Assignment 3

BY

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2017A7PS0433H

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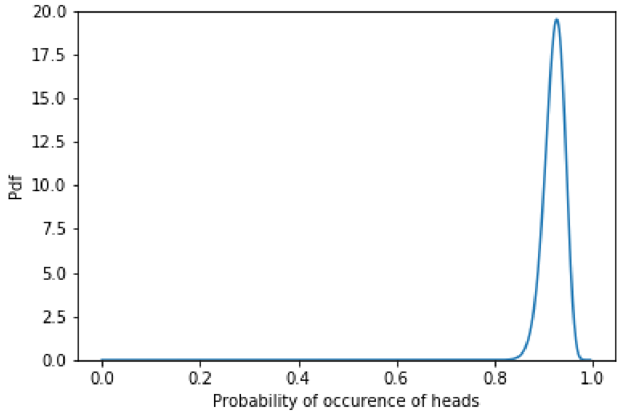
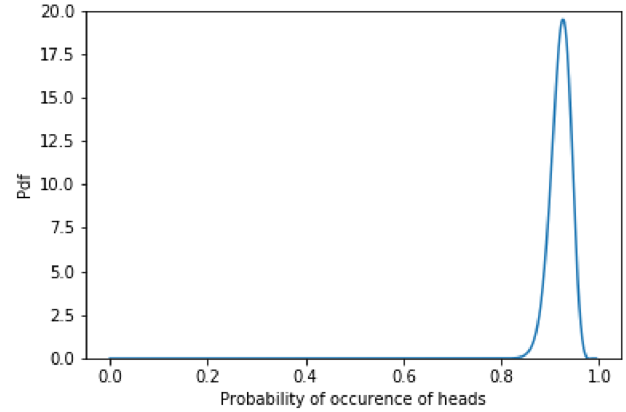
2017A7PS0297H

Comment on the differences/similarities between the two models obtained.



Part A



Part B

We observe that the two models obtained from Part A (Bob's method) and Part B (Lisa's method) are exactly identical.

Given:

Prior distribution for μ is Beta $(\mu|a,b)$

n -> Number of entries in dataset = 160

x -> Number of heads in the dataset = 150

The posterior distribution for μ is a Beta distribution with a and b parameters as a+x and b+n-x . Posterior distribution for μ is Beta $(\mu|a+x,b+n-1)$.

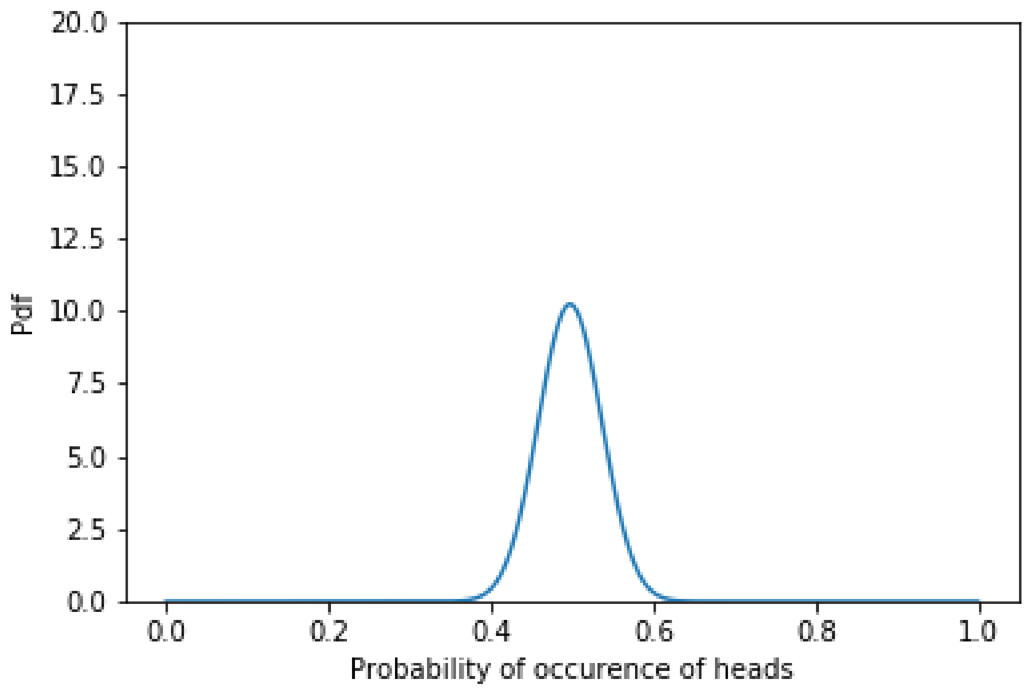
The size of the dataset has been restricted to 160 data points. What happens if more points are added?

When more data points are added, the peak in the posterior distribution gets more sharper at µML of the dataset. The variance in the posterior distribution gets continually reduced with increasing dataset and the mean tending to the µML of the dataset.

What would the posterior distribution look like if µML = 0.5?

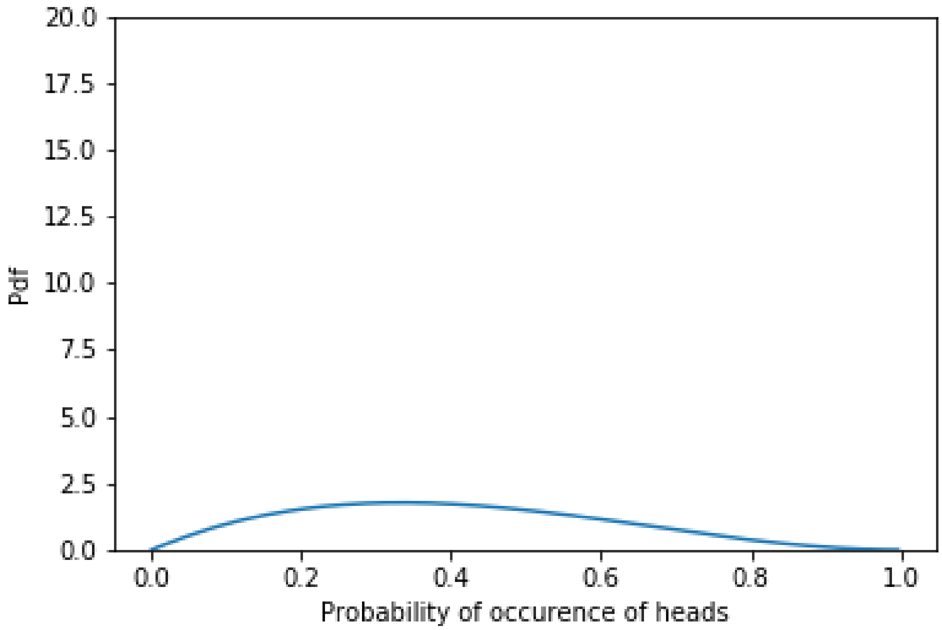
In such a case the posterior distribution comes out as Beta (µ| a + k, b + k) where

k = n/2. The graph is roughly a symmetric distribution with mean very close to 0.5



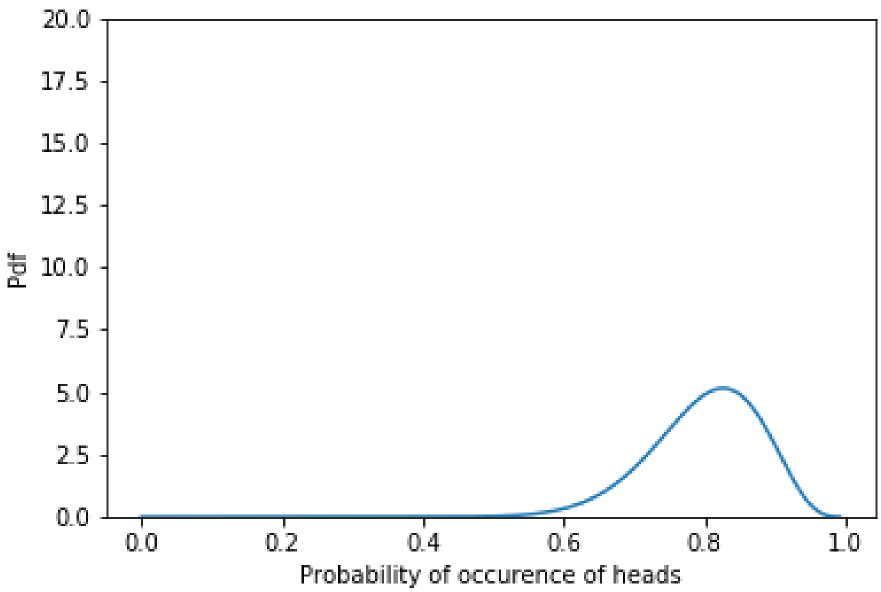
Part A

N = 0



20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
Pdf
0.0
0.2
0.4
0.6
0.8
1.0
Probability of occurence of heads

N = 20



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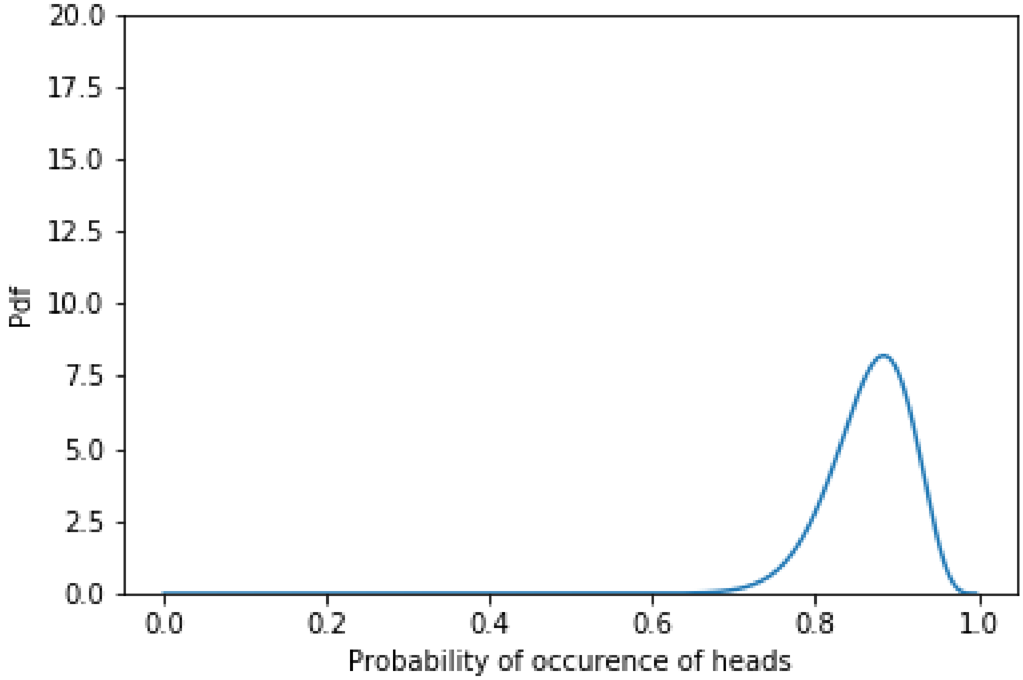
Probability of occurence of heads

N = 40



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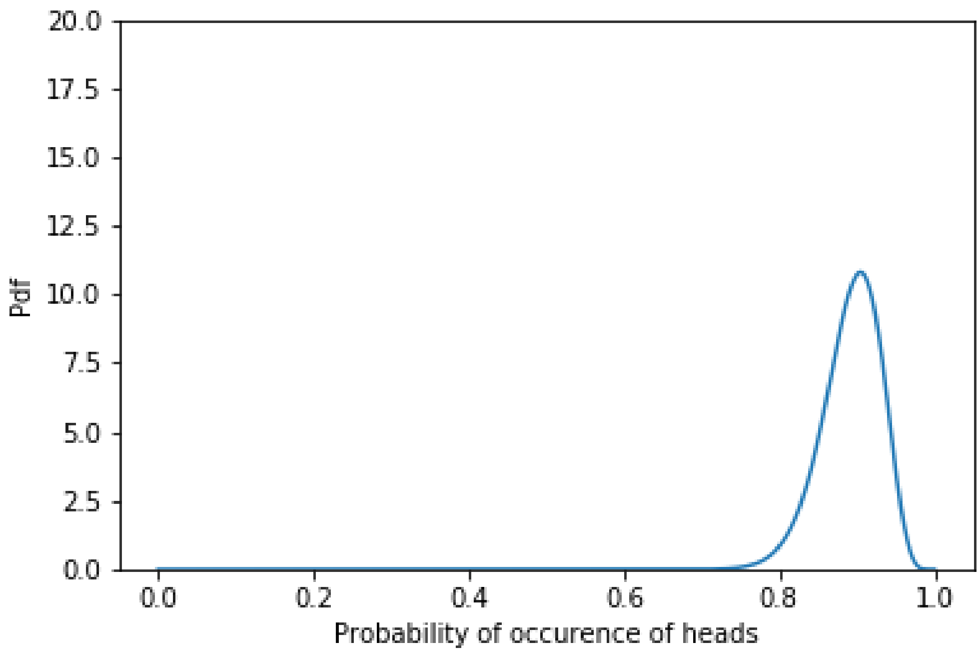
Probability of occurence of heads

N = 60



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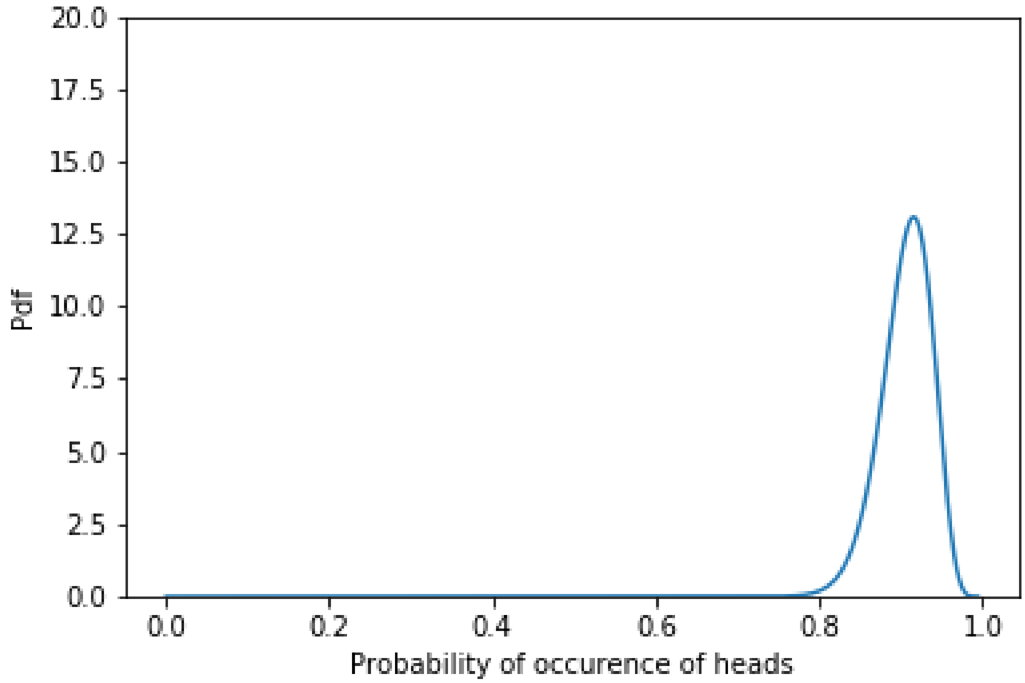
Probability of occurence of heads

N = 80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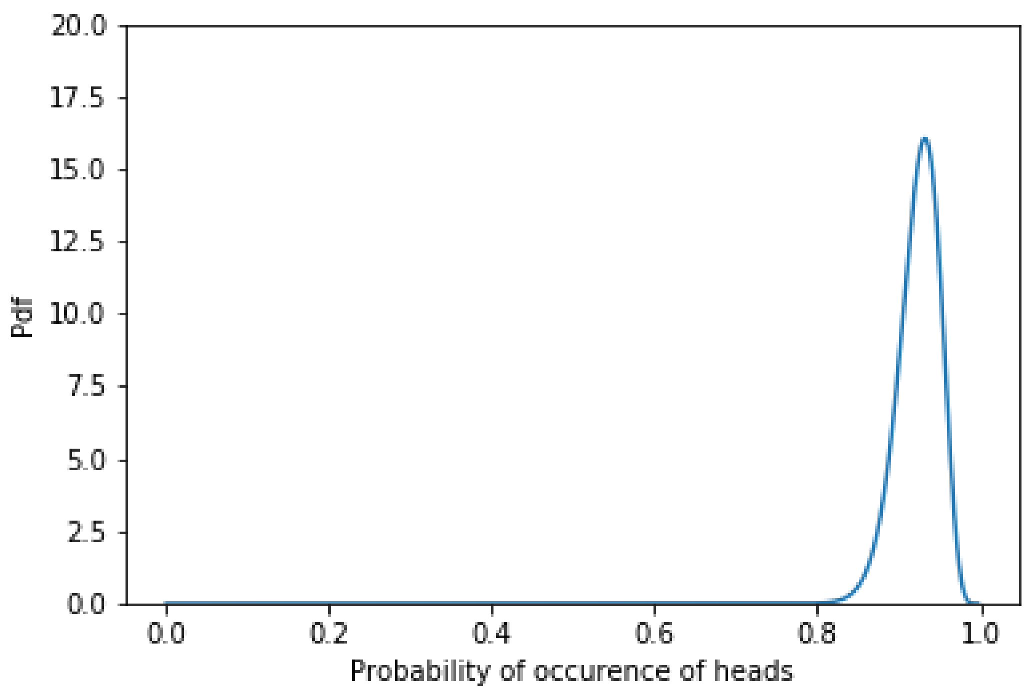
1.0
Probability of occurence of heads

N = 100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Pdf
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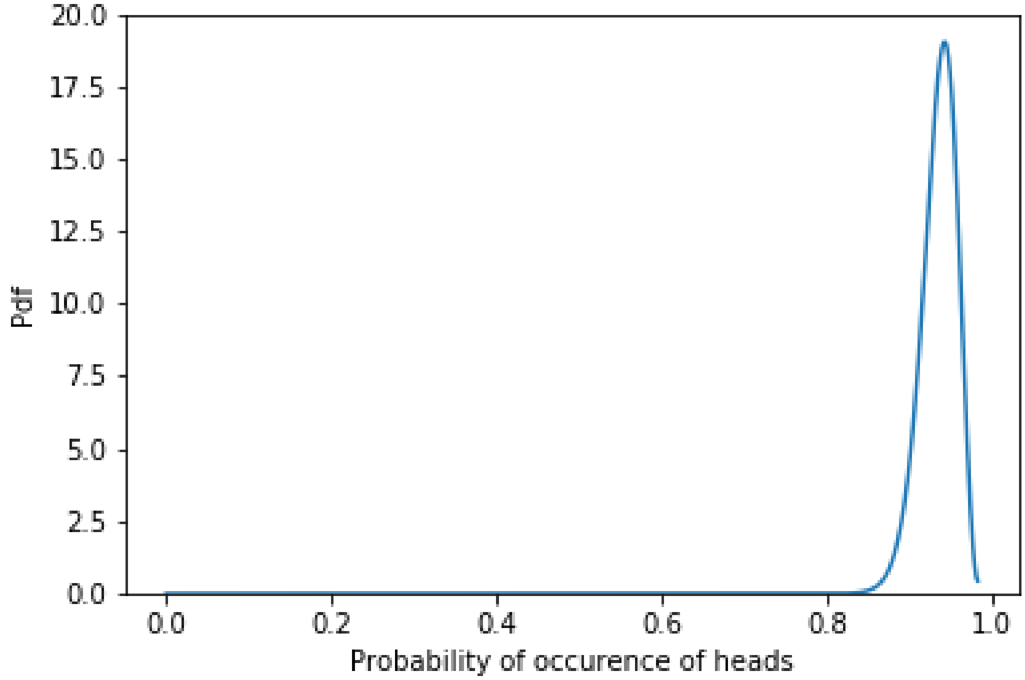
1.0
Probability of occurence of heads

N = 120



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Pdf
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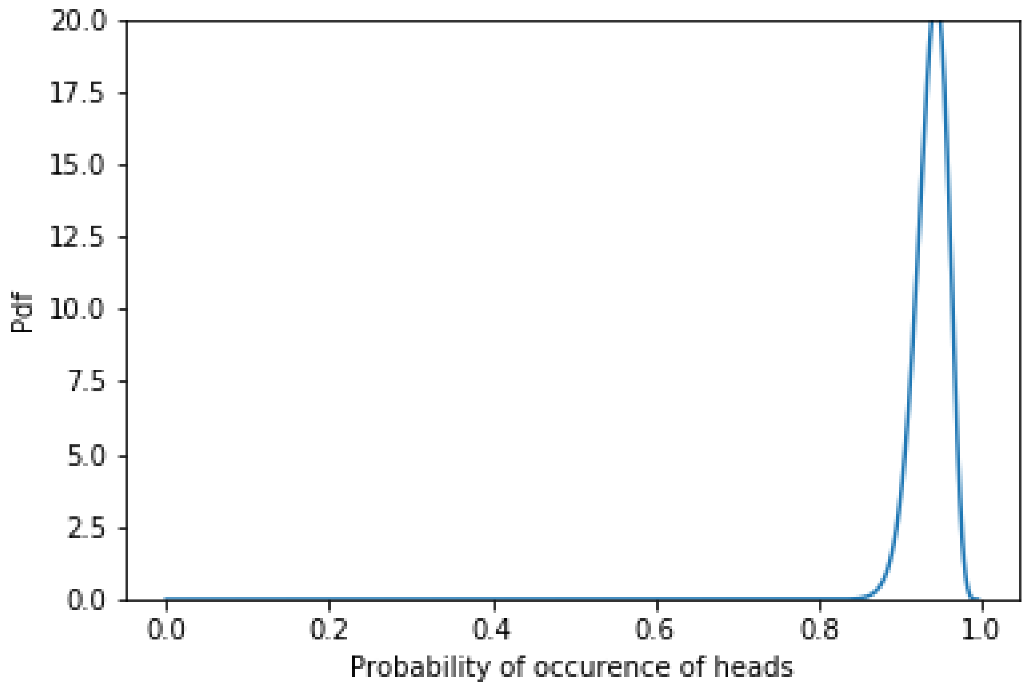
1.0
Probability of occurence of heads

N = 140



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Pdf
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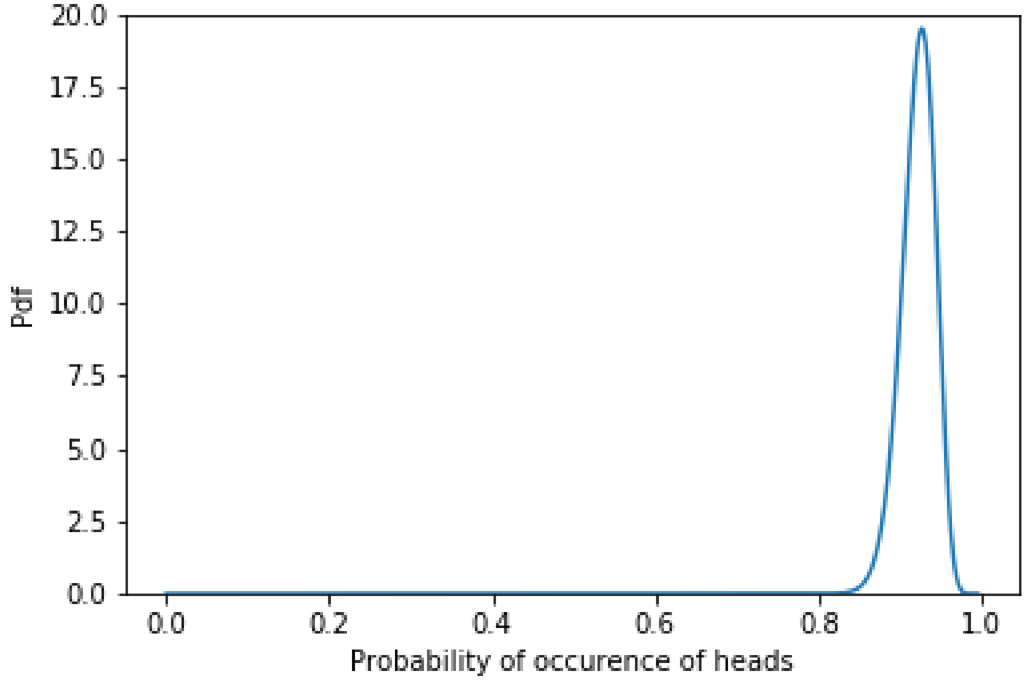
1.0
Probability of occurence of heads

N = 160



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Pdf
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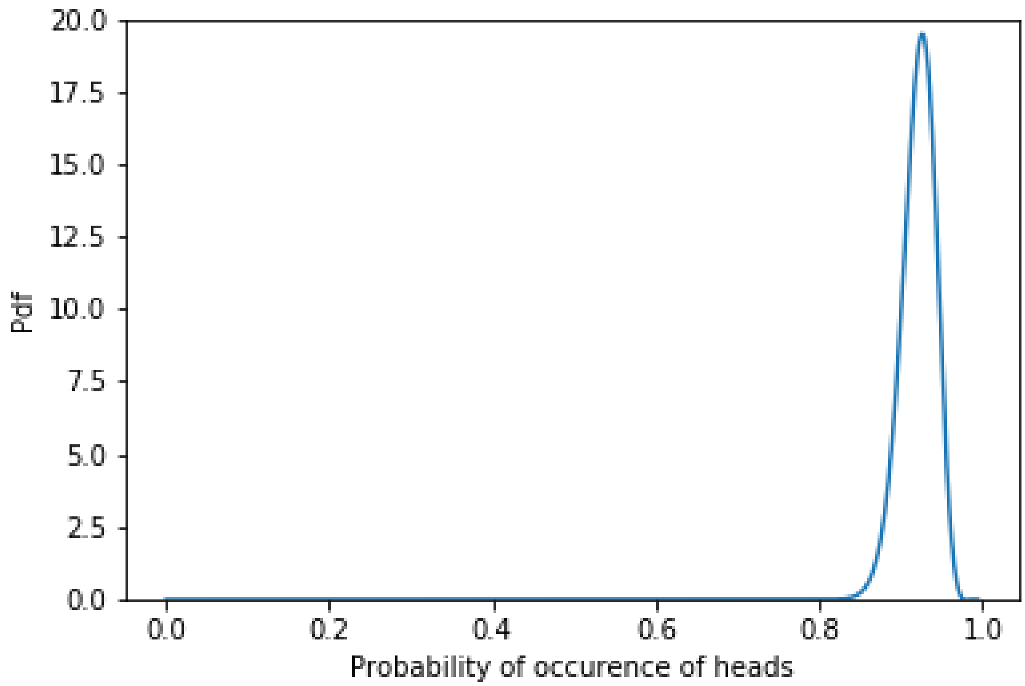
Probability of occurence of heads

PART B



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Pdf
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0.8
1.0
Probability of occurence of heads