Simulando procesos de media móvil

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MA(1)

Descripción

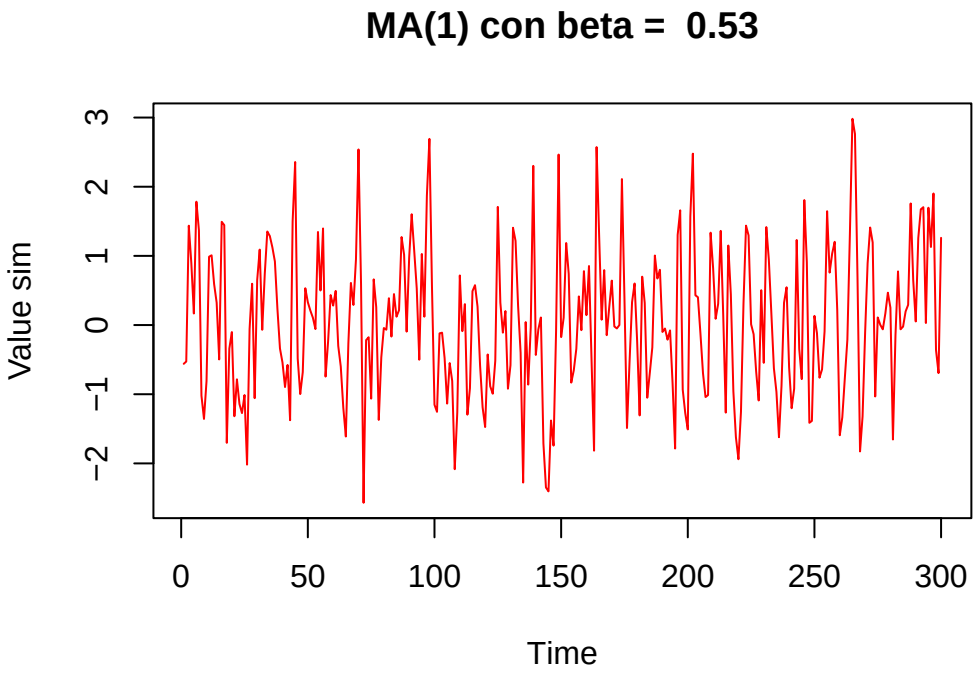
Veamos el proceso siguiente:

$$
\begin{aligned}
x_t &= Z_t + 0.53 Z_{t-1} \\
Z_t &\sim N(0,1) \\
t &= 1, 2, ..., 300
\end{aligned}
$$

Visualización

Simulando el proceso anterior MA(1) manualmente, viendo el gráfico correspondiente y mostrando las primeras 50 observaciones

```
##  [1] -0.56047565 -0.52722958  1.43671424  0.89662380  0.16665718  1.78358749
##  [7]  1.36990065 -1.02077565 -1.35733531 -0.80969398  0.98788095  1.00857718
## [13]  0.59147278  0.32309158 -0.49717930  1.49231734  1.44491444 -1.70275640
## [19] -0.34095119 -0.10107278 -1.31840315 -0.78392148 -1.14153115 -1.27267359
## [25] -1.01135162 -2.01796412 -0.05616041  0.59740025 -1.05684918  0.65060234
## [31]  1.09098613 -0.06904545  0.73873778  1.35255009  1.28699183  1.12407823
## [37]  0.91889699  0.23166465 -0.33877587 -0.54263121 -0.89635661 -0.57611198
## [43] -1.37559251  1.49829590  2.35750866 -0.48288872 -0.99813238 -0.68018432
## [49]  0.53263778  0.33001245
```



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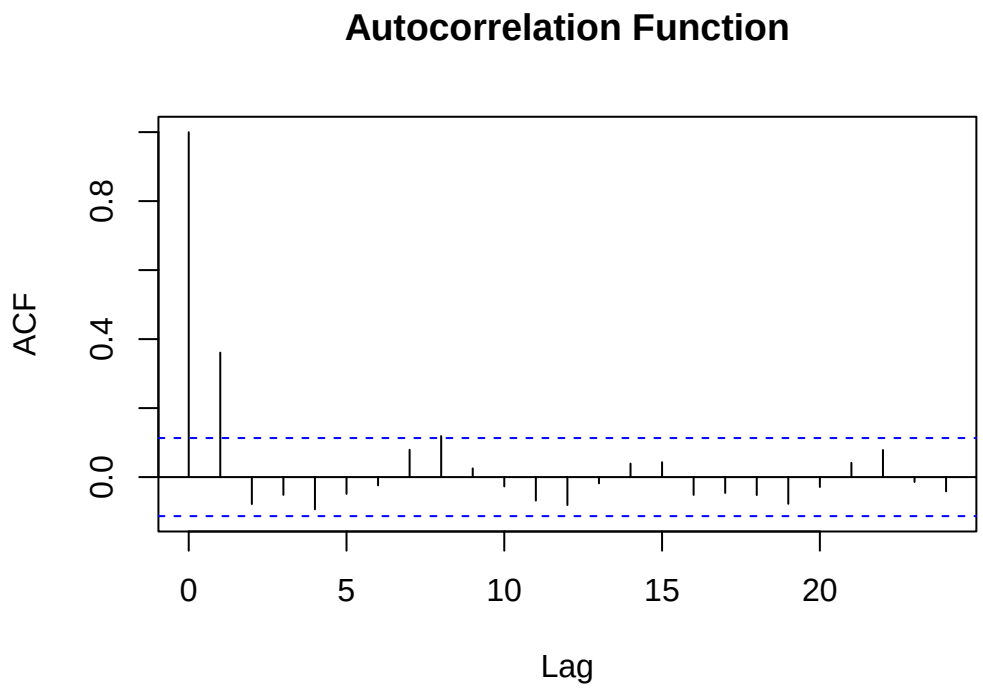


```
##
## Autocorrelations of series 'ma.1.process', by lag
##
##      0      1      2      3      4      5      6      7      8      9     10
##  1.000  0.361 -0.078 -0.051 -0.093 -0.049 -0.024  0.079  0.119  0.025 -0.027
##     11     12     13     14     15     16     17     18     19     20     21
## -0.068 -0.081 -0.018  0.039  0.043 -0.052 -0.046 -0.052 -0.077 -0.029  0.041
##     22     23     24
##  0.079 -0.014 -0.041
```

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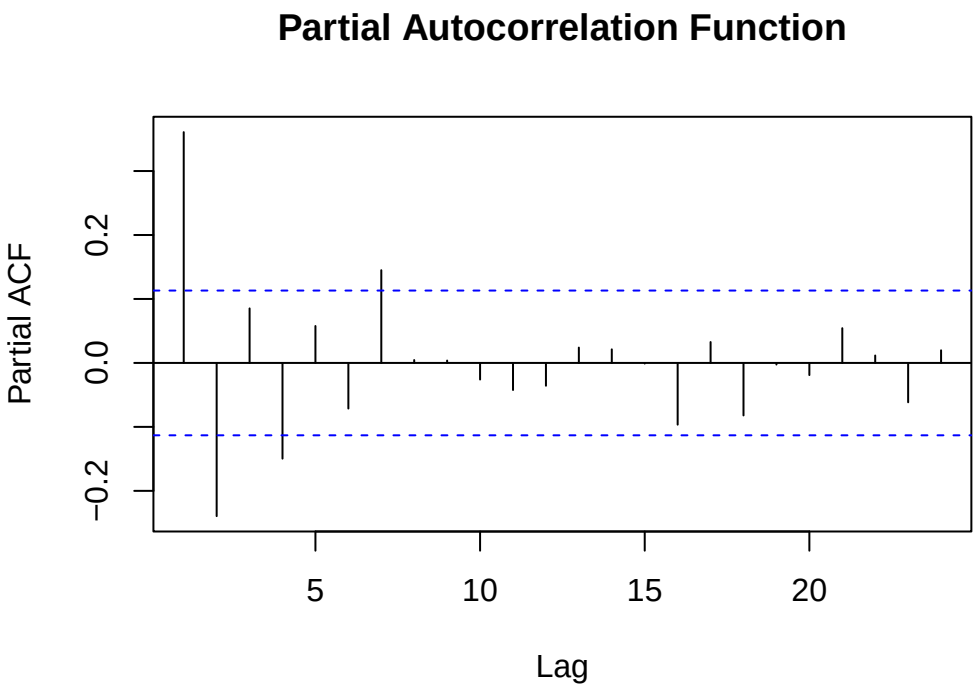



```
##
## Partial autocorrelations of series 'ma.1.process', by lag
##
##      1      2      3      4      5      6      7      8      9     10     11
##  0.361 -0.240  0.085 -0.150  0.058 -0.071  0.145  0.005  0.004 -0.026 -0.042
##     12     13     14     15     16     17     18     19     20     21     22
## -0.036  0.024  0.021 -0.001 -0.097  0.033 -0.082 -0.003 -0.019  0.054  0.012
##     23     24
## -0.062  0.020
```

MA(2)

Descripción

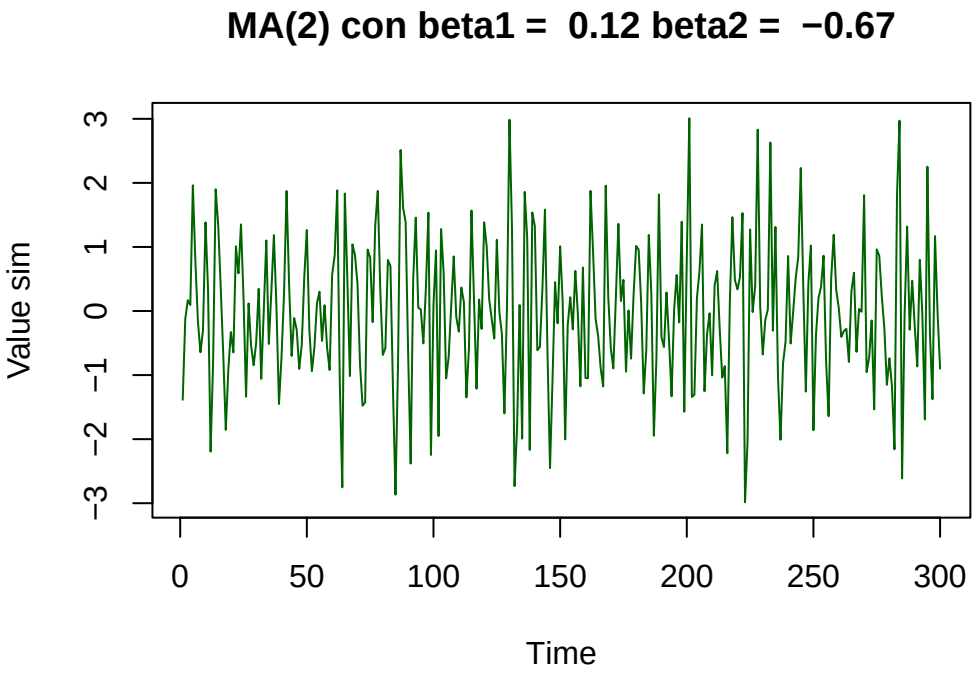
Veamos el proceso:

$$x_t = Z_t + 0.12Z_{t-1} - 0.67Z_{t-1}$$
$$Z_t \sim N(0,1)$$
$$t = 1, 2, ..., 300$$

Visualización

Simulando el proceso anterior MA(2) manualmente, viendo el gráfico correspondiente y mostrando las primeras 50 observaciones

```
##  [1] -1.385070619 -0.127885293  0.169565934  0.095065985  1.962244912
##  [6]  0.773299268 -0.165543456 -0.644128566 -0.299582392  1.384472628
## [11]  0.331142292 -2.194391475 -0.789232327  1.900720895  1.349675050
## [16]  0.366237032 -0.683206972 -1.856304032 -0.914442910 -0.327288191
## [21] -0.646623753  1.010213722  0.587788910  1.353434368  0.207070552
## [26] -1.338315378  0.118912366 -0.541654403 -0.846355325 -0.492177906
## [31]  0.346610150 -1.058450142  0.006536294  1.101812763 -0.514518842
## [36]  0.312620411  1.185147589  0.074559024 -1.451596488 -0.720819977
## [41]  0.269538196  1.873465008  0.416590133 -0.700400791 -0.110023790
## [46] -0.289510283 -0.904153904 -0.527815992  0.537773281  1.264750528
```



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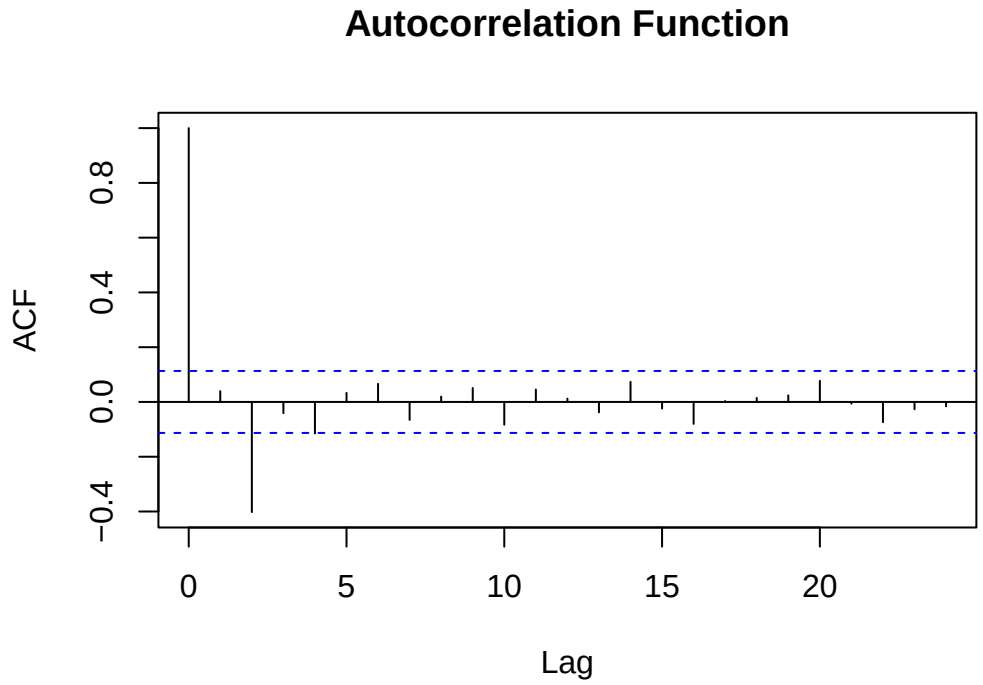


```
##
## Autocorrelations of series 'ma.2.process', by lag
##
##      0      1      2      3      4      5      6      7      8      9     10
##  1.000  0.039 -0.402 -0.041 -0.115  0.033  0.066 -0.066  0.020  0.051 -0.083
##     11     12     13     14     15     16     17     18     19     20     21
##  0.046  0.012 -0.038  0.074 -0.024 -0.080  0.003  0.015  0.024  0.077 -0.006
##     22     23     24
## -0.074 -0.027 -0.016
```

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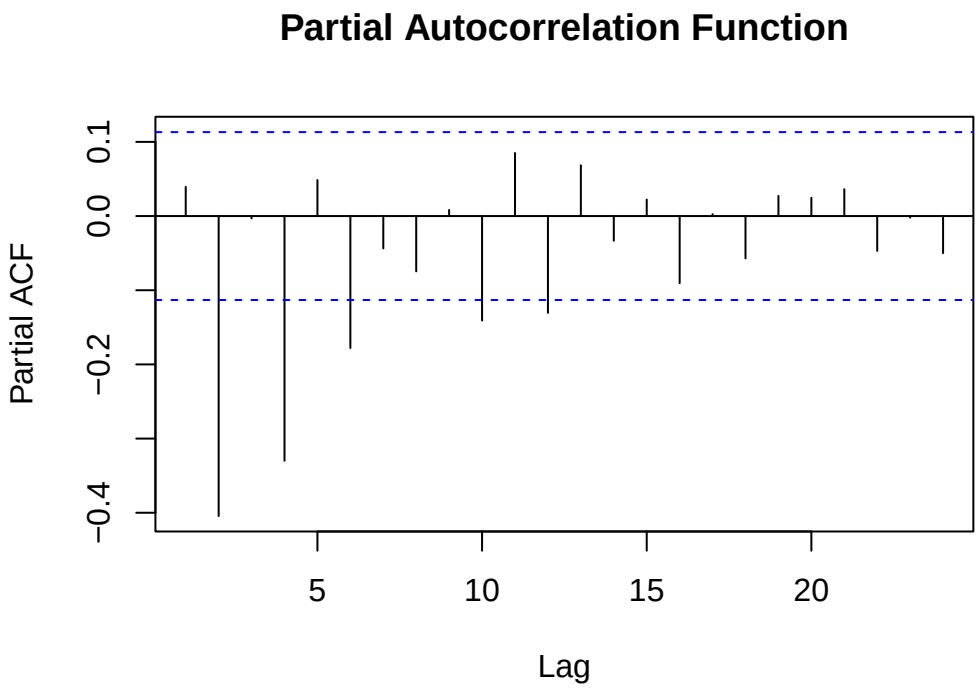



```
##
## Partial autocorrelations of series 'ma.2.process', by lag
##
##      1      2      3      4      5      6      7      8      9     10     11
##  0.039 -0.405 -0.003 -0.330  0.049 -0.178 -0.044 -0.075  0.008 -0.141  0.085
##     12     13     14     15     16     17     18     19     20     21     22
## -0.131  0.068 -0.033  0.022 -0.090  0.003 -0.057  0.027  0.025  0.036 -0.047
##     23     24
## -0.002 -0.050
```

MA(3)

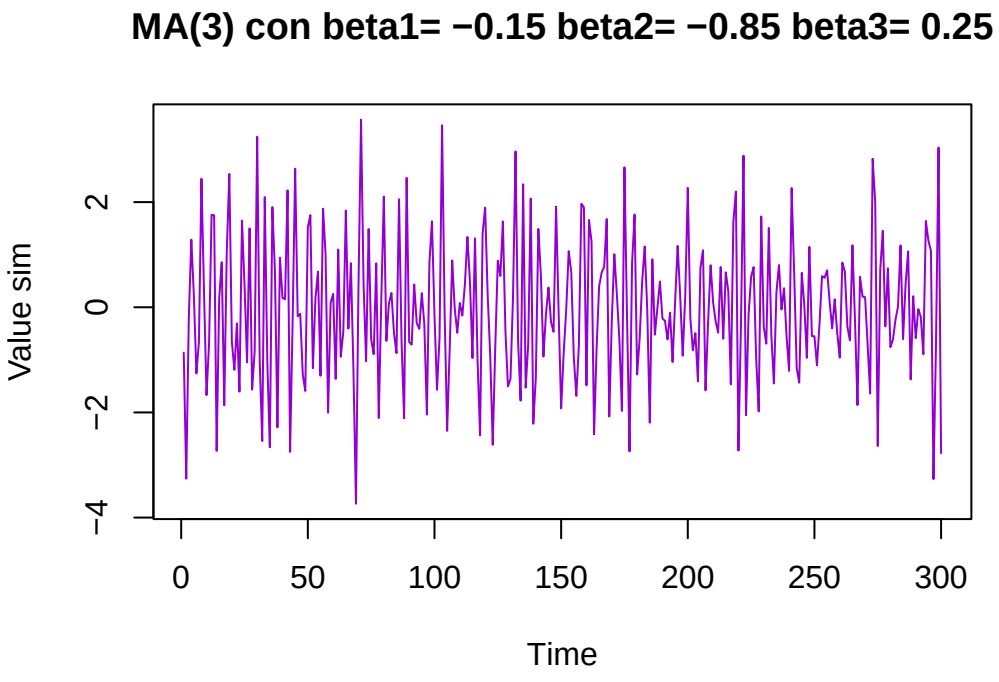
Descripción

$$x_t = Z_t - 0.15Z_{t-1} - 0.85Z_{t-2} + 0.25Z_{t-3}$$
$$Z_t \sim N(0,1)$$
$$t = 1, 2, ..., 300$$

Visualizacion

Simulando el proceso anterior AR(3) con linea de comando, viendo el gráfico correspondiente y mostrando las primeras 50 observaciones

```
##  [1] -0.8631653 -3.2594820 -0.2091865  1.2860433  0.2259030 -1.2586653
##  [7] -0.6589163  2.4432390  0.3075786 -1.6702107 -0.6910890  1.7582830
## [13]  1.7485855 -2.7302151  0.1637261  0.8567326 -1.8636738  1.0750618
## [19]  2.5355326 -0.6537526 -1.1889656 -0.3068486 -1.6038054  1.6506773
## [25]  0.4186007 -1.0471762  1.4996556 -1.5642194 -0.8358186  3.2410983
## [31] -1.0144890 -2.5440228  2.0958757 -1.0185699 -2.6635653  1.9061762
## [37]  0.7097088 -2.2852462  0.9425071  0.1755048  0.1534015  2.2232554
## [43] -2.7508719 -0.2583776  2.6340708 -0.1717644 -0.1248083 -1.2781968
## [49] -1.5921711  1.5216563
```



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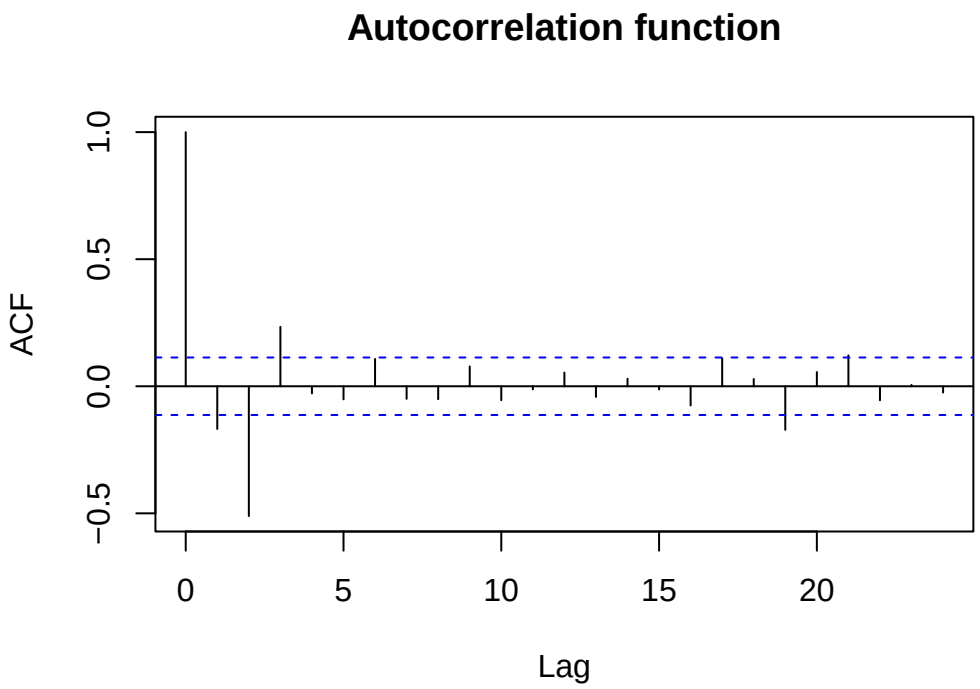


```
##
## Autocorrelations of series 'ma.3.process', by lag
##
##      0      1      2      3      4      5      6      7      8      9     10
##  1.000 -0.168 -0.511  0.234 -0.028 -0.052  0.107 -0.049 -0.051  0.078 -0.055
##     11     12     13     14     15     16     17     18     19     20     21
## -0.012  0.054 -0.042  0.030 -0.013 -0.076  0.110  0.028 -0.171  0.056  0.121
##     22     23     24
## -0.055  0.005 -0.025
```

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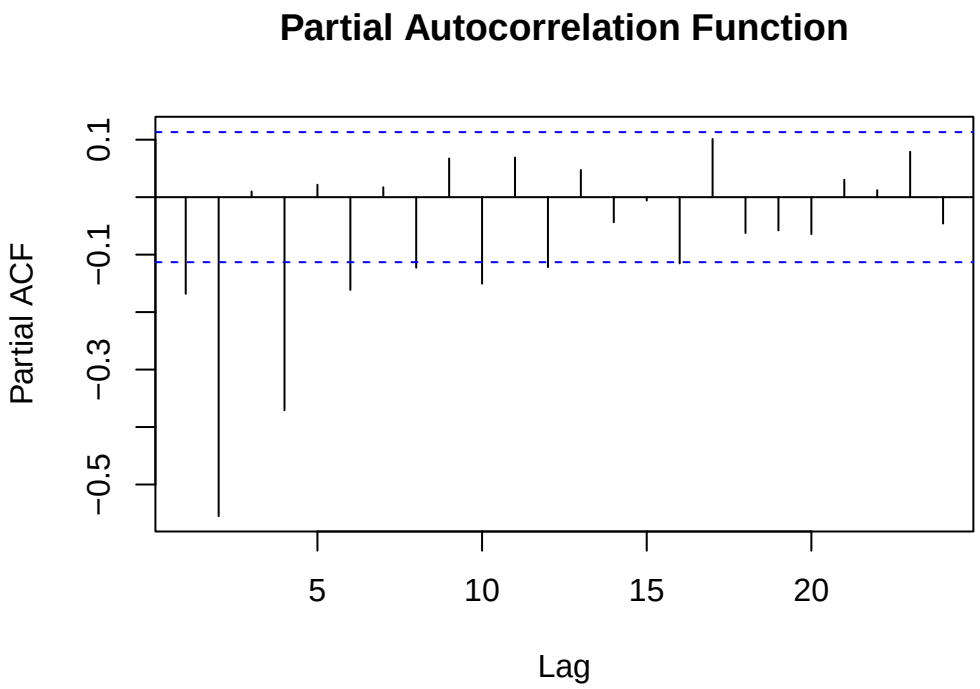


```
##
## Partial autocorrelations of series 'ma.3.process', by lag
##
##      1      2      3      4      5      6      7      8      9     10     11
## -0.168 -0.555  0.010 -0.371  0.022 -0.161  0.017 -0.123  0.067 -0.151  0.069
##     12     13     14     15     16     17     18     19     20     21     22
## -0.122  0.047 -0.044 -0.006 -0.115  0.101 -0.062 -0.058 -0.064  0.030  0.012
##     23     24
##  0.079 -0.046
```