



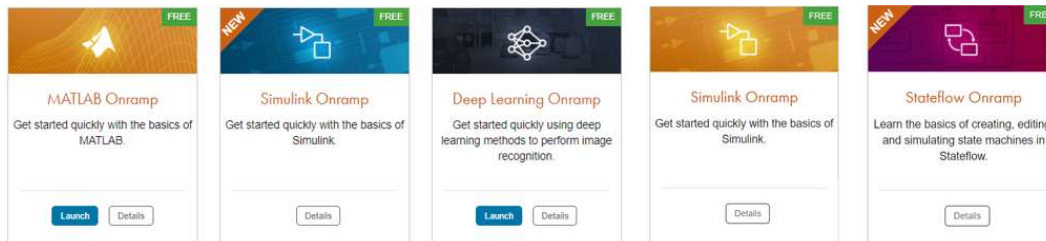
Accelerate E-Learning Online with MATLAB

17th Nov 2020

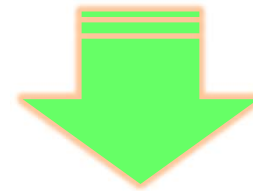
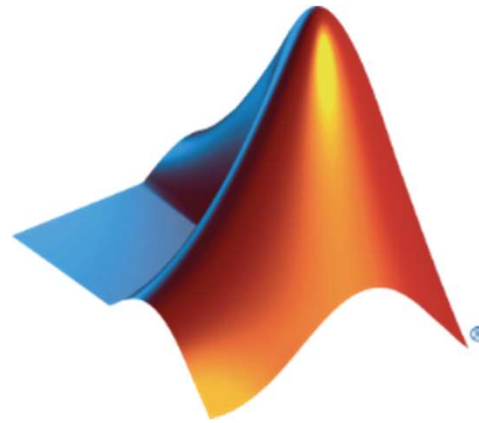
Agenda

Online MATLAB Curriculum resources

- Self Paced Online Training: Interactive lessons at your own pace
- MATLAB Courseware: Reuse downloadable curriculum across a range of disciplines
- MATLAB Grader: Create auto-graded course assignments with instant student feedback



DEMO



MATLAB Online



- NEWS
- NRL TV
- DRAW
- LADDER
- STATS
- PLAYERS
- FANTASY
- TIPPING
- PREDICTOR
- MORE ▾

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TELSTRA PREMIERSHIP

⏪	Round 25	05/09 7:50 PM 🐇 Rabbitohs 🦘 Roosters	06/09 6:00 PM 🐟 Eels 🦅 Sea Eagles	06/09 7:55 PM 🌩 Storm 🐎 Cowboys	07/09 3:00 PM 🦒 Raiders 👑 Warriors	07/09 5:30 PM 🐶 Bulldogs 🐎 Broncos	07/09 7:35 PM 👑 Titans 🐉 Dragons	08/09 2:00 PM 🦁 Wests Tigers 🐋 Sharks	⏩
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WESTS TIGERS

Farah expected to be named for Sharks showdown

FEATURE ▶ 04:43

Road to Finals: Raiders

EELS ▶ 00:54

Sivo's breakout year

Feedback

LATEST /

🏠 Type here to search

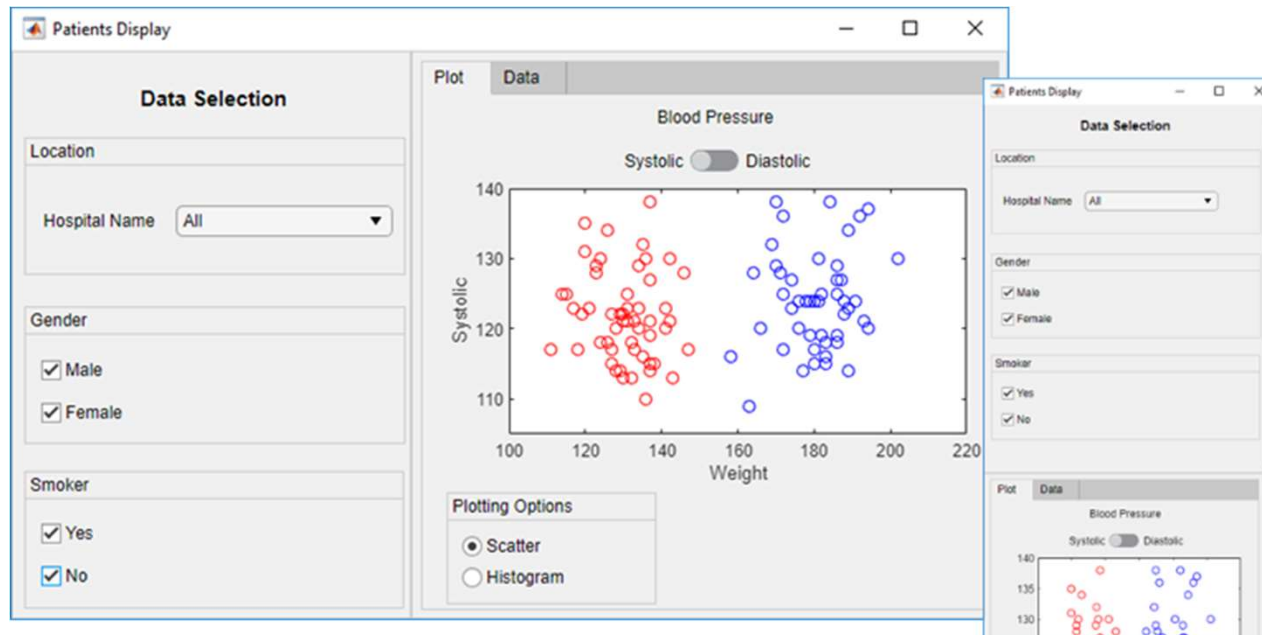


ENG

12:30 PM
3/09/2019



MATLAB App Designer



MATLAB Mobile for iPhone, iPad, and Android devices

- **A lightweight desktop**

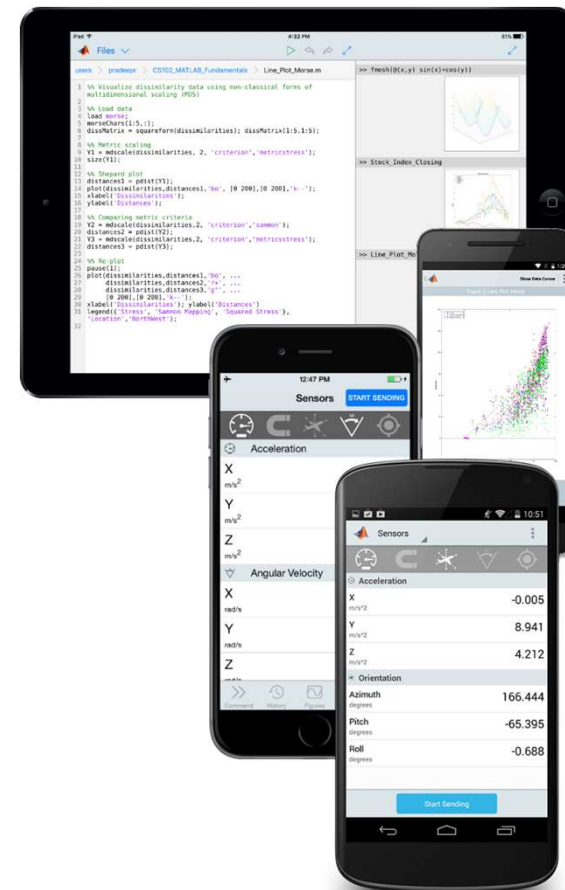
- Command-line access to MATLAB and add-on products
- Lightweight editor for scripting and prototyping
- Data visualization

- **Gateway to sensor data acquisition**

- View and acquire sensor data in MATLAB Mobile (even when offline)
- Send acquired data to MATLAB (on your computer or cloud) for further analysis and visualization

- **A mobile aid for teaching and learning**

- Professors can create examples and demo them from their mobile devices
- Can follow along in the classroom and instantly connect results to concepts

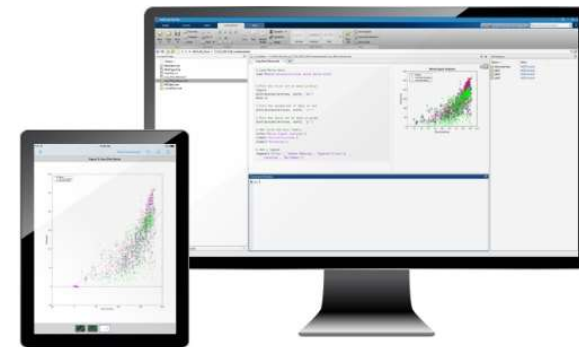


MATLAB Mobile – Connect to the Cloud or to Your Computer



Connecting to the cloud

- Access a MATLAB session on the go
- Upload files and data to MATLAB Drive and run them from the app
- Acquire data from device sensors



Connecting to your computer

- Remote access to scripts, files, and data on the computer
- Platform agnostic (supports Windows, Mac, and Linux)
- Acquire data from device sensors

MATLAB and Simulink Training

Search MathWorks.com



Training Overview Find a Course Get Certified Training At Your Facility More

» My Courses Contact Training

Learn MATLAB for Free

Hands-on practice sessions and demonstrations

Launch MATLAB Onramp

View my courses

Self-Paced, Online
Training for
MATLAB & Simulink

Free to everybody
on the planet



Getting Started

<https://matlabacademy.mathworks.com/>

MATLAB Onramp FREE

Get started quickly with the basics of MATLAB.

Launch Details

Simulink Onramp FREE

Get started quickly with the basics of Simulink.

Details

Deep Learning Onramp FREE

Get started quickly using deep learning methods to perform image recognition.

Launch Details

Machine Learning Onramp FREE

Learn the basics of practical machine learning methods for classification problems.

Launch Details

Stateflow Onramp FREE

Learn the basics of creating, editing, and simulating state machines in Stateflow.

Details

Self-Paced Online Courses

Get Started



MATLAB Onramp



Deep Learning Onramp



Simulink Onramp



Machine Learning Onramp

Learn the basics of practical machine learning methods for classification problems.

Launch

Details



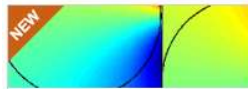
Stateflow Onramp

Learn the basics of creating, editing, and simulating state machines in Stateflow.

Details

Computational Mathematics

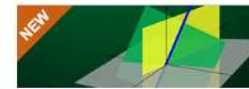
*Available only to users at universities that offer campus-wide online training access.



Solving Nonlinear Equations with MATLAB



Solving Ordinary Differential Equations with MATLAB



Introduction to Linear Algebra with MATLAB



Introduction to Statistical Methods with MATLAB



Introduction to Symbolic Math with MATLAB

5 courses targeting MATLAB skills needed in the classroom

Core MATLAB Functionality



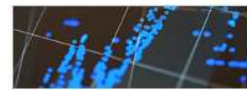
MATLAB Fundamentals



MATLAB Programming Techniques



MATLAB for Financial Applications



MATLAB for Data Processing and Visualization



Machine Learning with MATLAB



Deep Learning with MATLAB

Data Analytics

6 in-depth courses for enhancing MATLAB skills

Campus-Wide Online Training

Hands-on MATLAB and Simulink experience

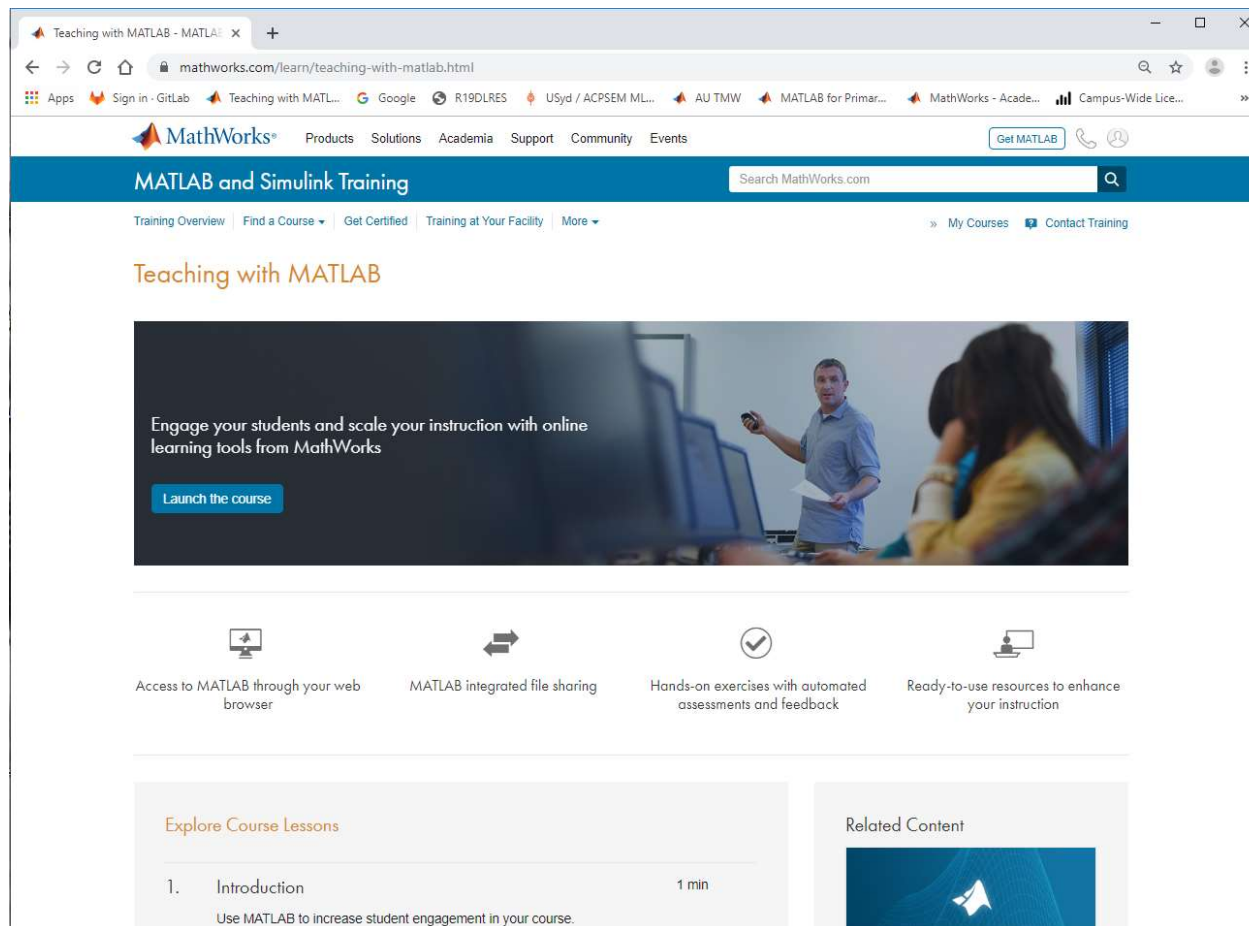
Measurable progress report and completion certificate

Interactive lessons with immediate feedback

24/7 availability

And one for Teachers:

<https://www.mathworks.com/learn/teaching-with-matlab.html>



Teaching with MATLAB - MATLAB

mathworks.com/learn/teaching-with-matlab.html

MathWorks® Products Solutions Academia Support Community Events

MATLAB and Simulink Training

Search MathWorks.com

Training Overview Find a Course Get Certified Training at Your Facility More

My Courses Contact Training

Teaching with MATLAB

Engage your students and scale your instruction with online learning tools from MathWorks

Launch the course

Access to MATLAB through your web browser

MATLAB integrated file sharing

Hands-on exercises with automated assessments and feedback

Ready-to-use resources to enhance your instruction

Explore Course Lessons

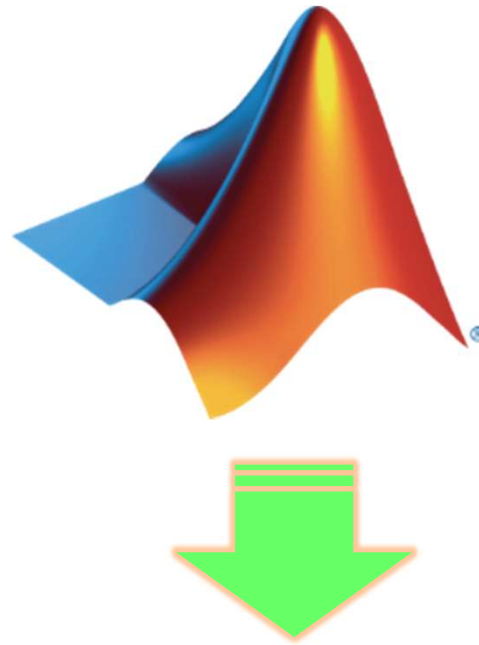
1. Introduction 1 min
Use MATLAB to increase student engagement in your course.

Related Content

Explore Course Lessons

1. Introduction 1 min
Use MATLAB to increase student engagement in your course.
2. Creating Interactive Scripts 20 mins
Engage your students with live scripts.
3. Moving to the Cloud 15 mins
Access and run MATLAB files from anywhere with MATLAB Online.
4. Sharing Content 15 mins
Use MATLAB Drive to share files with course collaborators and students.
5. Helping Students Learn MATLAB 10 mins
Incorporate MathWorks learning resources into your instruction.
6. Assessing Students 30 mins
Create and automatically grade MATLAB coding assignments with MATLAB Grader.
7. Conclusion 1 min

DEMO



MATLAB Academic Online Training Suite



Products Solutions Academia Support Community Events

Get MATLAB



MATLAB and Simulink Training

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Training Overview Find a Course Get Certified Training At Your Facility More

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Learn MATLAB for Free

Hands-on practice sessions and demonstrations

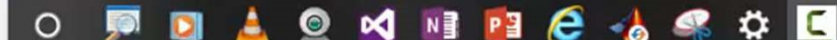
Launch MATLAB Onramp

View my courses

Getting Started



Type here to search



ENG 2:49 PM 3/09/2019

MATLAB Courseware

<https://www.mathworks.com/academia/courseware.html>

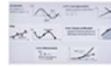
Downloadable sets of curriculum materials for educators based on MATLAB and Simulink.

- Video lectures
- Classroom materials
- Textbook references
- Homework assignments
- MATLAB and Simulink code examples

Topics Include:

- Introduction to Programming
- Introduction to Engineering
- Bioengineering and Biological Sciences
- Chemistry
- Earth, Ocean and Atmospheric Sciences
- Economics and Finance
- Electrical and Computer Engineering
- Mechanical and Aerospace Engineering
- Mathematics

Mathematics



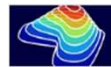
Applied Numerical Methods with MATLAB

Professor Steven C. Chapra
Tufts University



Differential Equations and Linear Algebra

Professor Gilbert Strang
Massachusetts Institute of Technology
Cleve Moler
MathWorks



Numerical Computing with MATLAB

Cleve Moler
MathWorks



Teaching Calculus with MATLAB

Integrating MATLAB into a Calculus Curriculum

Electrical and Computer Engineering



Control of Mobile Robots

Professor Magnus Egerstedt
J.P. de la Croix
Georgia Institute of Technology



Control Tutorials for MATLAB and Simulink

Professor Bill Messner
Professor Dawn Tilbury
Professor Rick Hill



Introduction to Model-Based System Design

Professor Marc Herner
Professor Zachariah Chambers
Rose-Hulman Institute of Technology



Advanced Model-Based System Design

Professor Zachariah Chambers
Professor Marc Herner
Rose-Hulman Institute of Technology

Introduction to Programming



Introduction to MATLAB Programming

Professor Kathleen Ossman
Professor Gregory Bucks
University of Cincinnati

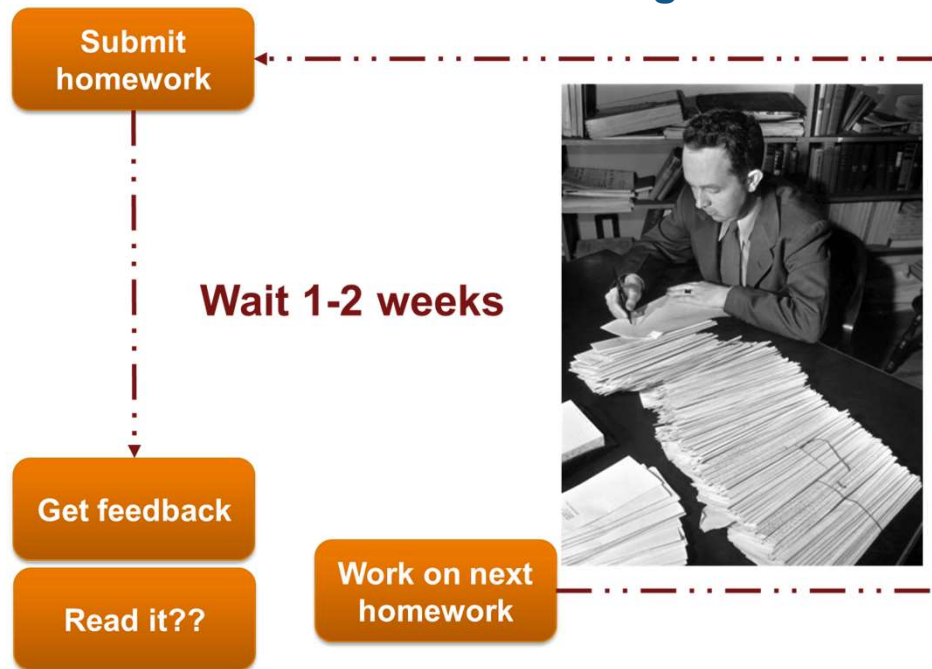


Introduction to MATLAB

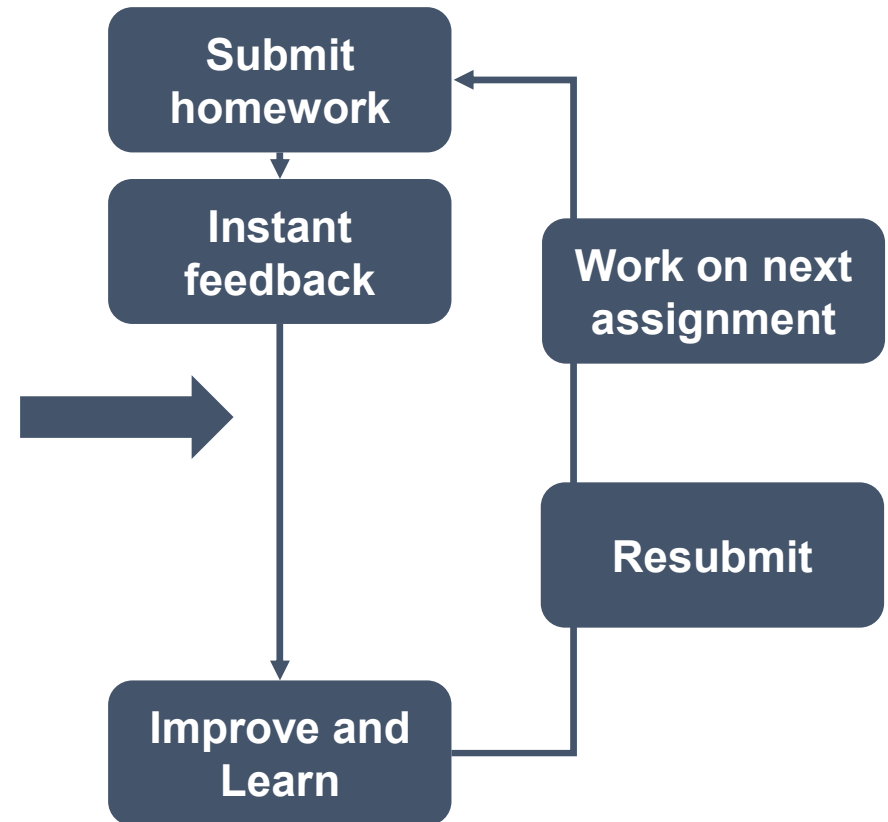
Professor William J. Palm, III
University of Rhode Island

What is MATLAB Grader?

Traditional Grading



Autograding



Transitioning from traditional assignments

Home
Tools
Assignment_v2.pdf
Sign In

1 / 3
44.6%

INTRODUCTION TO PROGRAMMING WITH MATLAB

Assignment 1: Convergent Series

Background

In mathematics, a series is the sum of the terms of an infinite sequence of numbers. A series is convergent if the sequence of its partial sums tends to a limit; that means that the partial sums become closer and closer to a given number when the number of their terms increases.

For more details, please refer to the [Wikipedia entry on Convergent Series](#).

Problem 1b: Estimating the value of Pi using Leibniz Series - Due 9/1

One of the methods to estimate the value of π is to use the Leibniz series expansion to a reasonably large number of terms and use the expression below to estimate the value of π .

$$\frac{\pi}{4} \approx 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots + \frac{(-1)^{n+1}}{2n-1} = \sum_{k=1}^n \frac{(-1)^{k+1}}{2k-1}$$

LaTeX: `\pi/4 \approx 1 - 1/3 + 1/5 - ... = \sum_{k=1}^n (-1)^{k+1} / (2k-1)`

Using this expression, write a script to estimate the value of π using N terms. Your code should include the following variables:

```

N           % Number of terms used in the series expansion
estPi       % Value of  $\pi$  estimated using 'N' terms in the series.

```

Determine a value of N that ensures that the estimated value of π is within 0.1% of the actual value. Start with 10 terms, and increase or decrease the number appropriately to adjust the estimate.

You can use the Learner Template code provided below to develop your solution.

Learner Template

```

nTerms = ; % Number of terms to be used in the series expansion
% <Enter your code here>

estPi = ; % Estimated value of Pi for 'N' values.

```

Check to ensure that:

- the code does NOT use the variable 'pi' available in MATLAB.
- the output is numerically accurate for the number of series terms used.

Test Suite 1: Is MATLAB's built-in variable 'pi' being invoked in your code?

Feedback: The variable 'pi' available in MATLAB is being used in your code. Please retain only your estimated value of π under the variable name 'estPi'.

Test Suite 2: Is the estimated value of 'pi' acceptably accurate?

Feedback: Your estimated value doesn't fall within 0.1% of the expected value of π .



MATLAB Grader
Jeff Alderson

CONTENTS
Close

Courses & Content
LMS Integration
License Management
Documentation & Support

CSU Demo > Week 1 Homework >

Untitled Problem

Back to Add Problem
Introduction to Programming
Close

Vector Creation (Leibniz series terms)
hide details...
Copy

Consider the Leibniz series:

$$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \dots$$

Write a script to generate a vector of the first twenty terms of this series. Assign the vector of series terms to a row vector variable named **LeibnizTerms**.

Solve this problem using vectorized code (i.e. do not use a loop in your solution.)

Files Referenced

None

Problem Type

Script

Code

Reference Solution Learner Template

```

1 k = 0:19;
2 LeibnizTerms = (-1).^k ./ (2 * k + 1);

```

Assessment

Test 1

Does variable LeibnizTerms have the correct values?

LeibnizTerms = Reference Solution?

MATLAB Grader



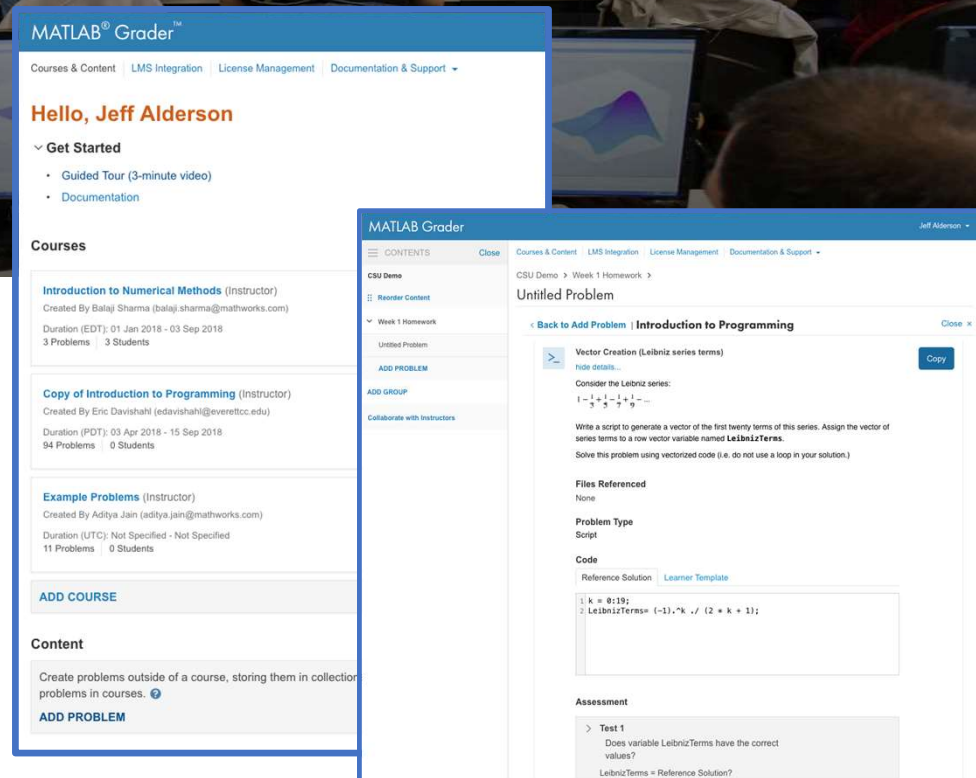
Create interactive course assignments



Automatically grade student work and provide feedback



Run your assignments in any learning environment



MATLAB® Grader™

Courses & Content | LMS Integration | License Management | Documentation & Support

Hello, Jeff Alderson

Get Started

- Guided Tour (3-minute video)
- Documentation

Courses

- Introduction to Numerical Methods (Instructor)**
Created By Bala Sharma (bala.sharma@mathworks.com)
Duration (EDT): 01 Jan 2018 - 03 Sep 2018
3 Problems | 3 Students
- Copy of Introduction to Programming (Instructor)**
Created By Eric Davishahi (edavishahi@everettcc.edu)
Duration (PDT): 03 Apr 2018 - 15 Sep 2018
94 Problems | 0 Students
- Example Problems (Instructor)**
Created By Aditya Jain (aditya.jain@mathworks.com)
Duration (UTC): Not Specified - Not Specified
11 Problems | 0 Students

ADD COURSE

Content

Create problems outside of a course, storing them in collection problems in courses.

ADD PROBLEM

MATLAB Grader

Courses & Content | LMS Integration | License Management | Documentation & Support

CSU Demo > Week 1 Homework >

Untitled Problem

< Back to Add Problem | Introduction to Programming

Vector Creation (Leibniz series terms)

Consider the Leibniz series:

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Files Referenced

None

Problem Type

Script

Code

Reference Solution | Learner Template

```
1 k = 0:19;
2 LeibnizTerms = (-1).^k ./ (2 * k + 1);
```

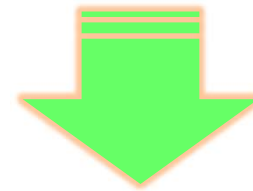
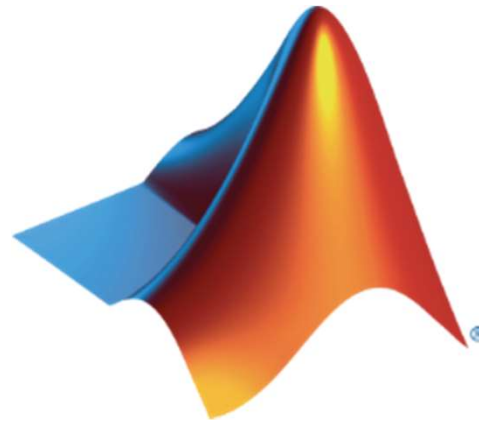
Assessment

> Test 1

Does variable LeibnizTerms have the correct values?

LeibnizTerms = Reference Solution?

DEMO



MATLAB Grader

Boston Temperatures: Getting warmer or not as cold? (DRAFT)

[Delete](#)[Back to Instructor View](#)

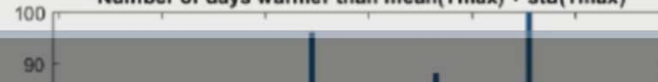
This example demonstrates providing custom functions for students to use, adding data files, and enforcing a particular style of solution by banning the use of `for` and `while` loops. Enforcing a specific style of solution is only recommended when that is a learning objective. This problem assumes students were just taught to use the `findgroups` and `splitapply` functions for data analysis.

In this problem we'll look for trends in the historical [temperature data for the city of Boston](#) in the United States from the year 1900 to 2017. The data is loaded into a table in the first line of code provided. The table contains three variables, **Date**, **Tmax**, and **Tmin**, representing the date, maximum recorded temperature for that day and the minimum recorded temperature for that day (temperature is in Fahrenheit). Below are the first few entries in the table.

Date	Tmax	Tmin
1/1/1900	27	16
1/2/1900	30	13
1/3/1900	21	10
1/4/1900	29	8
1/5/1900	46	23
1/6/1900	42	30
1/7/1900	43	23
1/8/1900	44	13
1/9/1900	29	9

While the overall global temperature is warming, the effect on the weather at specific locations varies greatly. For example, Boston is a coastal city on the northern Atlantic Ocean. The figure below shows the number of "hot" days per year, defined as days where the high temperature exceeded the average high *for that day* by more than one standard deviation. For example, the average high for January 1st is 39 degrees Fahrenheit with a standard deviation of 10. So a hot January 1st is $T > 49$, which occurs 22 times in the data set.

Number of days warmer than $\text{mean}(\text{Tmax}) + \text{std}(\text{Tmax})$



0:03 / 4:04



1x

Paid License Benefits

MATLAB Grader Feature		Free with a MathWorks Account and MATLAB License	Requires a Paid MATLAB Grader License
Autograding	Automated grading and real-time student feedback.	✓	✓
Example Problems	Sample assessments that showcase autograding features.	✓	✓
Gradebook	Student outcome reports and the results of autograding by class.	✓	✓
Invite Students	Ability to invite students to take part in courses authored by faculty.	✓	✓
Invite Instructors	Instructors can collaborate with other instructors.	✓	✓
Content Authoring	Course content and problems are stored in a content repository.	✓	✓
Data Export	Student outcomes can be exported from MATLAB Grader.	✓	✓
Learning Analytics	Ability to visualize student outcomes data.	Limited to common reports, solution maps, and student grades.	✓
Problem Catalog	Robust catalog of problems covering multiple academic disciplines.	Limited to Introduction to Programming collection (111 ready-made problems).	✓
LMS Integration	Standards-based, IMS-certified integration with learning management systems.	Not available.	✓

Learning Analytics

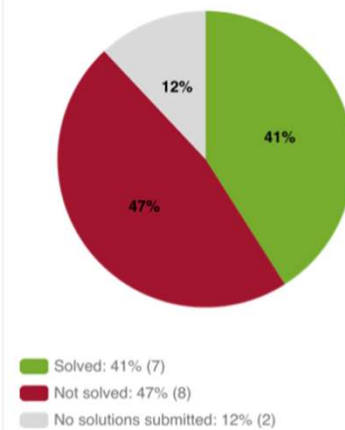
DAS

[Back to Problem](#)

Learner Status | [Learner Solutions](#)

Status Summary

17 Learners have accessed the problem.

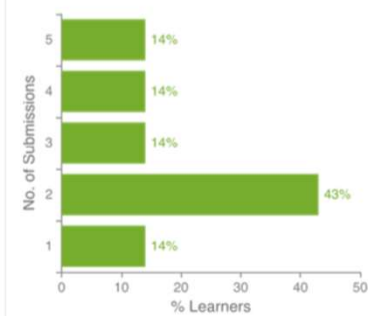


Solved:

7 Learners have solved the problem.

Submissions Required to Solve the Problem

Mean: 3



Average Submissions Required to Pass Each Test

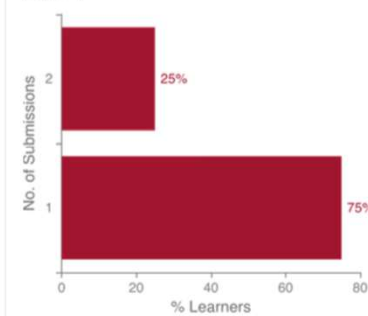


Not Solved:

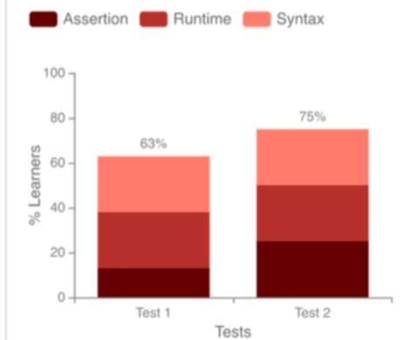
8 Learners have submitted solutions but haven't yet solved the problem.

Submissions Made Attempting to Solve the Problem

Mean: 1



% Learners Still Failing Each Test



Learning Analytics

Learner Status

Learner Solutions

Search for Solution ID

Q

All Learners

Selected Learner

Submitted (UTC) ▼

Solution ID

Attempt #

Test R

> 03/22/2019 08:43 PM 8cdfb7d6... 4 of 4 ✓

> 03/22/2019 08:43 PM f3796c49... 3 of 4 ✗

> 03/22/2019 08:41 PM 490f02f3... 2 of 4 ✗

> 03/21/2019 10:28 PM e2818e5c... 1 of 4 ✓

Learner Status

Learner Solutions

Search for Solution ID

All Learners

Showing: Each learner's best solution ?

Submitted (UTC) ▼	Solution ID	Attempt #	Test Result
> 10/30/2018 02:39 PM	c87d70f4...	1 of 1	✖ ✖
▼ 10/30/2018 01:20 PM	c2f01a5f...	1 of 1	✖ ✖

[View All Solutions By Learner](#)

[Copy Solution ID](#)

Learner's Solution:

```
1 %Enter the commands for your script mfile here. Be sure to assign
2
3 XandY = 'abcdefg';
4 XplusY = 'abcdefg';
```

Summary of Online Tools

Anytime, anywhere access with a Campus-wide license

- MATLAB Online : Run MATLAB in a web browser
- MATLAB Drive: Work with your MATLAB files from anywhere
- MATLAB Mobile: Use MATLAB on a tablet/phone



Online MATLAB Curriculum resources

- Self Paced Online Training: Interactive lessons at your own pace
- MATLAB Courseware: Reuse downloadable curriculum across a range of disciplines
- MATLAB Grader: Create auto-graded course assignments with instant student feedback

Educators

[Teach with MATLAB and Simulink](#) [Curriculum Resources](#) [Campus-Wide License](#)

Teach with MATLAB and Simulink

Provide hands-on learning experiences using industry-standard tools to analyze data, create models, and simulate systems.

See how MATLAB and Simulink are used in applications and industry.



Get Started with Free Online Tutorials

You and your students can quickly learn the basics of MATLAB and Simulink.



Autograde Code with MATLAB Grader

Build and share interactive course assignments with your students in any learning environment.




An open exchange for the MATLAB and Simulink user community



CODY

Cody - Draw Letters



FILE EXCHANGE

Pick of the week - 3/20/20



FILE EXCHANGE

Pick of the week - 3/6/20



FILE EXCHANGE

Pick of the week - 2/14/20

Explore the Community

Newest
Trending
Activities
All Community

Unable to start/run matlab 2011b?

AT ABTJ in MATLAB Answers on 09 April 2020

I have installed matlab 2011b and also activated it and get message on screen that activation is complete but matlab doesn't open. When again i click matlab icon,i am forced to go through same...

Tags: matlab, activation, installation

0
1
1

0
answer

LSTM for Event Detection on Time Series / Sequences (Gait Analysis)

BU Barry in MATLAB Answers on 09 April 2020

Hello! In 3-dimensional Gait Analysis, Human Gait Event Detection is a crucial part. The Gold Standard for this is the ground reaction force (GRF) plate. But often there are only 2-3 GRF plates...

Tags: lstm, gait analysis, event detection

0
1
0

0
answer

coonecting line closer to next xy coordinates based on distance

SG SatyaPrakash Gupta in MATLAB Answers on 09 April 2020

I have attached my XY coordinates and you can see RED and BLUE marked in the picture attached. I would like to coonect this lines in the similar way, how it appears in picture attached. Is there any...

0
answer



Keep Teaching through Distance Learning

Posted by Loren Shure, March 23, 2020

As many universities are moving quickly to distance learning, it is vital for educators to think carefully about how to adapt their approach to still deliver key learning outcomes for students in an online setting.

[» Read more...](#)

Discussions

[Start a discussion](#)

Webinar- Friday, April 3- Distance Learning with Cloud-based Tools from MathWorks

Latest activity by jiro about 18 hours ago

Tags: distance_learning

3

replies



Introduction to MATLAB zyBook Spring Semester Access

Latest activity by Hans Scharler on 7 Apr 2020 at 17:58

Tags: distance_learning, zybooks, matlab grader

1

reply



Do you use MATLAB Online for teaching?

Latest Activity by jiro on 3 Apr 2020 at 12:43

Tags: matlab online, distance_learning

0

replies

[» View all discussions](#)

Answers

[Ask a question](#)

Reusing content from a MATLAB Grader course in a LMS Course

Latest activity by Cris LaPierre on 8 Apr 2020 at 18:44

Tags: matlab, grader, distance_learning, matlab grader

1

answer

Accepted Answer



How do I use MATLAB Grader in proctored labs, examinations, or in secure, locked down browsers?

Latest activity by MathWorks Support Team on 8 Apr 2020 at 18:28

Tags: matlab, grader, distance_learning

1

answer

Accepted Answer



Welcome to the
Distance Learning
Community

Moderator:

[Jiro Doke](#)

This is a world-wide community for educators who are teaching remotely or online using MathWorks tools. It houses resources, such as articles, code examples, and videos, as well as an area where community members can ask questions or hold discussions around best practices in distance learning.

[Follow the community](#)[Share](#)[Tweet](#)[Share](#)

Additional Resources

- MATLAB Online
- MATLAB Drive
- MATLAB Mobile
- Online Training
- MATLAB Grader
- Live Editor
- Live Script Gallery
- MATLAB in the Cloud
- MATLAB Apps
- ThingSpeak
- Practical Data Science with MATLAB (MOOC)
- Teaching with MATLAB



Loren on the Art of MATLAB

Turn ideas into MATLAB

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Keep Teaching through Distance Learning

Posted by [Loren Shure](#), March 23, 2020

< Analyzing Novel Corona Virus COVID-19... The Meaning of CCC >

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As many universities are moving quickly to distance learning, it is vital for educators to think carefully about how to adapt their approach to still deliver key learning outcomes for students in an online setting. Today's guest blogger, [Ramnarayan Krishnamurthy](#), is at the forefront supporting universities as they transition to distance learning. In his role as a Customer Success Engineer, he partners with educators to support them in achieving their goals for teaching and learning.

In this post, Ram presents some of the questions that educators have been asking us and discusses resources and approaches to support them.

Contents

- [How do I keep my students engaged and introduce projects in an online setting?](#)
- [How do I provide individualized student feedback in a scalable way?](#)
- [How do I ensure that my students can remotely access course material?](#)
- [How do I ensure that my students, co-instructors, and I have access to MATLAB?](#)
- [What other resources does MathWorks provide to support online teaching?](#)
- [Summary](#)

How do I keep my students engaged and introduce projects in an online setting?

Interactive exercises and projects allow students to apply and retain learned concepts and keeps them engaged. You can make use of various tools to introduce *interactivity* into your course material such as executable notebooks, user-interfaces, and hands-on learning.

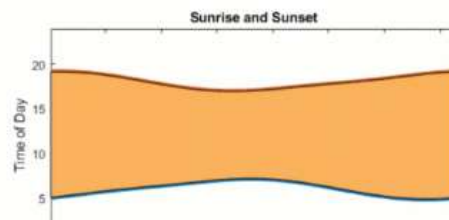
An executable notebook, created using [Live Editor](#), combines code, output, visualizations, images and formatted text. It allows you to create a *narrative* around that code to help guide students. You can set up interactive controls to allow your students to experiment with parameters and see the results *immediately* in the same document. To get started, you can find examples in the [Live script gallery](#).

Estimating Sunrise and Sunset

Estimate sunrise and sunset times for a given longitude and latitude. Using the latitude (ϕ), the sun's declination (δ) and the solar time correction (SC) we can calculate sunrise and sunset times.

$$\text{sunrise} = 12 - \frac{\cos^{-1}(-\tan \phi \tan \delta)}{15^\circ} - \frac{SC}{60} \quad \text{sunset} = 12 + \frac{\cos^{-1}(-\tan \phi \tan \delta)}{15^\circ} - \frac{SC}{60}$$

longitude:
latitude:



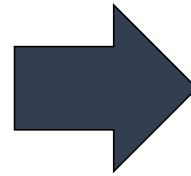
TechSource Solution: Tools & Support

Training Options & Recommendations

- **Free self-paced, introductory tutorials:**
 - [MATLAB Onramp](#) hands-on tutorial
 - [Deep Learning Onramp](#) hands-on tutorial
 - [Simulink Onramp](#) hands-on tutorial
 - [Stateflow Onramp](#) hands-on tutorial
- **Onsite, hands-on Workshops**
- **Formal Training classes: public, online/onsite**
 - **Public Class**
 - **Online Training**
 - **Custom Onsite Training**

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- Reduced costs
- Faster results
- Improved quality
- Higher efficiency

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