

# Distribución Uniforme

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10/10/2020

## La distribución uniforme

Una función se dice que distribuye uniforme si esta cumple con función de densidad

$$f(x) = \begin{cases} \frac{1}{b-a} & \text{si } a \leq x \leq b \\ 0 & \text{en cualquier otro caso} \end{cases}$$

y esta modela el elegir un intervalo  $[a, b]$  de manera equiprobable

La función de distribución es:

$$F(x) = \begin{cases} 0 & \text{si } x \leq a \\ \frac{x-a}{b-a} & \text{si } a \leq x < b \\ 1 & \text{si } x \geq b \end{cases}$$

con esperanza

$$\frac{a+b}{2}$$

y varianza

$$\frac{(b-a)^2}{12}$$

supongamos que  $X \sim U([0, 1])$  entonces podemos estudiar sus parámetros

En R

```
a=0
b=1

x = seq(0,1, 0.02)

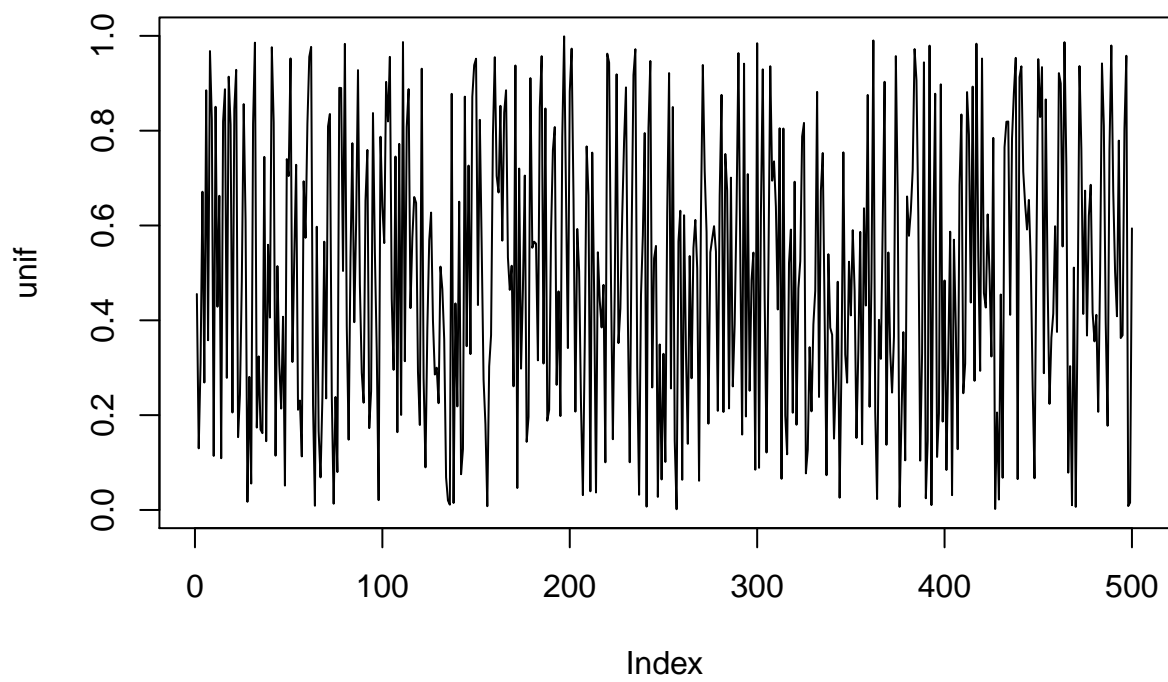
punif(0.5, min=a, max = b)

## [1] 0.5

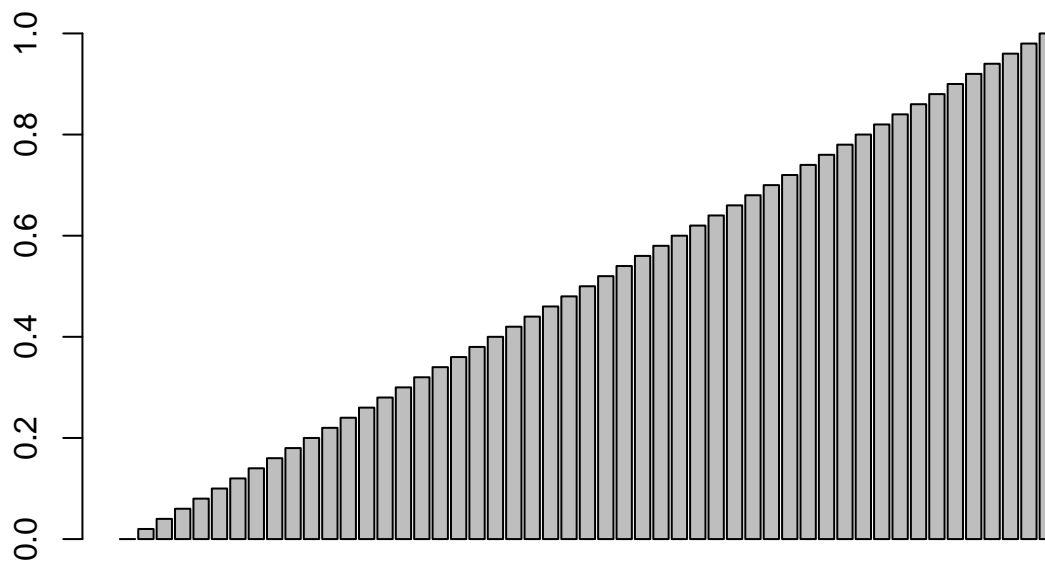
dunif(0.5, min=a,max = b)

## [1] 1

unif <- runif(500, min = 0, max = b)
plot(unif, type="l")
```



```
barplot(punif(x,min= a,max= b))
```



```
mean(unif)
```

```
## [1] 0.4974419
```

```
qunif(.5,a,b)
```

```
## [1] 0.5
```

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

```
a=0
```

```
b=1
```

```
loc = a
```

```
scale = b-a
```

```
fig, ax = plt.subplots(1,1)
```

```
mean, var, skew, kurt = uniform.stats(moments = "mvsk")
```

```
print("Media %f"%mean)
```

En Python

```
## Media 0.500000
```

```

print("Varianza %f"%var)

## Varianza 0.083333
print("Sesgo %f"%skew)

## Sesgo 0.000000
print("Curtosis %f"%kurt)

## Curtosis -1.200000
rv = uniform(loc = loc, scale = scale)
x = np.linspace(-0.1, 1.1, 120)
ax.plot(x, rv.pdf(x), "k-", lw = 2, label = "Uniforme en (0,1)")
r = rv.rvs(size=1000000)
ax.hist(r, density = True, histtype = "stepfilled", alpha = 0.25)

## (array([0.99795125, 0.99972125, 0.99874125, 0.99579124, 1.00133125,
##         0.99716124, 1.00119125, 1.00412125, 1.00265125, 1.00135125]), array([1.16486024e-06, 1.000010
##         4.00000666e-01, 5.00000541e-01, 6.00000416e-01, 7.00000291e-01,
##         8.00000166e-01, 9.00000042e-01, 9.99999917e-01]), <a list of 1 Patch objects>)
ax.legend(loc = "best", frameon = False)
plt.show()

```

