the root 9 months ago
test Created informed consent form and mailer 6 months ago
Code
Issues 52
Pull Requests 0
Wiki
Pulse
Graphs
Network
SSH clone URL
git@github.com:ASCT
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This course is a first and friendly introduction to calculus, suitable for someone who has never seen the subject before, or for someone who has seen some calculus but wants to review the concepts and practice applying those concepts to solve problems. One learns calculus by doing calculus, and so this course is based around doing practice problems.
Enroll in the course
Watch the lectures
Read the textbook
Do the problems
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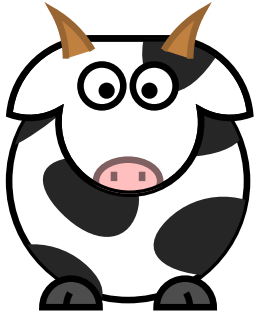

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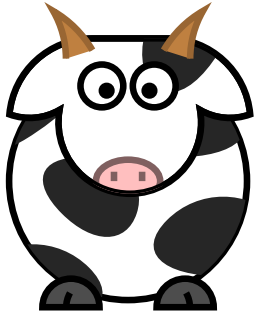

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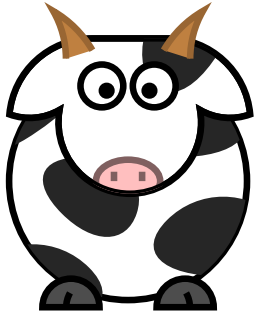

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Open textbook,
online homework,

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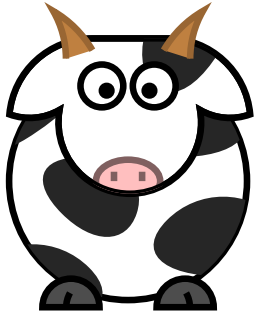

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online homework, with
a hidden Markov model.

Exercise Computing Derivatives Of Polynomials

Find the derivative of $-3x^2 - 2x - 1$ using the sum rule and the power rule.

Answer Acceptable formats

WYSIWYG Plain Text

Check Answer

Do you need help?

I'd like a hint

Progress

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Answer

Acceptable formats

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Do you need help?

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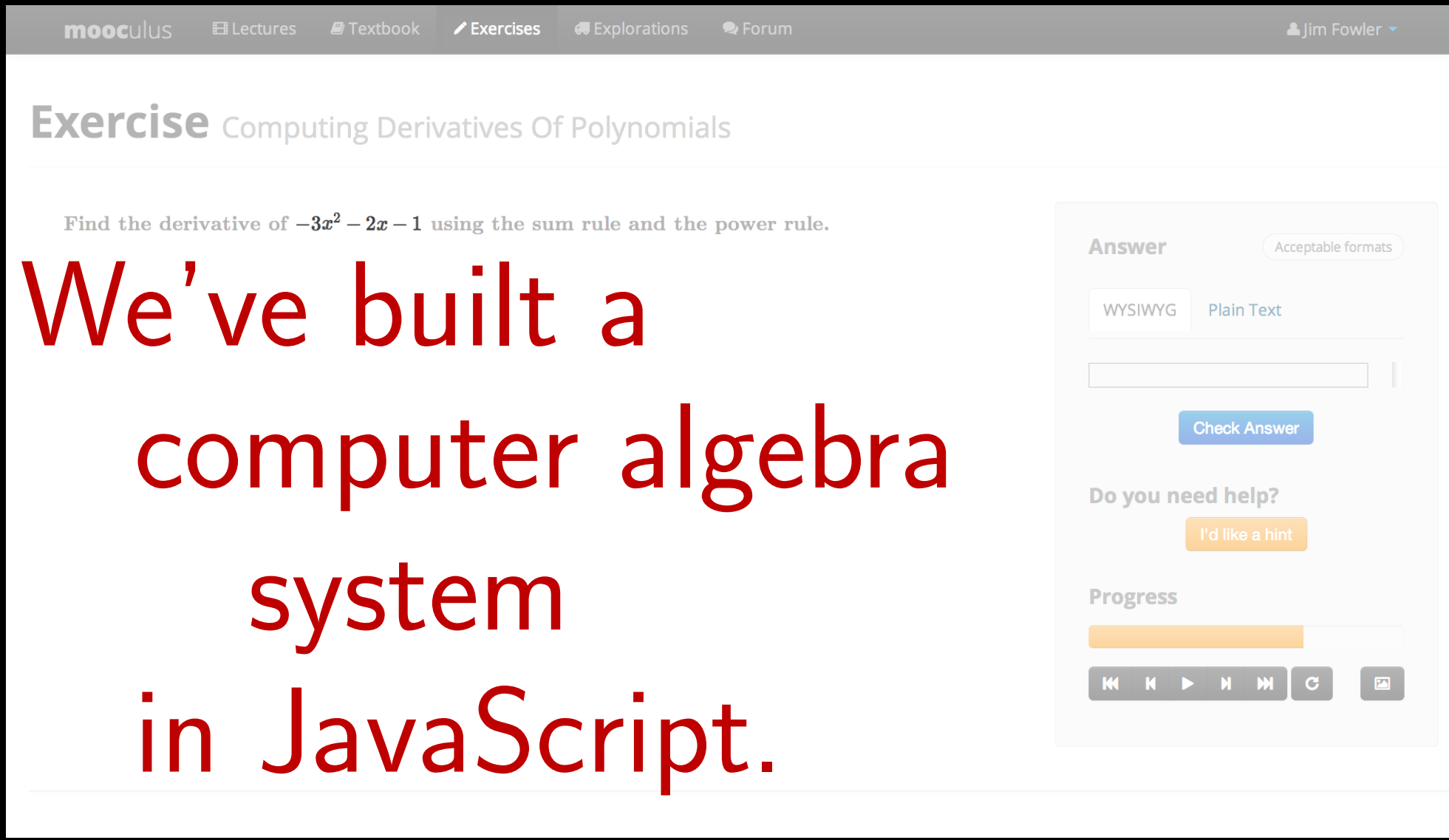
Progress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Exercise Computing Derivatives Of Polynomials
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Answer
Acceptable formats
WYSIWYG
Plain Text
Check Answer
Do you need help?
I'd like a hint
Progress
We've built a computer algebra system in JavaScript.

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Progress

Exercise Computing Derivatives Of Polynomials

Find the derivative of $-3x^2 - 2x - 1$ using the sum rule and the power rule.

$\frac{d}{dx}(-3x^2 - 2x - 1) = \frac{d}{dx}(-3x^2) + \frac{d}{dx}(-2x^1) + \frac{d}{dx}(-1)$ by the sum rule.

Answer Acceptable formats

WYSIWYG Plain Text

Check Answer

Do you need help?

I'd like another hint (4 steps left)

Progress

Exercise Computing Derivatives Of Polynomials

Find the derivative of $-3x^2 - 2x - 1$ using the sum rule and the power rule.

$$\frac{d}{dx}\left(-3x^2 - 2x - 1\right) = \frac{d}{dx}\left(-3x^2\right) + \frac{d}{dx}\left(-2x^1\right) + \frac{d}{dx}\left(-1\right) \text{ by the sum rule.}$$

$$= -3\frac{d}{dx}\left(x^2\right) - 2\frac{d}{dx}\left(x^1\right) + 0 \text{ by the constant factor rule.}$$

Answer Acceptable formats

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Do you need help?

I'd like another hint (3 steps left)

Progress

Exercise Computing Derivatives Of Polynomials

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$$= (-3 \cdot 2)x^1 + (-2 \cdot 1)x^0 \text{ by the power rule.}$$

Answer Acceptable formats

WYSIWYG | Plain Text

Check Answer

Do you need help?

I'd like another hint (2 steps left)

Progress

Exercise Computing Derivatives Of Polynomials

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$$= -6x - 2$$

Answer Acceptable formats

WYSIWYG Plain Text

Check Answer

Do you need help?

I'd like another hint (1 step left)

Progress

Exercise Computing Derivatives Of Polynomials

Find the derivative of $-3x^2 - 2x - 1$ using the sum rule and the power rule.

$$\frac{d}{dx}(-3x^2 - 2x - 1) = \frac{d}{dx}(-3x^2) + \frac{d}{dx}(-2x^1) + \frac{d}{dx}(-1) \text{ by the sum rule.}$$

$$= -3\frac{d}{dx}(x^2) - 2\frac{d}{dx}(x^1) + 0 \text{ by the constant factor rule.}$$

$$= (-3 \cdot 2)x^1 + (-2 \cdot 1)x^0 \text{ by the power rule.}$$

$$= -6x - 2$$

Answer Acceptable formats

WYSIWYG Plain Text

Check Answer

Do you need help?

I'd like another hint (1 step left)

Progress

Problem	Progress
Abscissas And Ordinates Of Ordered Pairs	
Graphing Points	
Points On Functions	
Points On Functions 2	
Evaluating A Function At A Point In Its Domain	
Could These Points Be On The Graph Of A Function?	
Basic Relationships Between Functions	
Identifying Where A Function Is Positive Or Negative	
Identifying Increasing And Decreasing Behavior Of Functions	
Identifying Local Maxima And Minima	
Identifying Concavity	
Approximating Limits Graphically	
Approximating Limits Numerically With Graphical Assistance	
Approximating Limits Numerically	
Understanding Limit Laws	

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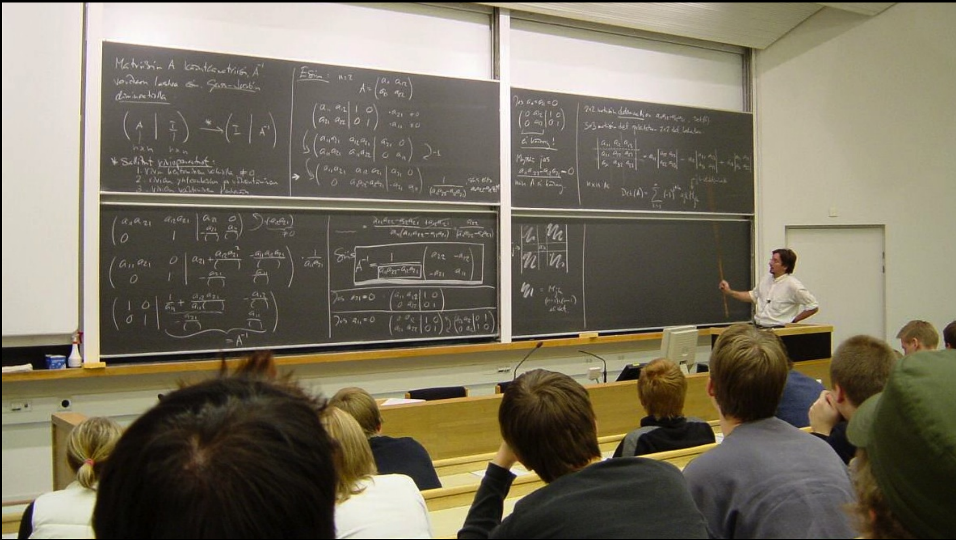
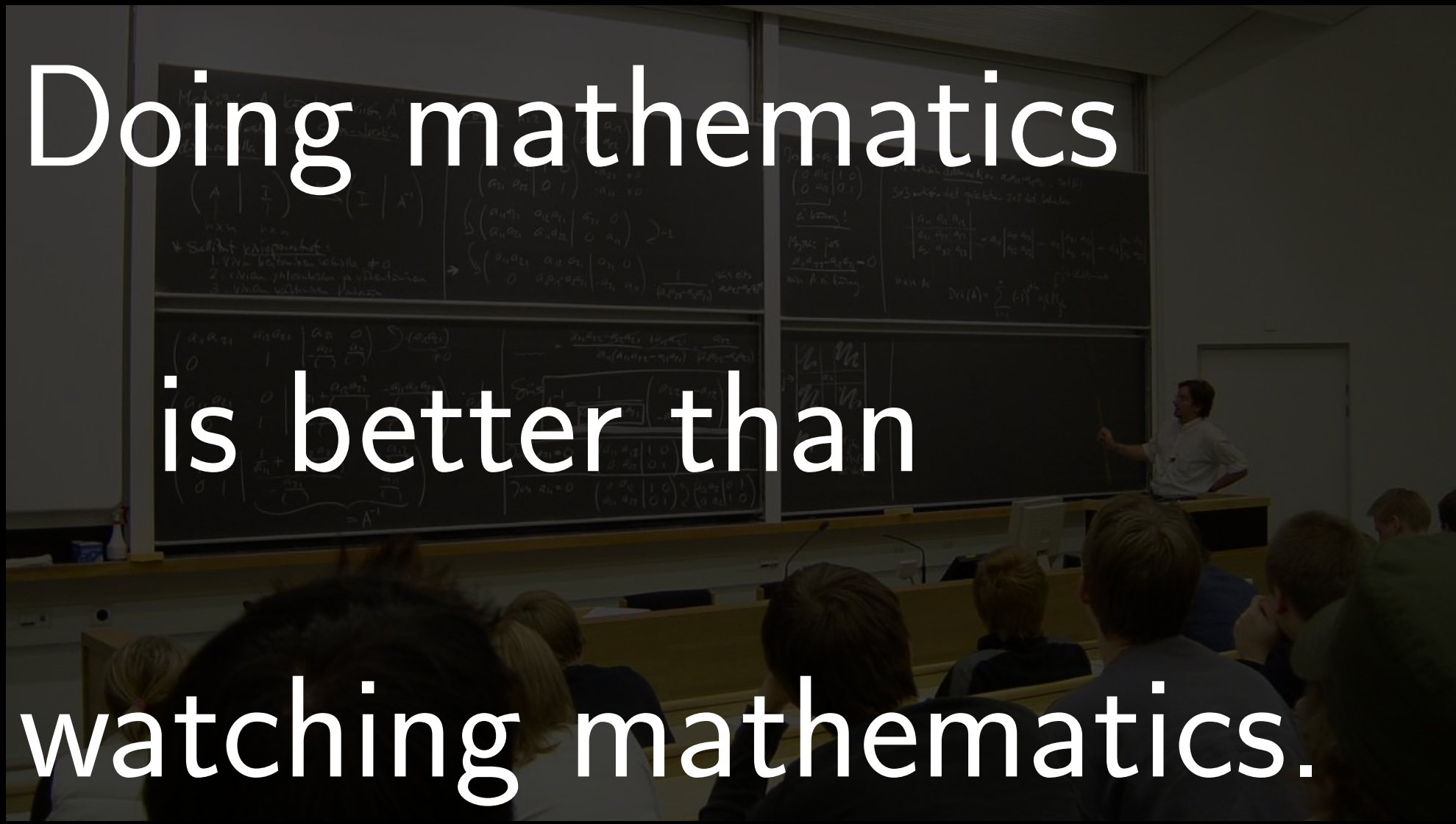
Open source platform for
building open source,
interactive textbooks.




Doing mathematics
is better than
watching mathematics.

Thank You