Caminata aleatoria

Joel Alejandro Zavala Prieto

Contents

Informacion de contacto

Mail: alejandro.zavala1001@gmail.com

Facebook: https://www.facebook.com/AlejandroZavala1001

Git: https://github.com/AlejandroZavala98

```
## Loading required package: zoo

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

Caminata aleatoria

Descripcion

Veamos el proceso:

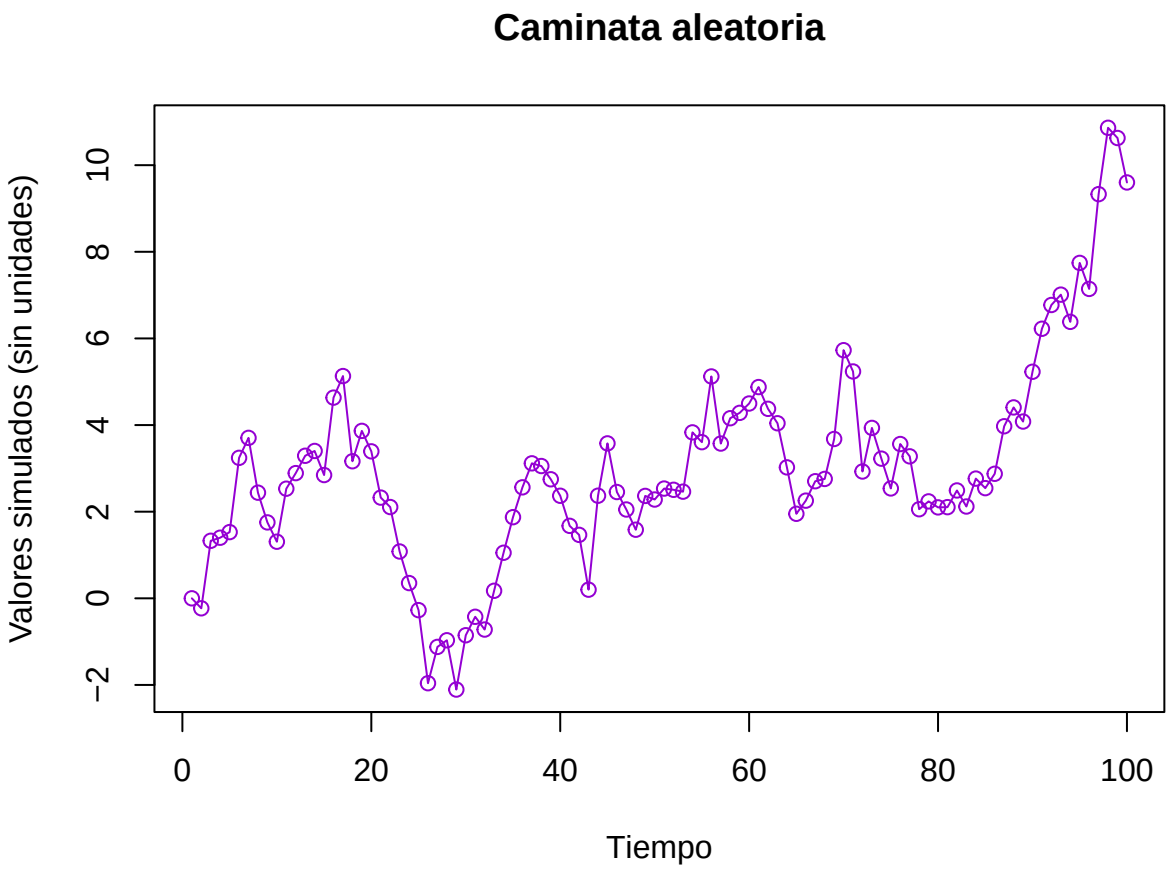
$$
\begin{aligned}
x_t &= x_{t-1} + Z_t \\
Z_t &\sim N(0,1) \\
i &= 1, 2, ..., 100
\end{aligned}
$$

Desplegando los valores de la serie que se simulara, creando funciones propias

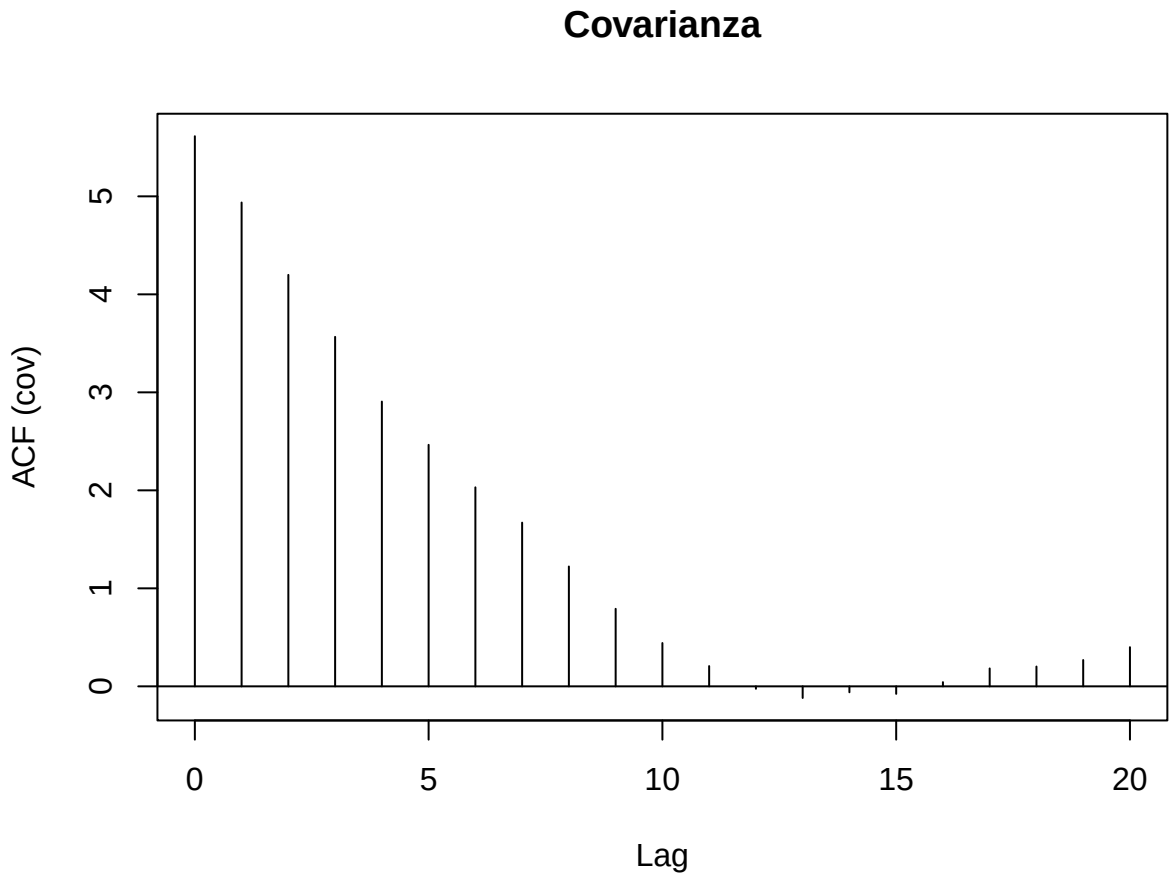
```
## Time Series:
## Start = 1
## End = 100
## Frequency = 1
##   [1]  0.0000000 -0.2301775  1.3285308  1.3990392  1.5283270  3.2433919
##   [7]  3.7043081  2.4392469  1.7523941  1.3067321  2.5308139  2.8906277
##  [13]  3.2913992  3.4020819  2.8462407  4.6331539  5.1310044  3.1643872
##  [19]  3.8657431  3.3929517  2.3251280  2.1071531  1.0811486  0.3522574
##  [25] -0.2727819 -1.9594752 -1.1216881 -0.9683150 -2.1064520 -0.8526370
##  [31] -0.4261728 -0.7212443  0.1738814  1.0520149  1.8735959  2.5622362
##  [37]  3.1161538  3.0542421  2.7482795  2.3678085  1.6731015  1.4651842
##  [43]  0.1997879  2.3687438  3.5767058  2.4535972  2.0507124  1.5840570
##  [49]  2.3640222  2.2806531  2.5339716  2.5054249  2.4625544  3.8311567
##  [55]  3.6053857  5.1218563  3.5731035  4.1577173  4.2815715  4.4975131
##  [61]  4.8771525  4.3748291  4.0416217  3.0230463  1.9512551  2.2547837
##  [67]  2.7029935  2.7559977  3.6782652  5.7283499  5.2373187  2.9281499
##  [73]  3.9338884  3.2246876  2.5366790  3.5622504  3.2774774  2.0567597
##  [79]  2.2380631  2.0991718  2.1049360  2.4902164  2.1195563  2.7639329
##  [85]  2.5434463  2.8752283  3.9720673  4.4072488  4.0813172  5.2301248
##  [91]  6.2236287  6.7720256  7.0107574  6.3828513  7.7435037  7.1432442
##  [97]  9.3305771 10.8631878 10.6274874  9.6010665
```

Visualizacion de la caminata aleatoria

Viendo el grafico correspondiente



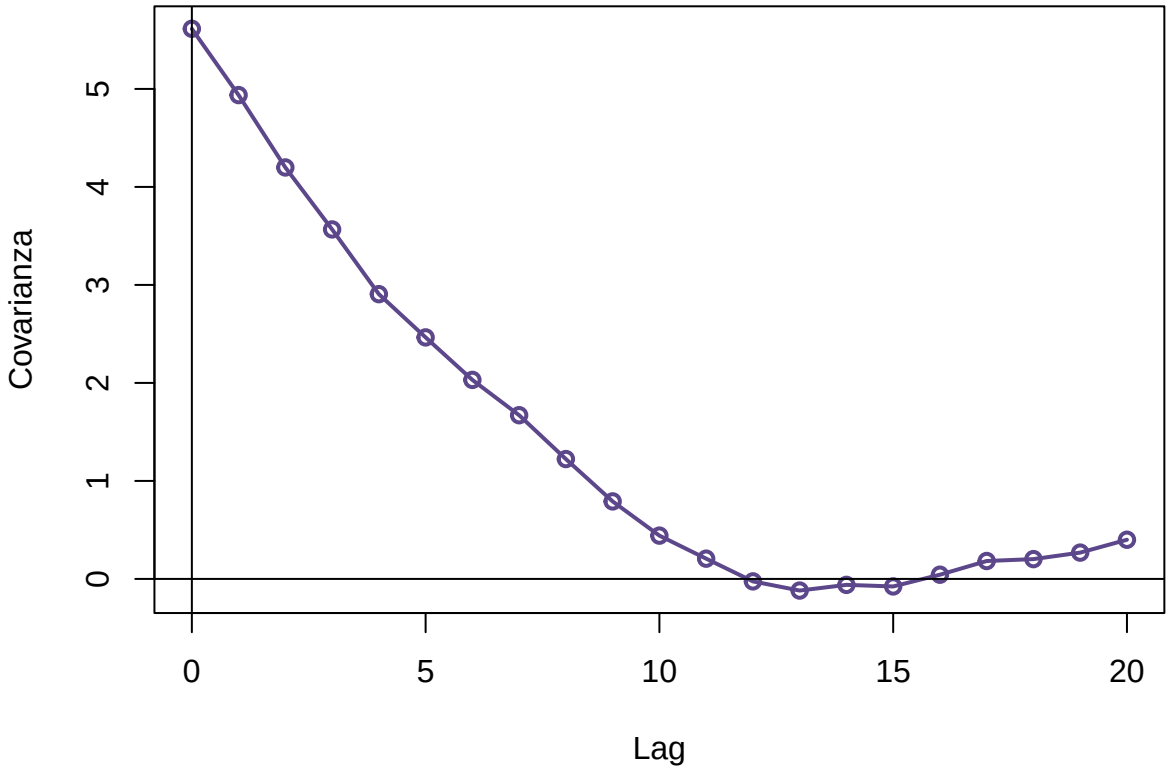
Funcion de autocovarianza (linea de comando)




```
##
## Autocovariances of series 'random_walk', by lag
##
##       0       1       2       3       4       5       6       7       8       9
##  5.6136  4.9370  4.1987  3.5662  2.9057  2.4643  2.0308  1.6704  1.2231  0.7908
##      10      11      12      13      14      15      16      17      18      19
##  0.4418  0.2066 -0.0252 -0.1188 -0.0607 -0.0768  0.0428  0.1828  0.2021  0.2686
##      20
##  0.3996
```

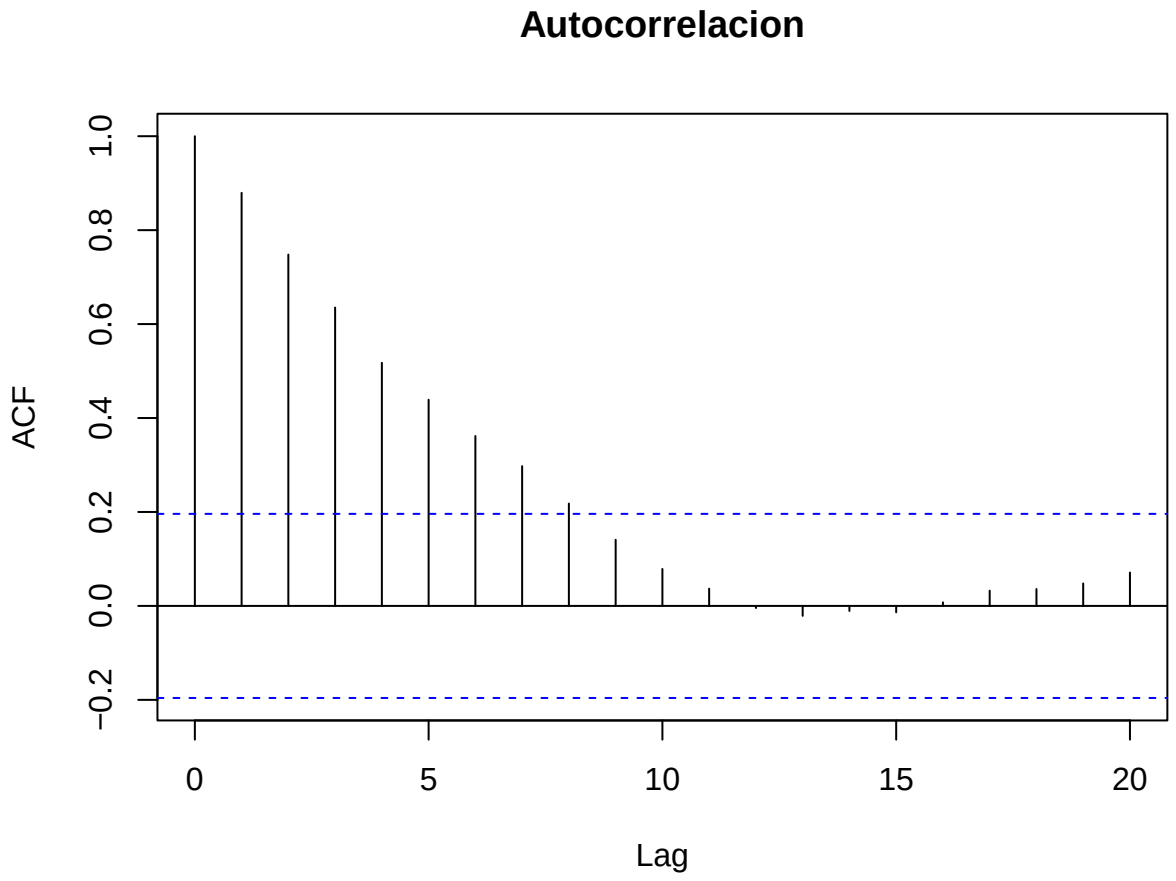
Funcion de autocovarianza ACF (funcion propia)

Programando la funcion de autocovarianza para comparar




```
##  [1]  5.61361604  4.93697857  4.19866360  3.56615358  2.90565953  2.46426507
##  [7]  2.03076975  1.67041840  1.22313850  0.79080219  0.44176616  0.20656990
## [13] -0.02517372 -0.11882969 -0.06065415 -0.07679099  0.04284598  0.18280084
## [19]  0.20212641  0.26855131  0.39964020
```

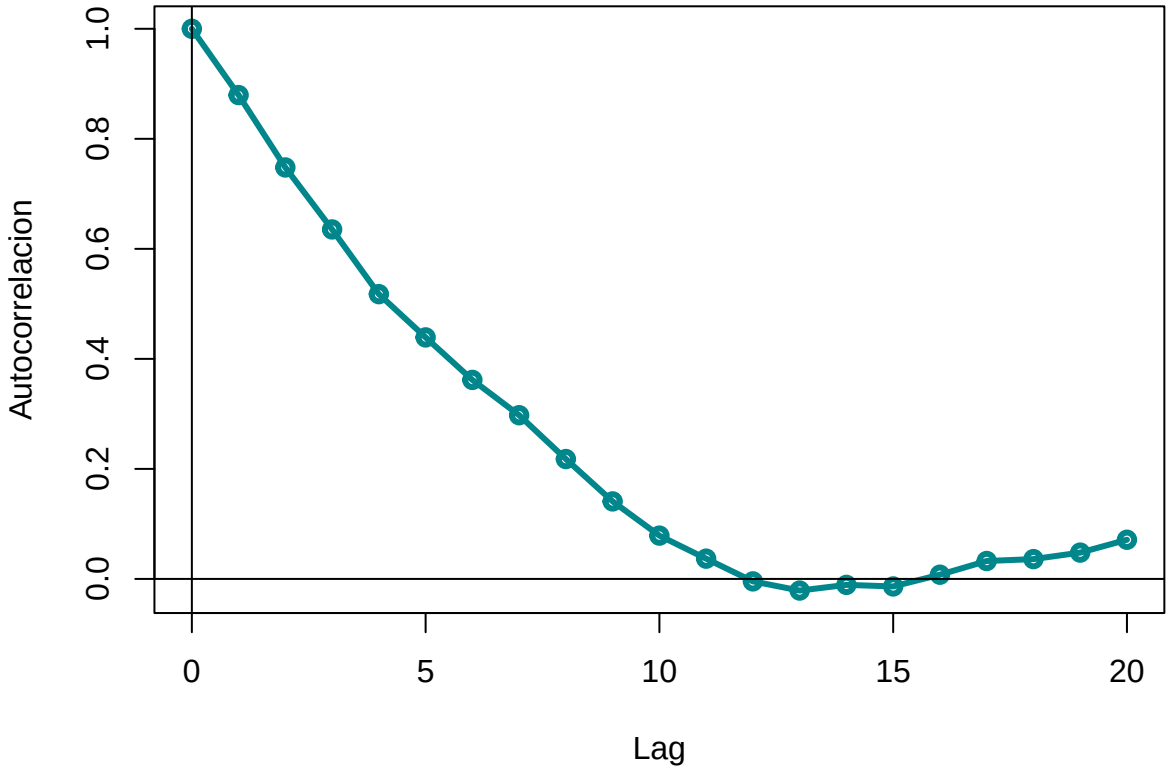
Funcion de autocorrelacion (linea de comando)




```
##
## Autocorrelations of series 'random_walk', by lag
##
##      0      1      2      3      4      5      6      7      8      9     10
##  1.000  0.879  0.748  0.635  0.518  0.439  0.362  0.298  0.218  0.141  0.079
##     11     12     13     14     15     16     17     18     19     20
##  0.037 -0.004 -0.021 -0.011 -0.014  0.008  0.033  0.036  0.048  0.071
```

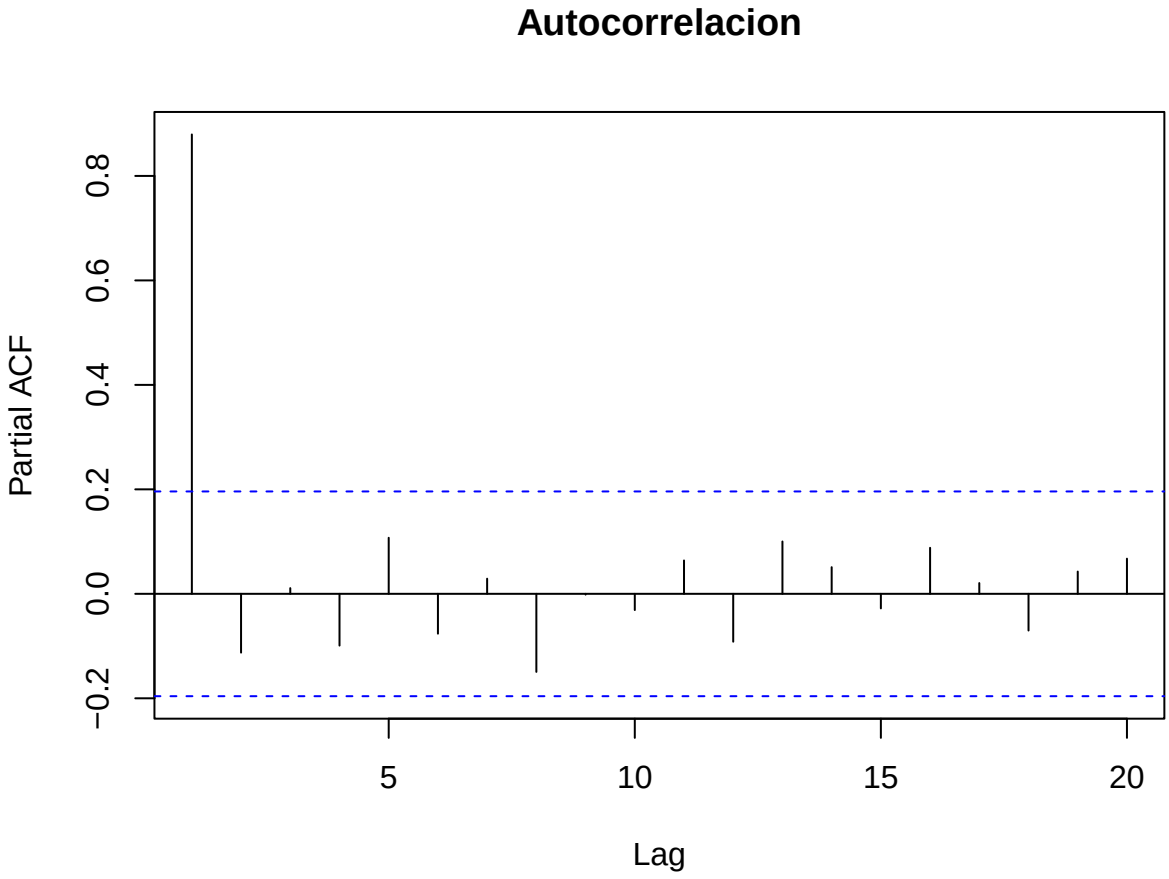
Funcion de autocorrelacion (funcion propia)

Programando la funcion de autocorrelacion para comparar



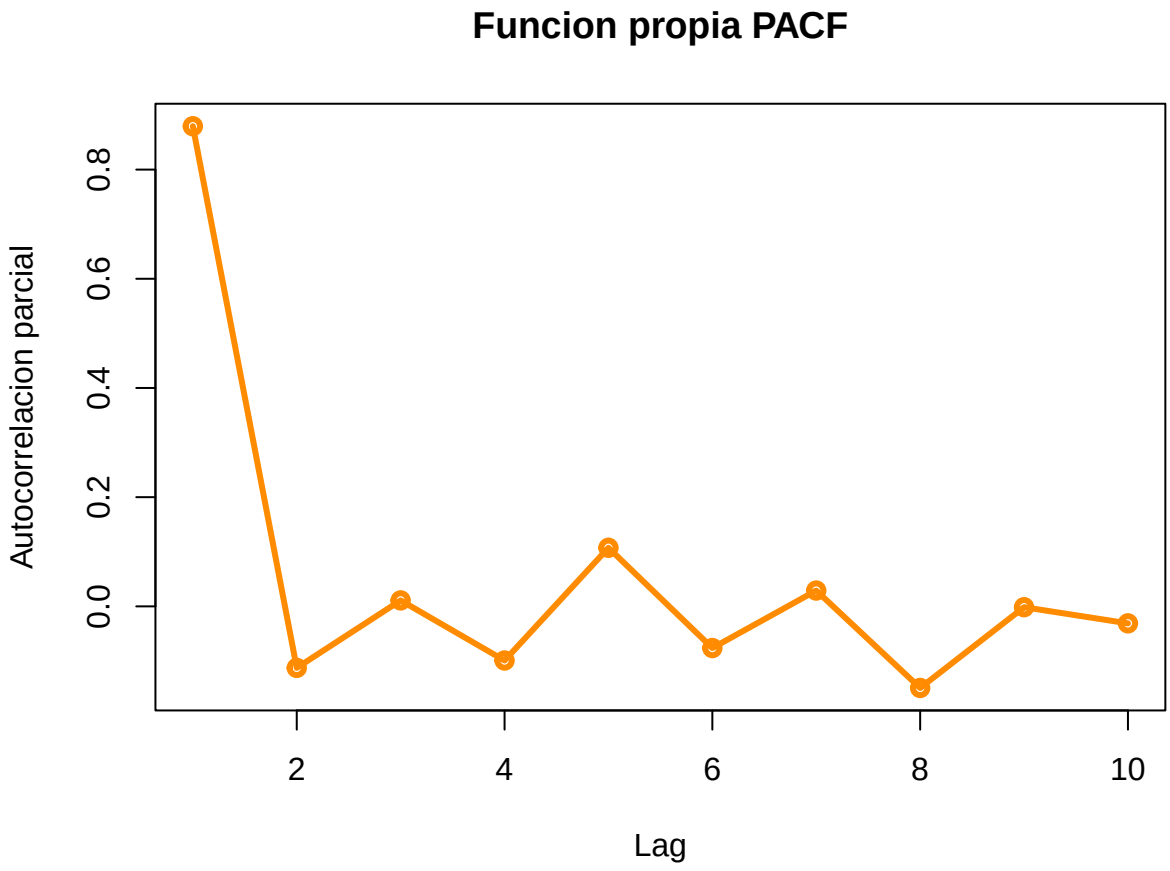

```
##  [1]  1.000000000  0.879464954  0.747942783  0.635268525  0.517609239
##  [6]  0.438979983  0.361757865  0.297565488  0.217887808  0.140872155
## [11]  0.078695471  0.036798010 -0.004484403 -0.021168118 -0.010804827
## [16] -0.013679416  0.007632509  0.032563830  0.036006455  0.047839274
## [21]  0.071191225
```

PACF por linea de comando




```
##
## Partial autocorrelations of series 'random_walk', by lag
##
##      1      2      3      4      5      6      7      8      9     10     11
##  0.879 -0.113  0.011 -0.099  0.107 -0.076  0.029 -0.149 -0.002 -0.031  0.064
##     12     13     14     15     16     17     18     19     20
## -0.092  0.100  0.051 -0.028  0.088  0.021 -0.070  0.043  0.067
```

PACF de forma manual (primeros 10 rezagos)




```
##  [1]  0.879464954 -0.112632048  0.010939561 -0.099128816  0.107318297
##  [6] -0.076334919  0.028978460 -0.149474449 -0.001520482 -0.031108977
```

Quitando tendencia

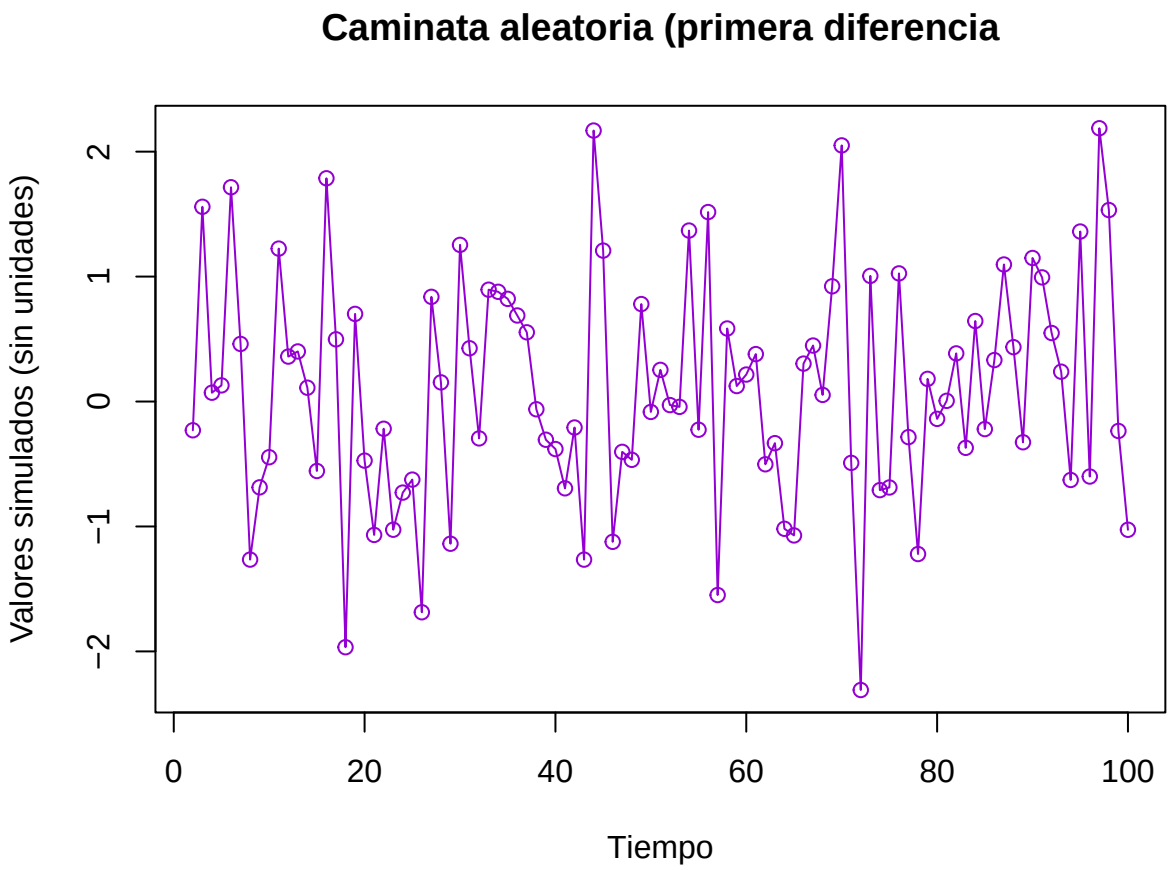
Descripcion

Del proceso anterior:

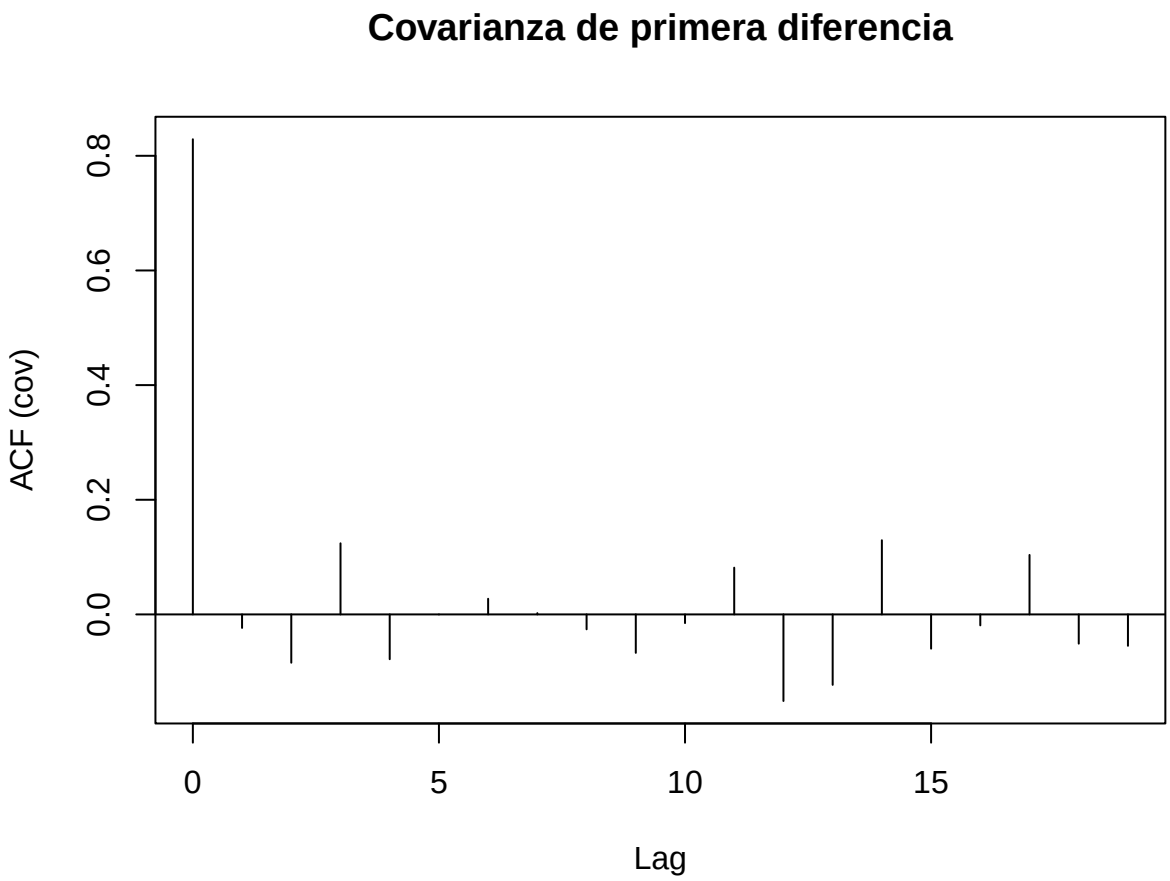
$$
\begin{aligned}
x_t &= x_{t-1} + Z_t \\
x_t - x_{t-1} &= Z_t \\
\nabla x_t &= Z_t \\
Z_t &\sim N(0,1)
\end{aligned}
$$

Visualización del operador diferencia

De tal forma nuestro nuevo grafico seria

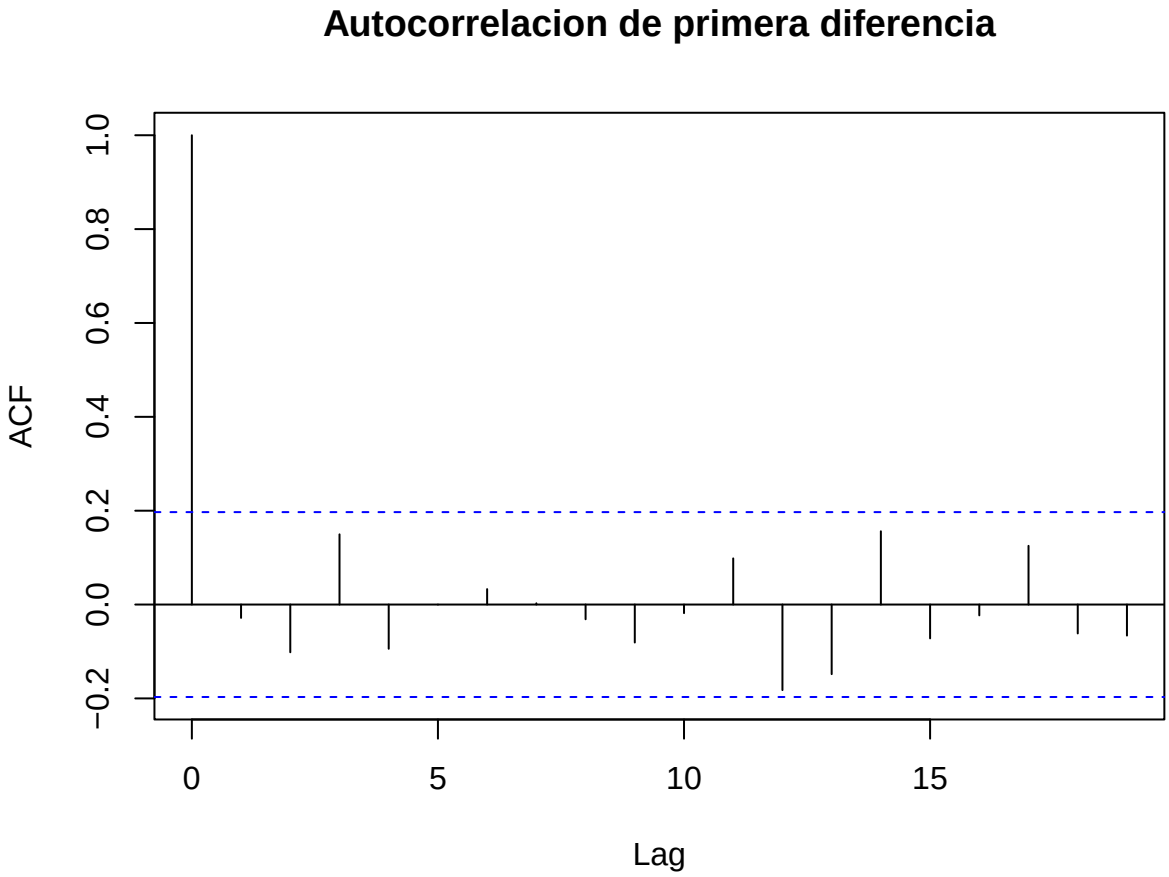


Funcion de autocovarianza



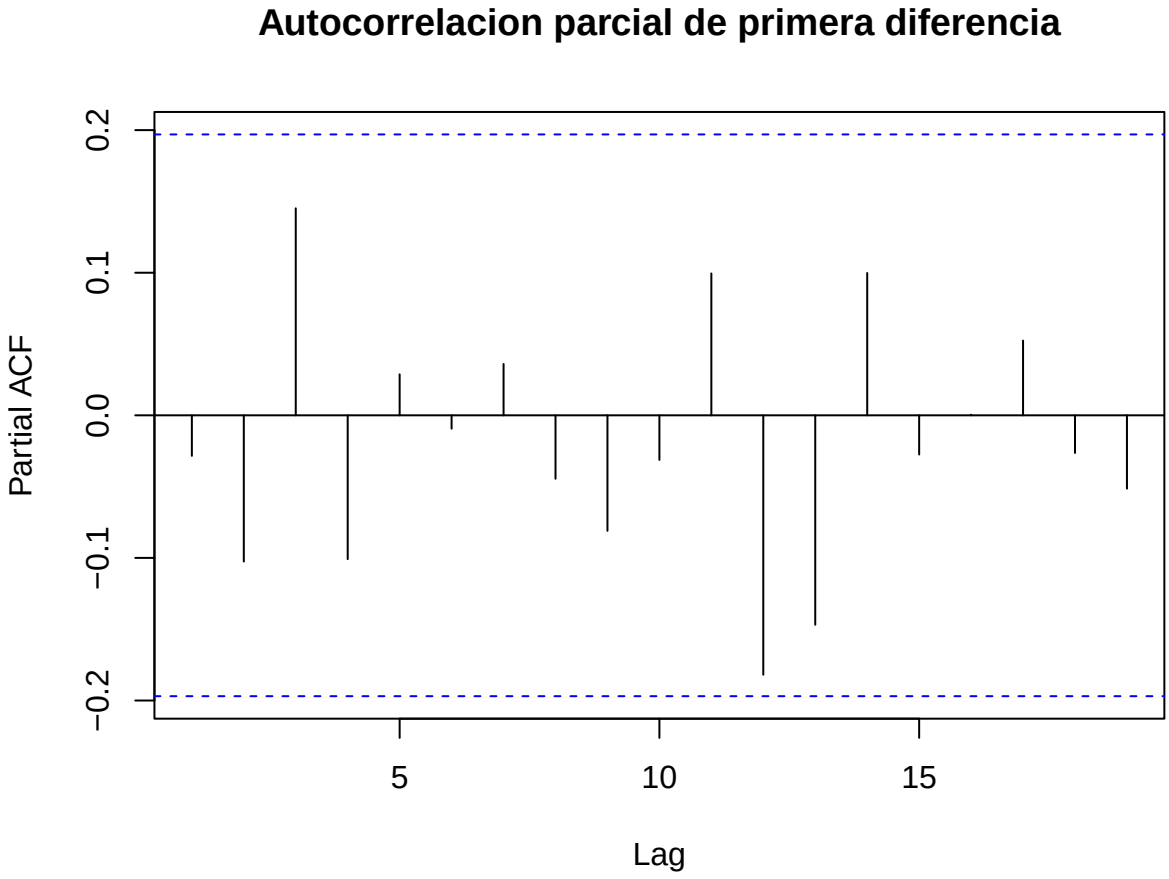

```
##
## Autocovariances of series 'random_walk_diff', by lag
##
##         0         1         2         3         4         5         6         7
##  0.828910 -0.023575 -0.084277  0.124043 -0.078128 -0.000128  0.027310  0.002245
##         8         9        10        11        12        13        14        15
## -0.025982 -0.067090 -0.015168  0.081536 -0.151057 -0.122898  0.129434 -0.059758
##        16        17        18        19
## -0.019096  0.103741 -0.051035 -0.054789
```

Funcion de autocorrelacion




```
##
## Autocorrelations of series 'random_walk_diff', by lag
##
##      0      1      2      3      4      5      6      7      8      9     10
##  1.000 -0.028 -0.102  0.150 -0.094  0.000  0.033  0.003 -0.031 -0.081 -0.018
##     11     12     13     14     15     16     17     18     19
##  0.098 -0.182 -0.148  0.156 -0.072 -0.023  0.125 -0.062 -0.066
```

Funcion de autocorrelacion parcial




```
##
## Partial autocorrelations of series 'random_walk_diff', by lag
##
##      1      2      3      4      5      6      7      8      9     10     11
## -0.028 -0.103  0.145 -0.101  0.029 -0.009  0.036 -0.044 -0.081 -0.031  0.100
##     12     13     14     15     16     17     18     19
## -0.182 -0.147  0.100 -0.028  0.000  0.052 -0.026 -0.051
```