Selected Problems Chapter 1
Grinstead and Snell's Introduction to Probability , 2rd Edition

Mustaf Ahmed

May 25, 2021

Problem 1.1.5. Consider the bet that all three dice will turn up sixes at least once in n rolls of three dice. Calculate $f(n)$, the probability of at least one triple-six when three dice are rolled n times. Determine the smallest value of n necessary for a favorable bet that a triple-six will occur when three dice are rolled n times. (DeMoivre would say it should be about $216log(2) = 149.7$ and so would answer 150—see Exercise 1.2.17. Do you agree with him?)

Yes. Using a program to simulate the bet 1000 times, $f(n) \approx .50$,

Program.

```python
import random

def TripleSix(k):
  """
  Estimates the probability of rolling at least 1 triple six in k rolls;
  1000 trials are used to estimate this.

  Args:
    rolls: number of rolls for the situation

  Returns:
    number of triplesix situations divided by how many experiments
  """

  times = 0

  for j in range(1000): # 1000 trials to estimate the probability
    triplesix = False

    for i in range(k):
      dice1 = random.randint(1,6)
      dice2 = random.randint(1,6)
      dice3 = random.randint(1,6)

      if dice1 == 6 and dice2 == 6 and dice3 == 6:
        triplesix  = True
```

```python
    if triplesix:
        times = times + 1

  return times/1000

print(TripleSix(150))
```