Randomness, chapter 2.1

Grethe Hystad

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Randomness

Example

Suppose we want to simulate 10 flips of a coin. To simulate a flip of a coin in R use the **sample** command. This is the command of sampling without replacement. To sample with replacement in R, we will call for the command **Replace = T**
Let x be a vector. The command: sample(x,n,replace=T) randomly choose n numbers from the vector x independently from each other and with replacement.

Simulate flips of a coin in R

Example

To simulate 10 flips of a coin in R:
Let 1 be associated with head and 0 with tail.
> x <- c(0,1)
> x
[1] 0 1
> data<-sample(x,10,replace = T)
> data
[1] 1 1 0 0 1 0 1 0 1 1
These numbers corresponds to:
H H T T H T H T H H
From these 10 simulated flips, the estimated probability of heads is $6/10 = 0.6$

Example

To simulate 50 flips of a coin in R:

```
> x <- c(0,1)
> x
[1] 0 1
> data<-sample(x,50,replace = T)
> data
[1] 1 0 1 0 0 1 0 0 0 0 1 1 0 0 0 1 1 1 0 0 1 1 1 1 0 0 1 1 1 0 1 0 1
1 0 1 0 0
[39] 1 0 0 1 1 1 0 0 1 0 1 1
> sum(data)
[1] 26
```

From these 50 simulated flips, the estimated probability of heads is $26/50 = 0.52$

The limiting relative frequency of number of heads as the number of coin flips get large is 0.5.