

Walther Lewis T. Zipagan III

CAS-05-601P

""""

Created on Thu Mar 09 18:20:02 2024

@author: WLTZipaganIII

""""

```
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  $\mu$  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  $\mu$  given observation 1.7m")
```

```
plt.ylabel("Probability Density/Likelihood")
```

```
plt.xlabel("Value of  $\mu$ ")
```

```
plt.show()
```

```
import scipy as sp
```

```
unnormalized_posterior = likelihood_out * uniform_dist
```

```
plt.plot(mu, unnormalized_posterior)
```

```
plt.xlabel(" $\mu$  in meters")
```

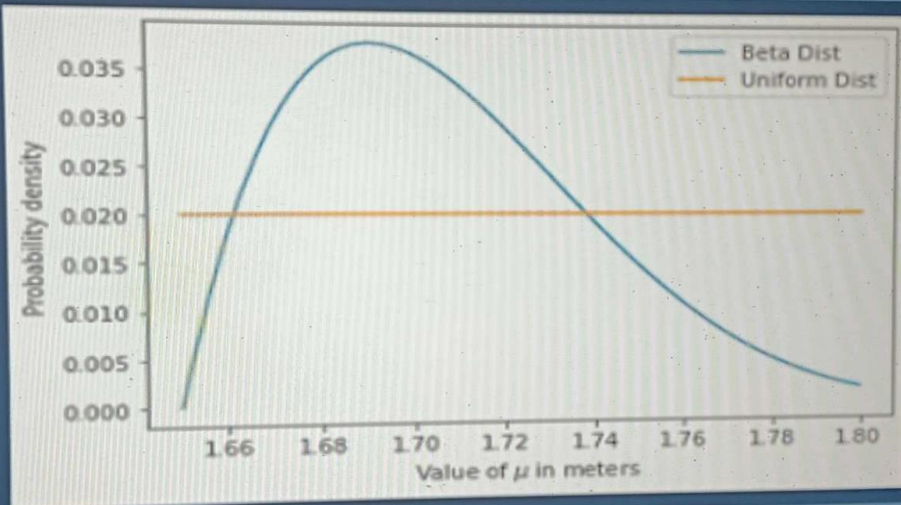
```
plt.ylabel("Unnormalized Posterior")
```

```
plt.show()
```

```

1  # -*- coding: utf-8 -*-
2  """
3  Created on Sat Mar 9 18:20:02 2024
4
5  @author: Wltzipagan
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7  import scipy.stats as sts
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19  plt.plot(mu, uniform_dist, label = 'Uniform Dist')
20  plt.xlabel("Value of  $\mu$  in meters")
21  plt.ylabel("Probability density")
22  plt.legend()
23
24

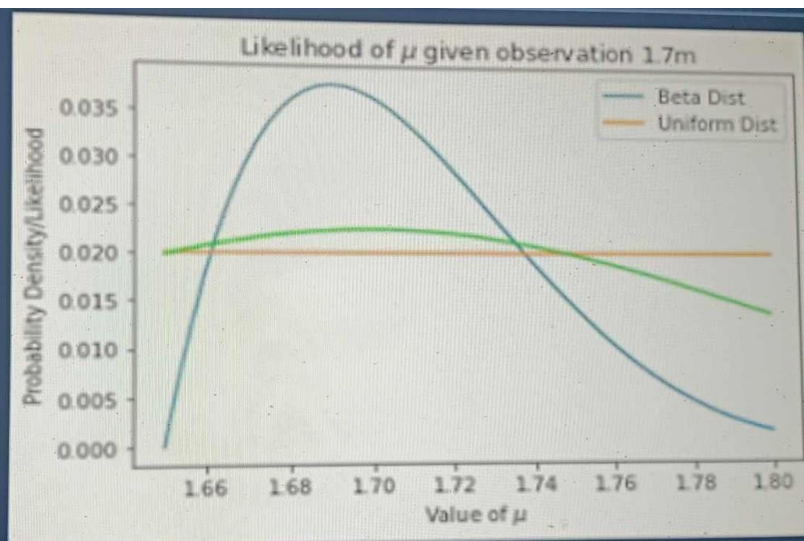
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29  likelihood_out = likelihood_func(1.7, mu)
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31  plt.plot(mu, likelihood_out)
32  plt.title("Likelihood of  $\mu$  given observation 1.7m")
33  plt.ylabel("Probability Density/Likelihood")
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```

import scipy as sp

unnormalized_posterior = likelihood_out * uniform_dist
plt.plot(mu, unnormalized_posterior)
plt.xlabel(" $\mu$  in meters")
plt.ylabel("Unnormalized Posterior")
plt.show()

```

