MANE 3351

LECTURE 2

Classroom Management

Agenda

- Questions
- Review 1st day
- Introduction to Python
- Discuss lab today

Much of the lecture 2 material is a demonstration. Later in the course, we will learn these techniques.

RESOURCES

Handouts

- Lecture 2 Slides
- Lecture 2 Marked Slides

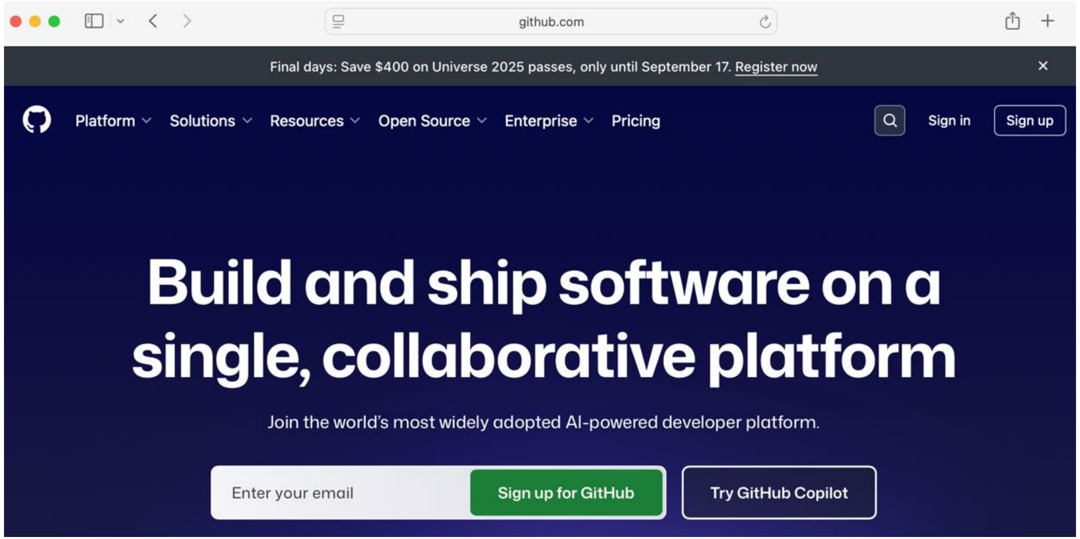
Assignments

Create free GitHub account

Student accounts are free

[GitHub Account Creation Checklist]

[GitHub Student Verification Information]



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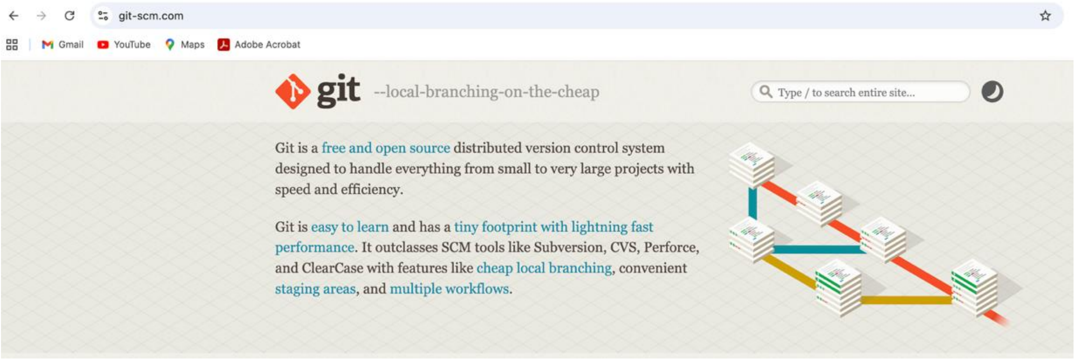
GitHub Home Page

Source

Git


git-scm.com
Gmail
YouTube
Maps
Adobe Acrobat
git
--local-branching-on-the-cheap
Type / to search entire site...

Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

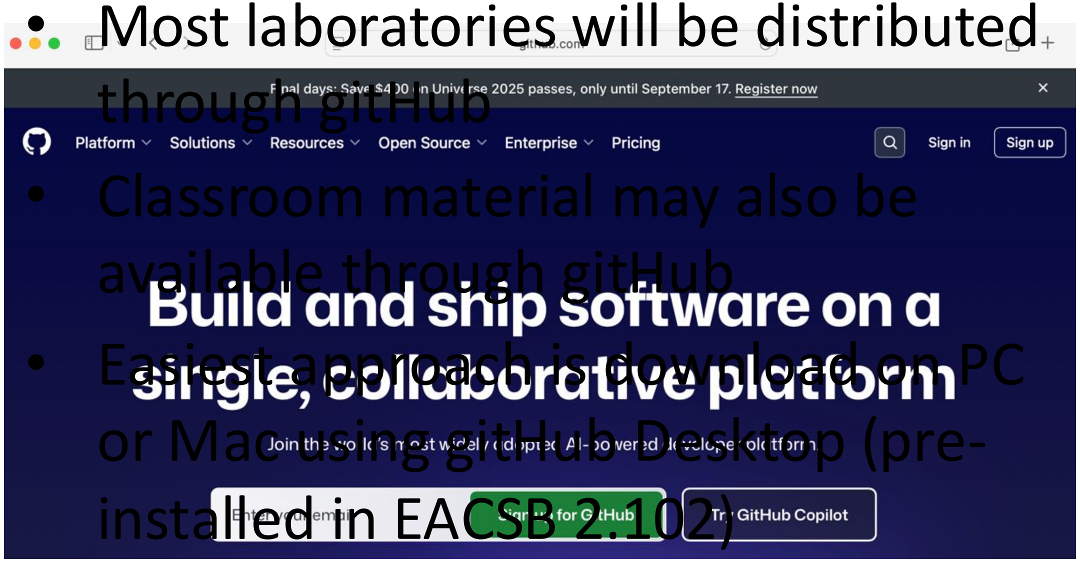
Git is easy to learn and has a tiny footprint with lightning fast performance. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like cheap local branching, convenient staging areas, and multiple workflows.

git

GitHub

- [Source]()
- Most laboratories will be distributed through gitHub
- Classroom material may also be available through gitHub
- Easiest approach is download on PC or Mac using gitHub Desktop (pre-installed in EACSB 2.102)

asiest approach is download on



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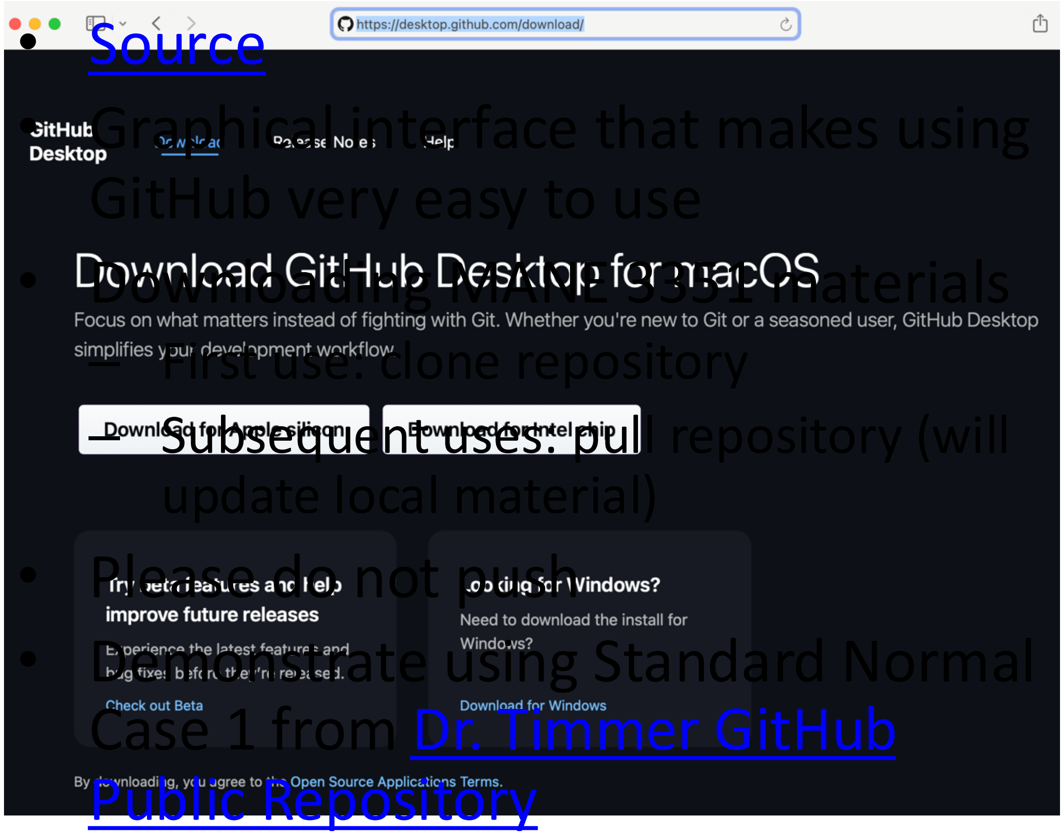
gitHub

GitHub Desktop

- Source
- Graphical interface that makes using GitHub very easy to use
- Downloading MANE 3351 materials
  - First use: clone repository
  - Subsequent uses: pull repository (will update local material)
- Please do not push
- Demonstrate using Standard Normal Case 1 from Dr. Timmer GitHub Public Repository



Download GitHub Desktop for macOS

Focus on what matters instead of fighting with Git. Whether you're new to Git or a seasoned user, GitHub Desktop simplifies your development workflow.

Try beta features and help improve future releases

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Looking for Windows?

Need to download the install for Windows?

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gitHub Desktop

Python with Jupyter Notebook

- Standard Normal Case 1

```
import matplotlib.pyplot as plt
import numpy as np
import scipy.stats as sct
import math

a=0.5

x=np.linspace(-4,4,500)
y=sct.norm.pdf(x,0,1)
y2=0.0*x
maske =(x<a)

plt.plot(x,y,'b')
plt.fill_between(x,y,color='#666666',where=maske)
plt.plot(x,y2,'b')
plt.show()

answer=sct.norm.cdf(a,0,1)
print ("%8.6f" % (answer))
```

Methods for Acquiring Python Code

1. Clone repository to local machine using GitHub Desktop
2. Copy code from MANE 3351 Fall 2025 Public Repository
3. Copy code from lecture notes

Comments about Python Installation

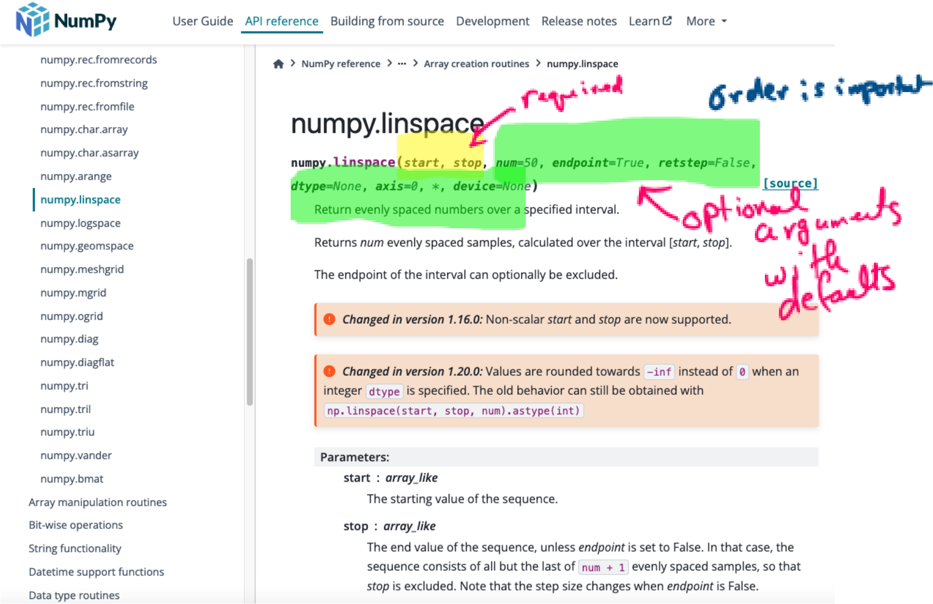
- We will utilize Anaconda python that is pre-installed on lab computers
  - Discuss installing on personal computers
- Dr. Timmer will utilize a conda environment so that configure for MANE 3351 is stored separately and doesn't possible corrupt other environments
- Most of the time, Dr. Timmer will work from the command line on a Mac
- Quick demonstration on both Mac and Windows

First 4 Lines

- Imports allow external packages to be used
- Most standard packages are included in the Anaconda installation
  - **Matplotlib** “is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Matplotlib can be used in Python scripts, the Python and IPython shells, the Jupyter notebook, web application servers, and four graphical user interface toolkits”
  - **NumPy** “is the fundamental package for scientific computering with Python. It contains amont other things: 1). a powerfull N-dimensional array object, 2). sophisticated (broadcasting) functions, 3. tools for integrating C/C++ and Fortran code, and 4). usefull linear algebra, Fourier transform, and random number capabilities.”
  - **SciPy** “is a Python-based ecosystem of open-source software for mathematics, science, and engineering. In particular, these are some of the core packages: NumPy, SciPy library, Matplotlib, IPython, Sympy, and pandas.”
  - **Math** “provides access to the mathematical functions defined by the C standard.”

Numpy Linspace

- [Source]
- Experiment with endpoint



numpy.linspace

```
numpy.linspace(start, stop, num=50, endpoint=True, retstep=False,
dtype=None, axis=0, *, device=None)
```

[source]

Return evenly spaced numbers over a specified interval.

Returns *num* evenly spaced samples, calculated over the interval [*start*, *stop*].

The endpoint of the interval can optionally be excluded.

! *Changed in version 1.16.0:* Non-scalar *start* and *stop* are now supported.

! *Changed in version 1.20.0:* Values are rounded towards `-inf` instead of `0` when an integer `dtype` is specified. The old behavior can still be obtained with `np.linspace(start, stop, num).astype(int)`.

Parameters:

start : *array_like*
The starting value of the sequence.

stop : *array_like*
The end value of the sequence, unless *endpoint* is set to False. In that case, the sequence consists of all but the last of `num + 1` evenly spaced samples, so that *stop* is excluded. Note that the step size changes when *endpoint* is False.

required

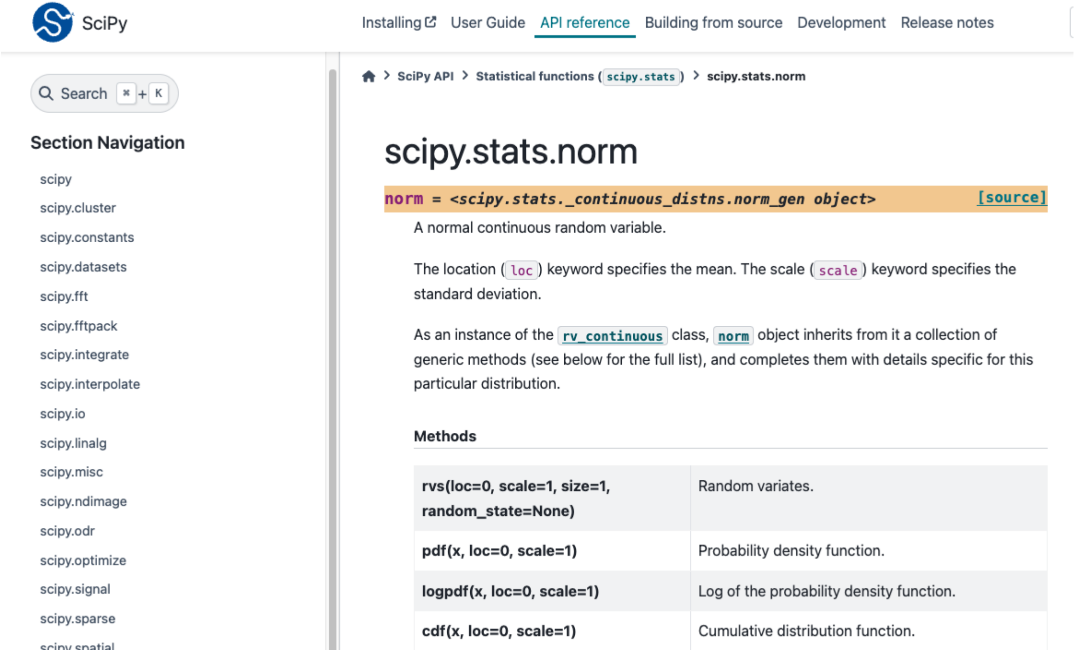
Order is important

optional arguments with the defaults

Numpy Linspace

Source

scipy.stats.norm



scipy.stats.norm

`norm = <scipy.stats._continuous_distns.norm_gen object>` [source]

A normal continuous random variable.

The location (`loc`) keyword specifies the mean. The scale (`scale`) keyword specifies the standard deviation.

As an instance of the `rv_continuous` class, `norm` object inherits from it a collection of generic methods (see below for the full list), and completes them with details specific for this particular distribution.

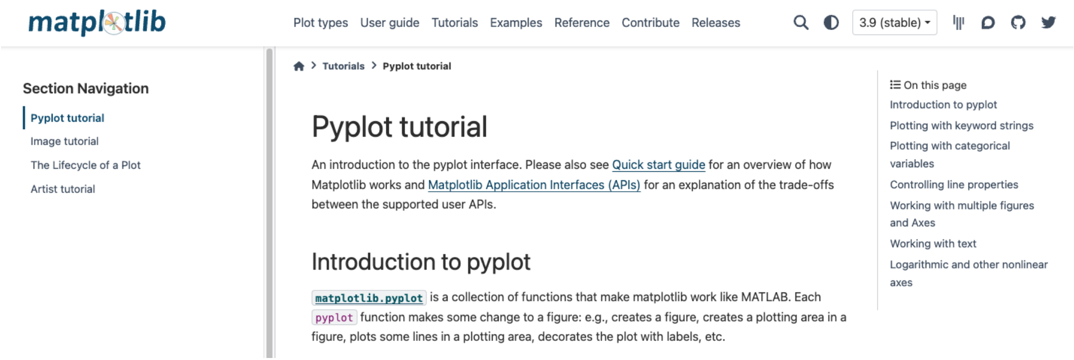
Methods

rvs(loc=0, scale=1, size=1, random_state=None)	Random variates.
pdf(x, loc=0, scale=1)	Probability density function.
logpdf(x, loc=0, scale=1)	Log of the probability density function.
cdf(x, loc=0, scale=1)	Cumulative distribution function.

scipy stats norm

Source

Matplotlib



Pyplot tutorial

An introduction to the pyplot interface. Please also see Quick start guide for an overview of how Matplotlib works and Matplotlib Application Interfaces (APIs) for an explanation of the trade-offs between the supported user APIs.

Introduction to pyplot

`matplotlib.pyplot` is a collection of functions that make matplotlib work like MATLAB. Each `pyplot` function makes some change to a figure: e.g., creates a figure, creates a plotting area in a figure, plots some lines in a plotting area, decorates the plot with labels, etc.

matplotlib