

Probability and Random Processes

ECS 315

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1 Probability and You



Office Hours:
Rangsit Library:
 Tuesday 16:20-17:20
BKD3601-7:
 Thursday 14:40-16:00

Life is random

In 2005, this statement (which is true)

Life is random

showed up all over the world...

iPod shuffle
Life is random.

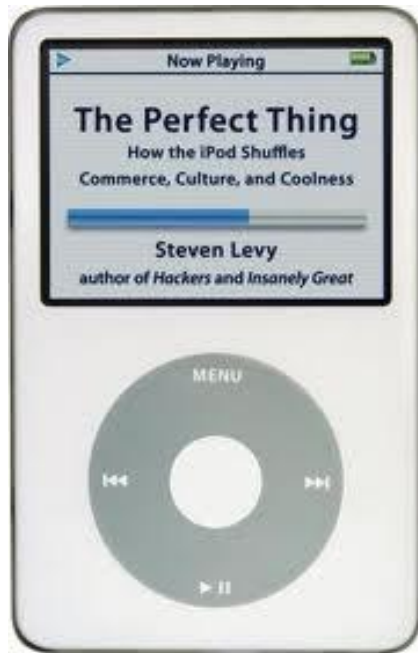


Applications of Probability Theory

- The subject of probability can be traced back to the **17th century** when it arose out of the study of **gambling games**.
- The range of applications extends beyond games into business decisions, insurance, law, **medical tests**, and the social sciences.
- The **stock market**, “the largest casino in the world,” cannot do without it.
- The **telephone network**, call centers, and airline companies with their randomly fluctuating loads could not have been economically designed without probability theory.



“The Perfect Thing”



What is this?



“The Perfect Thing”



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The Perfect Thing: How the iPod Shuffles Commerce, Culture, and Coolness

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Perfect?!...



What about the shuffle function?

Electronics >
About.com iPhone / iPod
Part of The New York Times Company

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Is iTunes' Shuffle Mode Truly Random?

By Sam Costello, About.com Guide

<http://ipod.about.com/od/advanceditunesuse/a/itunes-random.htm>



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iTunes: Just how random is random?

By David Braue | March 8, 2007 | 127

<http://www.cnet.com.au/itunes-just-how-random-is-random-339274094.htm>

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iPod Shuffle Problems: How Random is the iPod Shuffle?

So just how random is the shuffle capability on an iPod Shuffle? Even before the device debuted in 2005, people have wondered about the shuffle function on iPods. Many complain that what they hear from

<http://electronics.howstuffworks.com/ipod-shuffle2.htm>



USA Currency Coins

- Penny = 1 cent
(Abraham Lincoln)



- Dime = 10 cents
(Franklin D. Roosevelt)



- Nickel = 5 cents
(Thomas Jefferson)



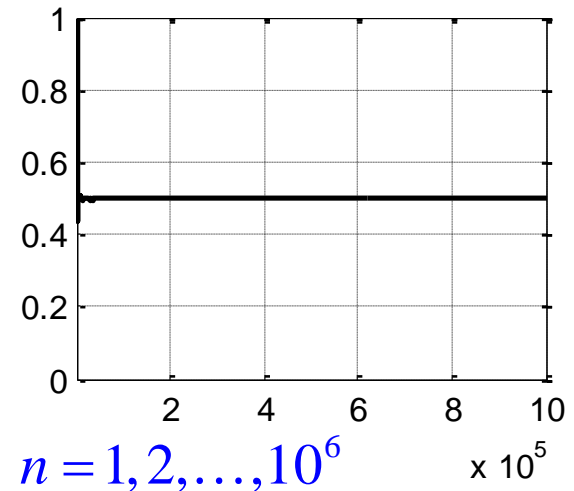
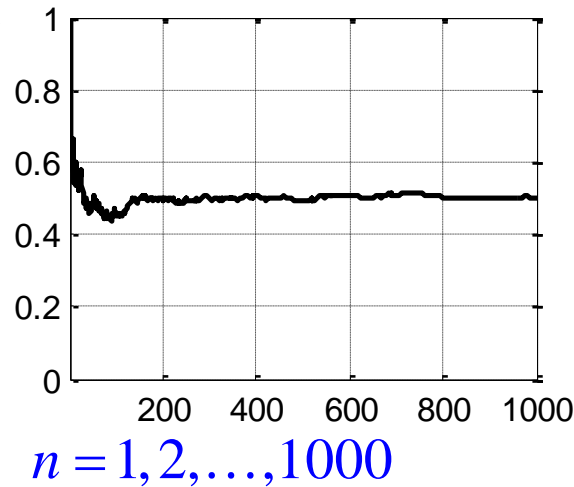
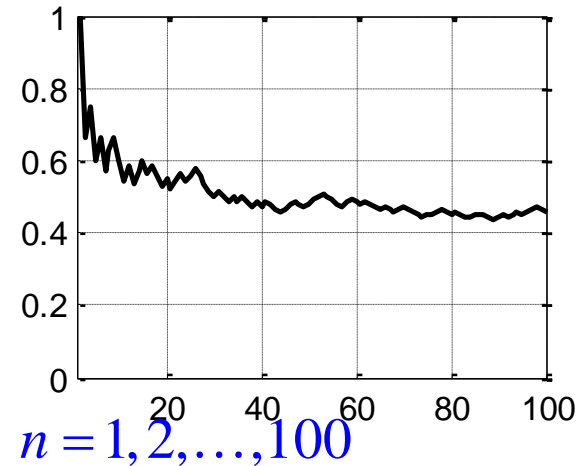
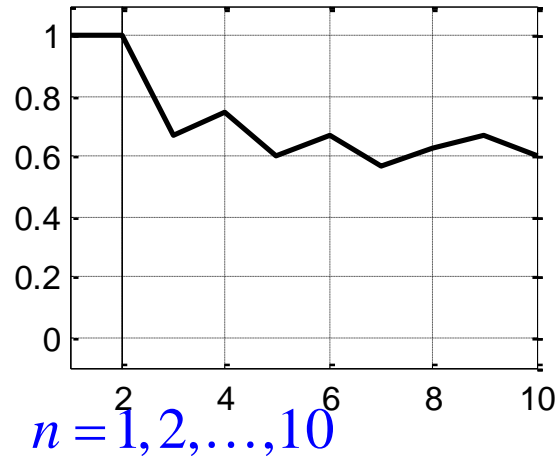
- Quarter = 25 cents
(George Washington)



Coin Tossing: Relative Frequency

$$\frac{N(A, n)}{n}$$

If a fair coin is flipped a large number of times, the **proportion** of heads will tend to get closer to $1/2$ as the number of tosses increases.

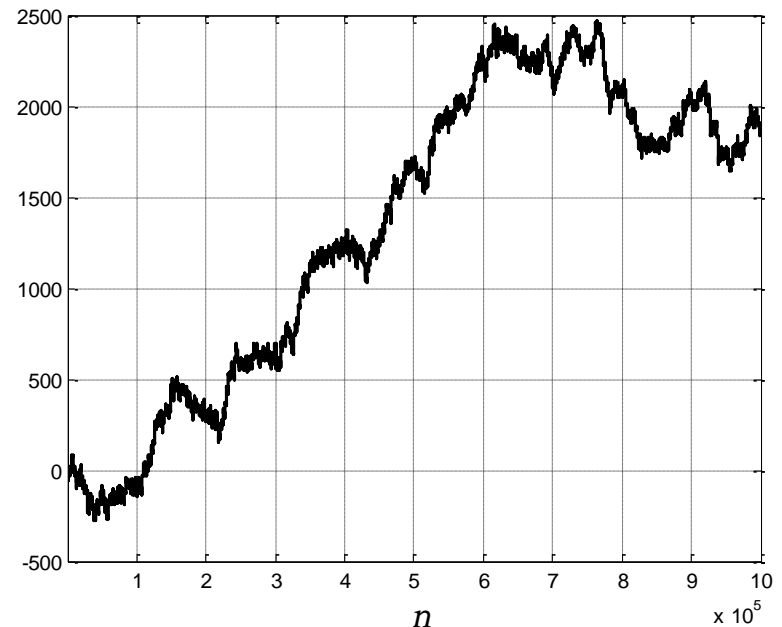


Coin Tossing: Relative Freq. vs. #H-#T

This statement does not say that the difference between #H and #T will be close to 0.

If a fair coin is flipped a large number of times, the **proportion** of heads will tend to get closer to $1/2$ as the number of tosses increases.

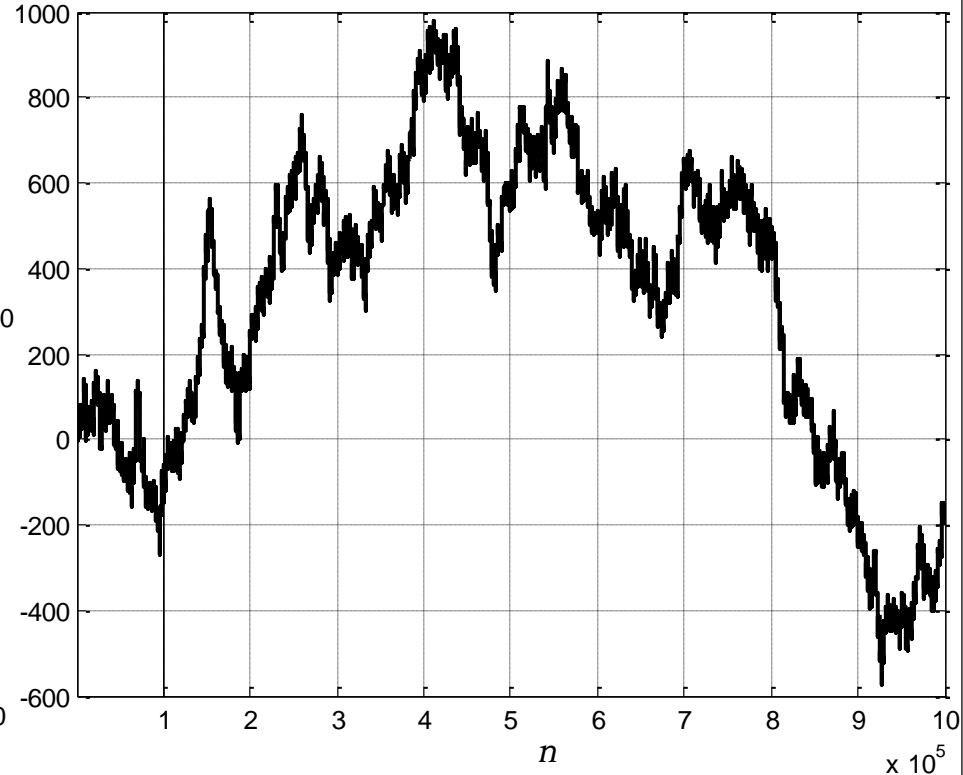
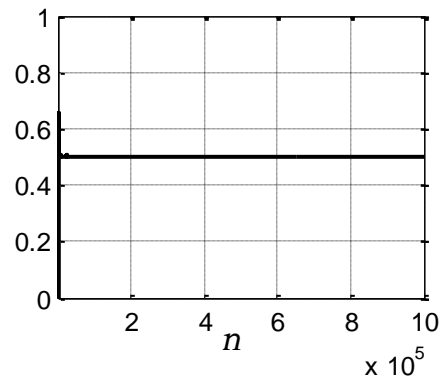
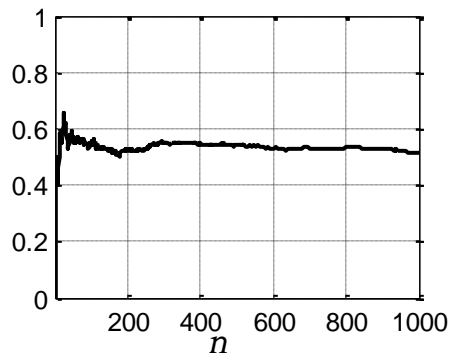
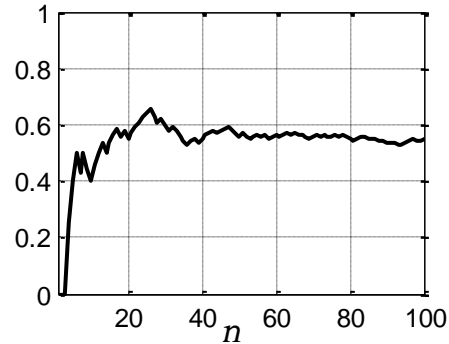
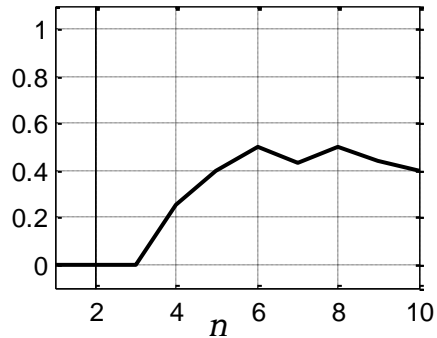
The **difference** between #H and #T will **not** converge to 0.



Another trial

Relative Freq.

#H-#T



Another trial

Relative Freq.

#H-#T

