

Hipergeometrica

Hernández Martínez Oscar Gerardo

29/6/2020

```
import os
os.environ['QT_QPA_PLATFORM_PLUGIN_PATH'] = 'C:/Users/jxsje/anaconda3/Library/plugins/platforms'
```

Distribución Hipergeométrica

Supongamos que tenemos 20 animales, de los cuales 7 son perros. Queremos medir la probabilidad de encontrar un número determinado de perros si elegimos $k = 12$ animales al azar.

En R

```
library(Rlab)

## Rlab 2.15.1 attached.
##
## Attaching package: 'Rlab'
##
## The following objects are masked from 'package:stats':
##
##      dexp, dgamma, dweibull, pexp, pgamma, pweibull, qexp, qgamma,
##      qweibull, rexp, rgamma, rweibull
##
## The following object is masked from 'package:datasets':
##
##      precip
M = 7
N = 13
k = 12
dhyper(x = 0:k, m = M, n = N, k = k)

## [1] 0.0001031992 0.0043343653 0.0476780186 0.1986584107 0.3575851393
## [6] 0.2860681115 0.0953560372 0.0102167183 0.0000000000 0.0000000000
## [11] 0.0000000000 0.0000000000 0.0000000000

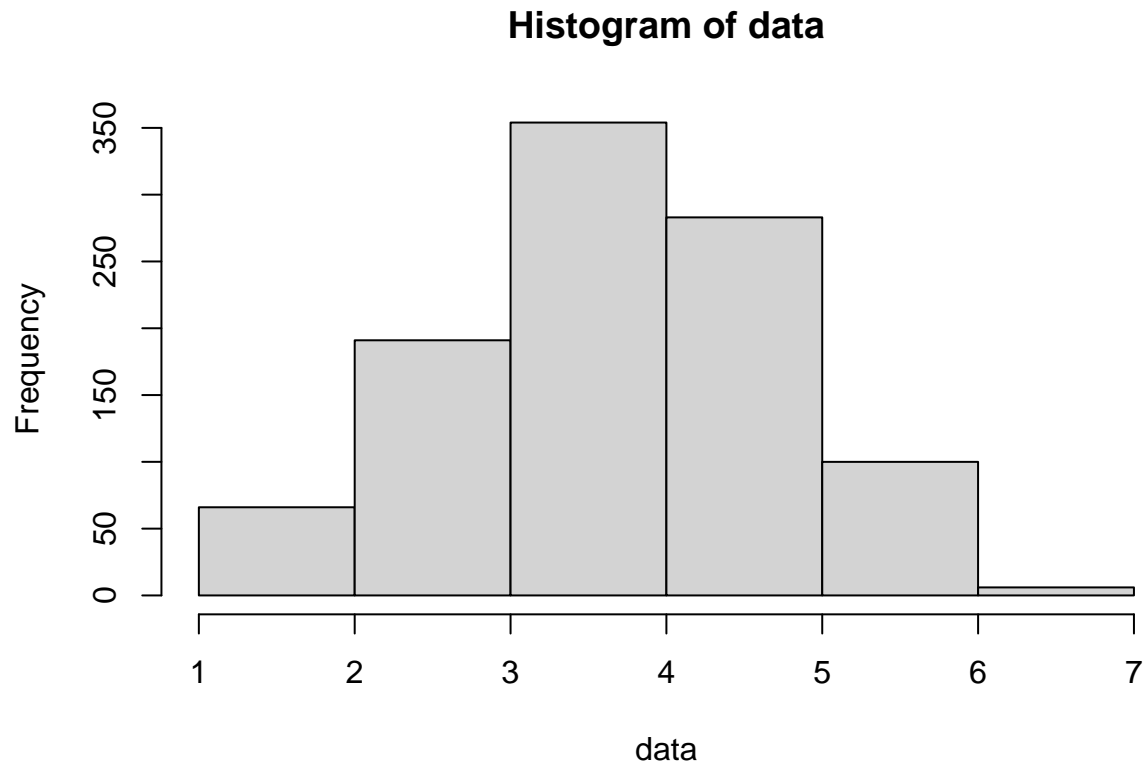
phyper(q = 0:k, m = M, n = N, k = k)

## [1] 0.0001031992 0.0044375645 0.0521155831 0.2507739938 0.6083591331
## [6] 0.8944272446 0.9897832817 1.0000000000 1.0000000000 1.0000000000
## [11] 1.0000000000 1.0000000000 1.0000000000

qhyper(p = 0.5, m = M, n = N, k = k)

## [1] 4
```

```
data = rhyper(nn = 1000, m = M, n = N, k = k)
hist(data, breaks = 8)
```



En Python

```
from scipy.stats import hypergeom
import matplotlib.pyplot as plt
import numpy as np

[M, n, N] = [20, 7, 6]
rv = hypergeom(M, n, N)
x = np.arange(0, n+1)
y = rv.pmf(x)

mean, var, skew, kurt = rv.stats(moments = 'mvsk')
print("Media %f"%mean)

## Media 2.100000

print("Varianza %f"%var)

## Varianza 1.005789

print("Sesgo %f"%skew)

## Sesgo 0.132949
```

```
print("Curtosis %f"%kurt)
```

```
## Curtosis -0.203835
```

```
fig = plt.figure()
ax = fig.add_subplot(111)
ax.plot(x, y, 'bo' )
ax.vlines(x,0,y, lw = 2, alpha = 0.5, color = "b")
ax.set_xlabel("Número de perros entre los 12 elegidos al azar")
ax.set_ylabel("Distribución de probabilidad de H(13,7,12)")
plt.show()
```

