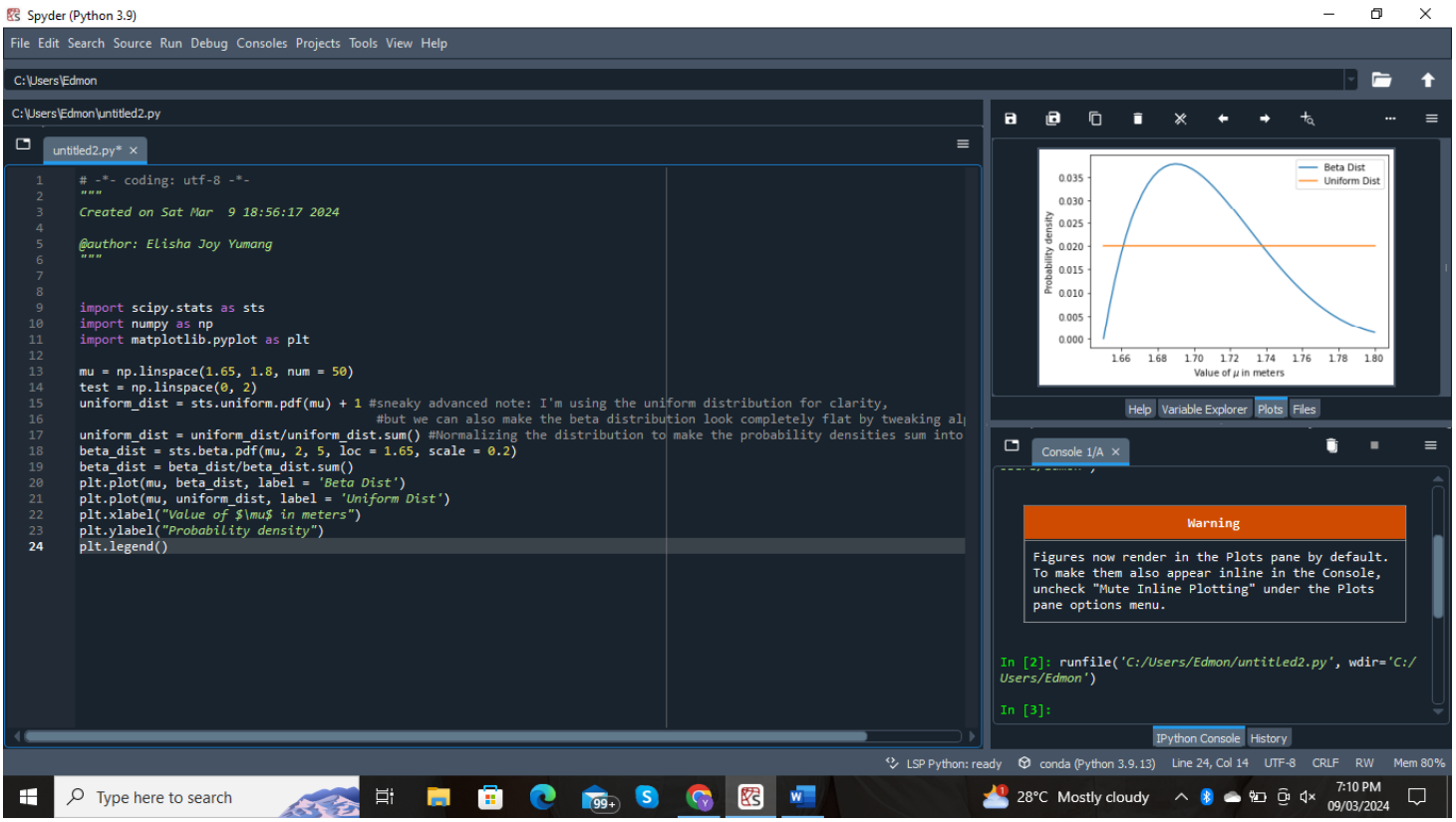
Elisha Joy R. Yumang

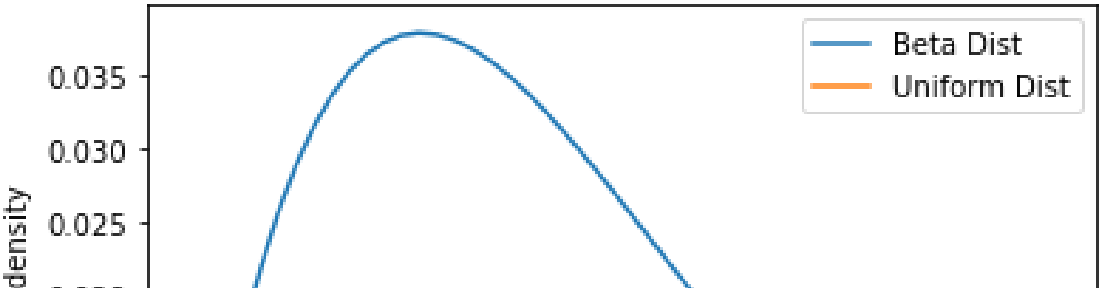
CAS-05-601P

ACTIVITY 5

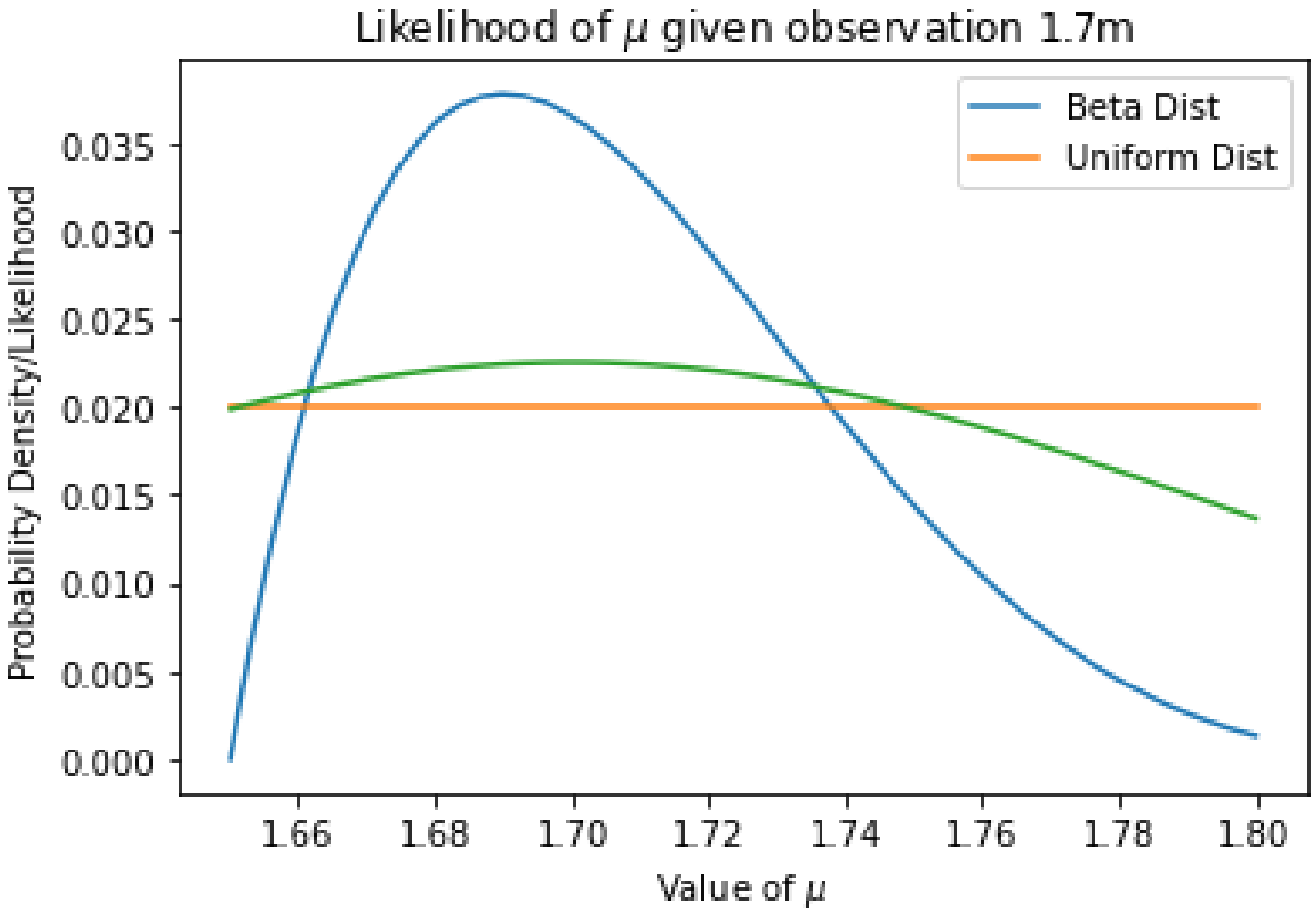
import scipy.stats as sts import numpy as np import matplotlib.pyplot as plt mu = np.linspace(1.65, 1.8, num = 50) test = np.linspace(0, 2) uniform_dist = sts.uniform.pdf(mu) + 1 #sneaky advanced note: I'm using the uniform distribution for clarity, #but we can also make the beta distribution look completely flat by tweaking alpha and beta! uniform_dist = uniform_dist/uniform_dist.sum() #Normalizing the distribution to make the probability densities sum into 1 beta_dist = sts.beta.pdf(mu, 2, 5, loc = 1.65, scale = 0.2) beta_dist = beta_dist/beta_dist.sum() plt.plot(mu, beta_dist, label = 'Beta Dist') plt.plot(mu, uniform_dist, label = 'Uniform Dist') plt.xlabel("Value of μ in meters") plt.ylabel("Probability density") plt.legend() def likelihood_func(datum, mu): likelihood_out = sts.norm.pdf(datum, mu, scale = 0.1) return likelihood_out/likelihood_out.sum() likelihood_out = likelihood_func(1.7, mu) plt.plot(mu, likelihood_out) plt.title("Likelihood of μ given observation 1.7m") plt.ylabel("Probability Density/Likelihood") plt.xlabel("Value of μ") plt.show()

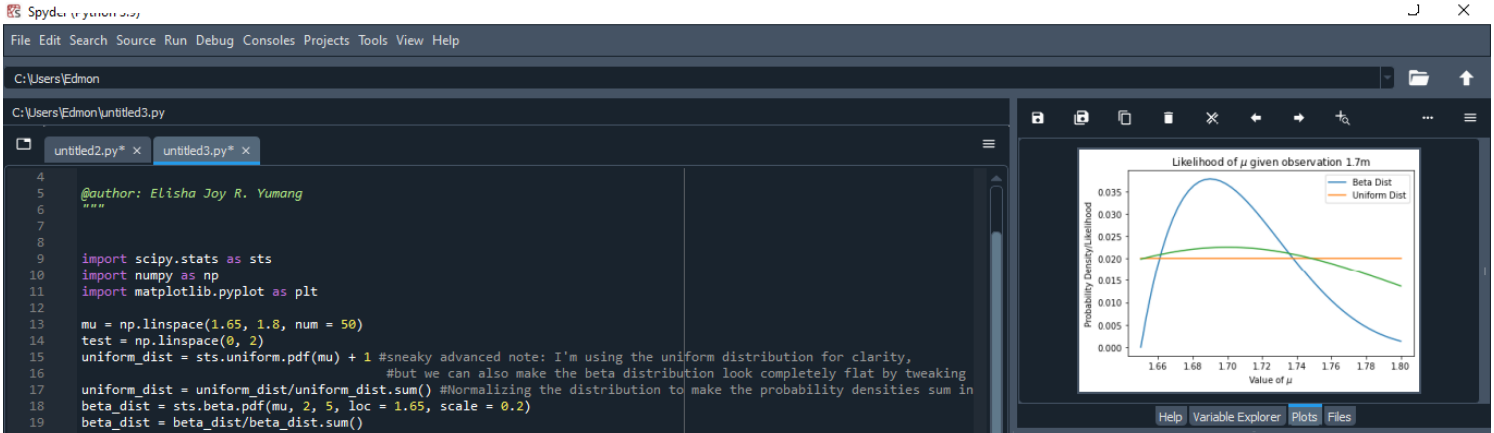
1ST CODE



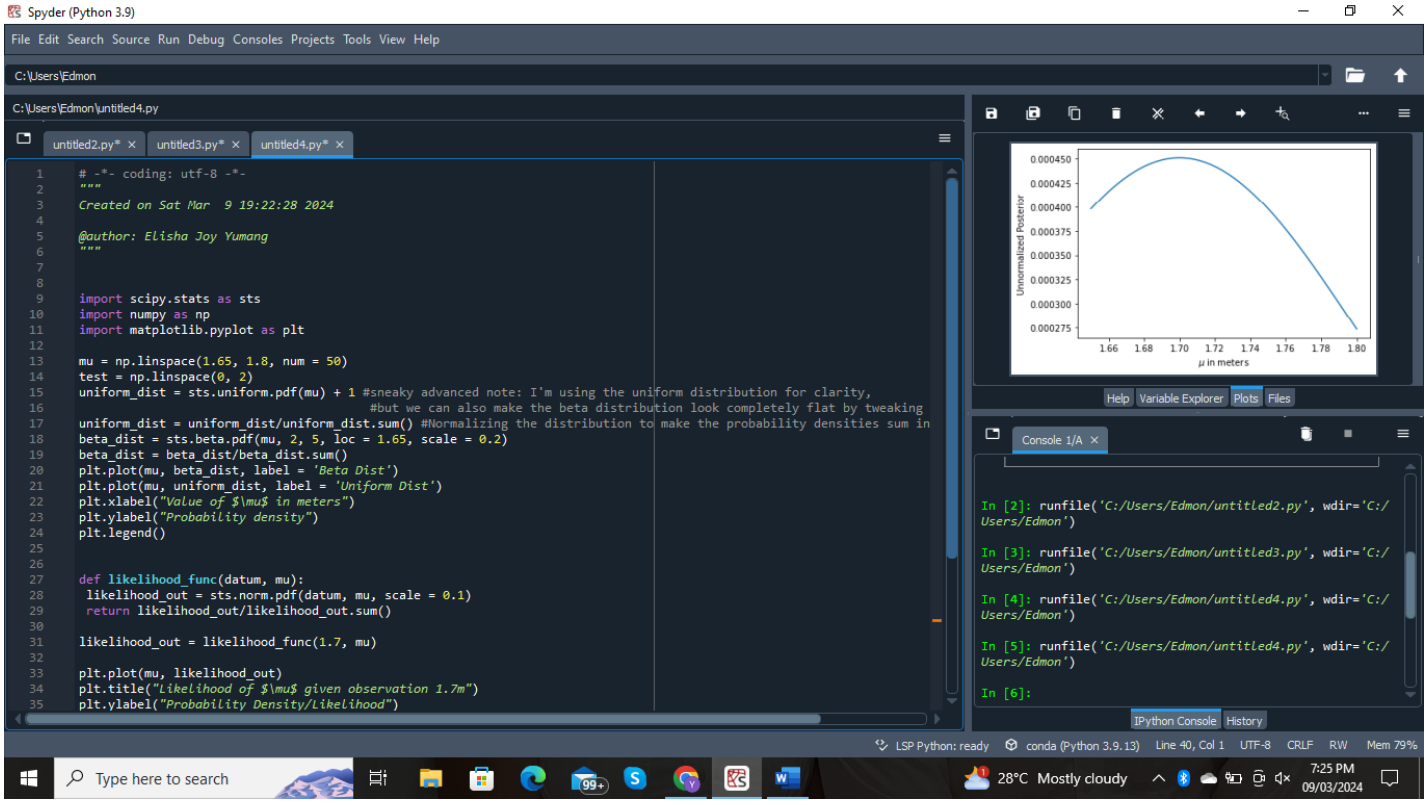


2ND CODE


Likelihood of μ given observation 1.7m
Beta Dist
Uniform Dist
Probability Density/Likelihood
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
1.66
1.68
1.70
1.72
1.74
1.76
1.78
1.80
Value of μ


File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\Edmon
C:\Users\Edmon\untitled3.py
untitled2.py*
untitled3.py*
@author: Elisha Joy R. Yumang
"""
import scipy.stats as sts
import numpy as np
import matplotlib.pyplot as plt
mu = np.linspace(1.65, 1.8, num = 50)
test = np.linspace(0, 2)
uniform_dist = sts.uniform.pdf(mu) + 1 #sneaky advanced note: I'm using the uniform distribution for clarity,
#but we can also make the beta distribution look completely flat by tweaking
uniform_dist = uniform_dist/uniform_dist.sum() #Normalizing the distribution to make the probability densities sum in
beta_dist = sts.beta.pdf(mu, 2, 5, loc = 1.65, scale = 0.2)
beta_dist = beta_dist/beta_dist.sum()
Likelihood of μ given observation 1.7m
Beta Dist
Uniform Dist
Probability Density/Likelihood
Value of μ
Help
Variable Explorer
Plots
Files

3rd CODE


Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\Edmon
C:\Users\Edmon\untitled4.py
untitled2.py* untitled3.py* untitled4.py*
-*- coding: utf-8 -*-
"""
Created on Sat Mar 9 19:22:28 2024
@author: Elisha Joy Yumang
"""
import scipy.stats as sts
import numpy as np
import matplotlib.pyplot as plt
mu = np.linspace(1.65, 1.8, num = 50)
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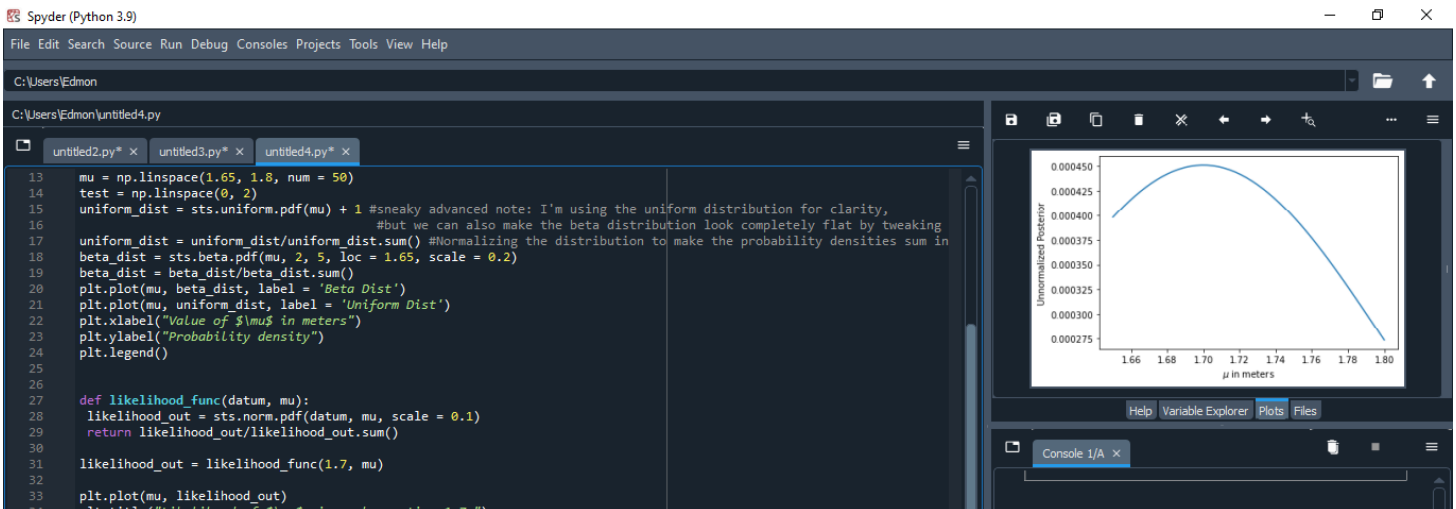
beta_dist = sts.beta.pdf(mu, 2, 5, loc = 1.65, scale = 0.2)
beta_dist = beta_dist/beta_dist.sum()
plt.plot(mu, beta_dist, label = 'Beta Dist')
plt.plot(mu, uniform_dist, label = 'Uniform Dist')
plt.xlabel("Value of μ in meters")
plt.ylabel("Probability density")
plt.legend()
def likelihood_func(datum, mu):
likelihood_out = sts.norm.pdf(datum, mu, scale = 0.1)
return likelihood_out/likelihood_out.sum()
likelihood_out = likelihood_func(1.7, mu)
plt.plot(mu, likelihood_out)
plt.title("Likelihood of μ given observation 1.7m")
plt.ylabel("Probability Density/Likelihood")
Unnormalized Posterior
μ in meters
Help Variable Explorer Plots Files
Console 1/A
In [2]: runfile('C:/Users/Edmon/untitled2.py', wdir='C:/Users/Edmon')
In [3]: runfile('C:/Users/Edmon/untitled3.py', wdir='C:/Users/Edmon')
In [4]: runfile('C:/Users/Edmon/untitled4.py', wdir='C:/Users/Edmon')
In [5]: runfile('C:/Users/Edmon/untitled4.py', wdir='C:/Users/Edmon')
In [6]:
IPython Console History
LSP Python: ready
conda (Python 3.9.13)
Line 40, Col 1
UTF-8
CRLF
RW
Mem 79%
Type here to search
28°C Mostly cloudy
7:25 PM
09/03/2024


Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\Edmon
C:\Users\Edmon\untitled4.py
untitled2.py* untitled3.py* untitled4.py*
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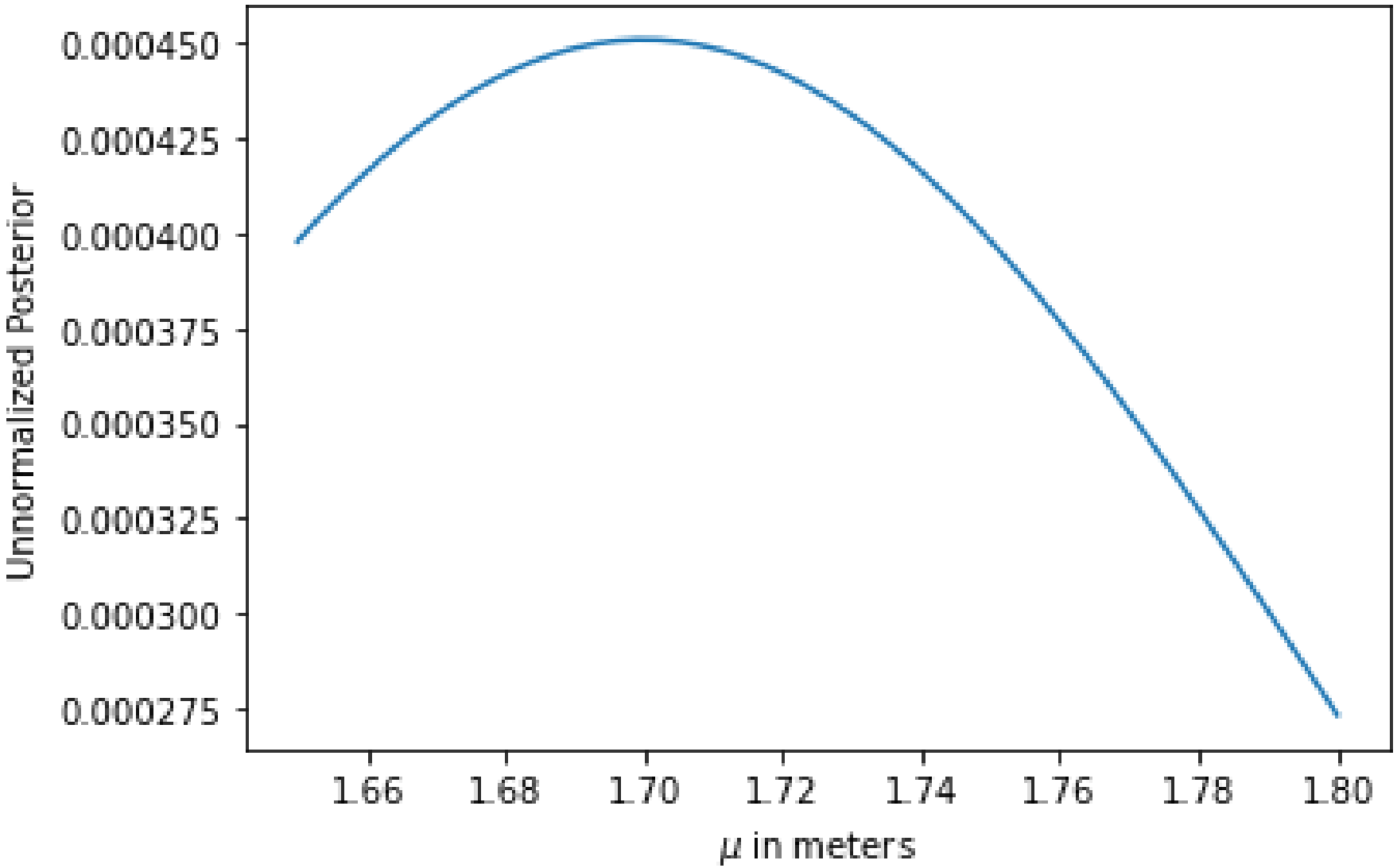
likelihood_out = likelihood_func(1.7, mu)
plt.plot(mu, likelihood_out)
Unnormalized Posterior
μ in meters
Help Variable Explorer Plots Files
Console 1/A


0.000450
0.000425
0.000400
0.000375
0.000350
0.000325
0.000300
0.000275
Unnormalized Posterior
1.66
1.68
1.70
1.72
1.74
1.76
1.78
1.80
μ in meters