Annexes : Plot And Explain

```r
library(NantesStatisticalAnalysis)
```

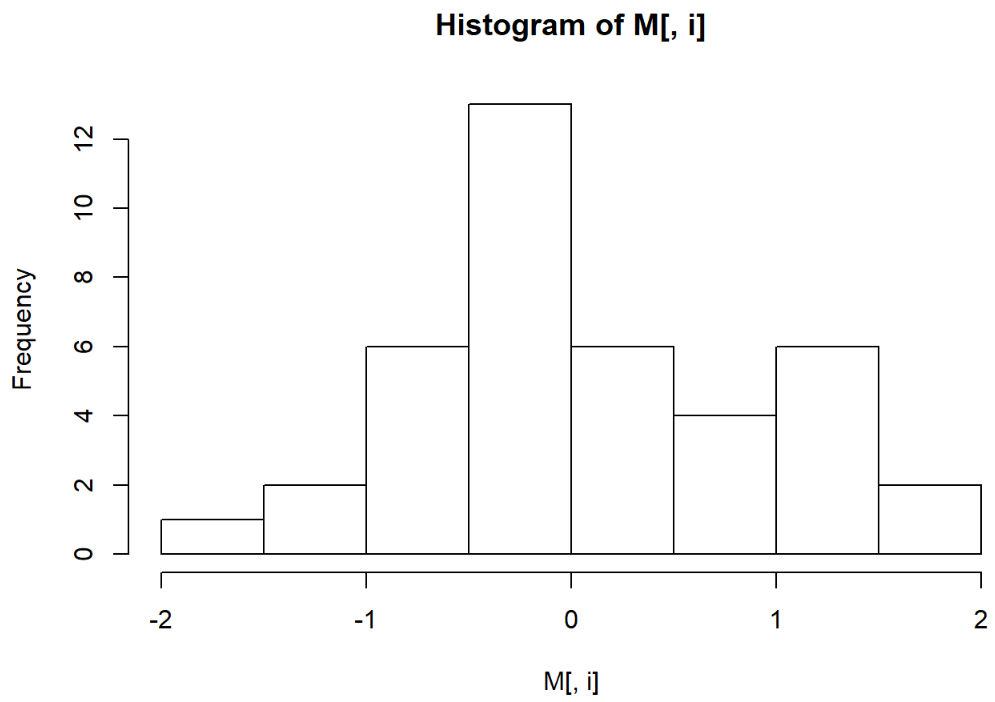
```r
data <- t(read.csv(file="dataset.csv", header=FALSE, sep=","))
```

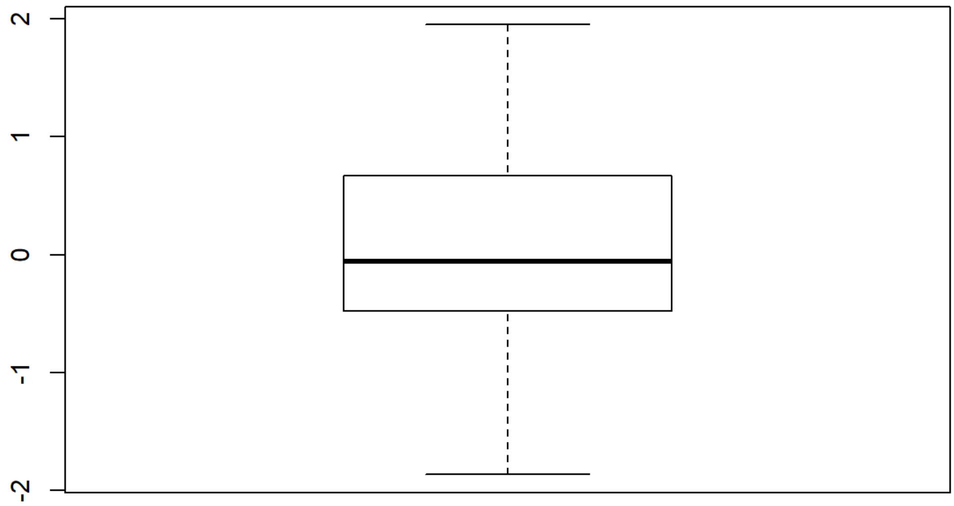
Comment interprétrer une boite à moustaches : –> la boite est délimitée par le premier et neuvième décile de la variable étudiée, ainsi cela nous permet de détecter des valeurs extrêmes (outliers) qui tireraient la distribution. –> les deux extrémités de la boite représente le premier et troisième quartile, par rapport à la médiane, la barre centrale. Cela nous permet d'interpréter la répartition des valeurs étudiées (savoir si la répartition se veut plus centrée, tirée d'un côté ou l'autre)

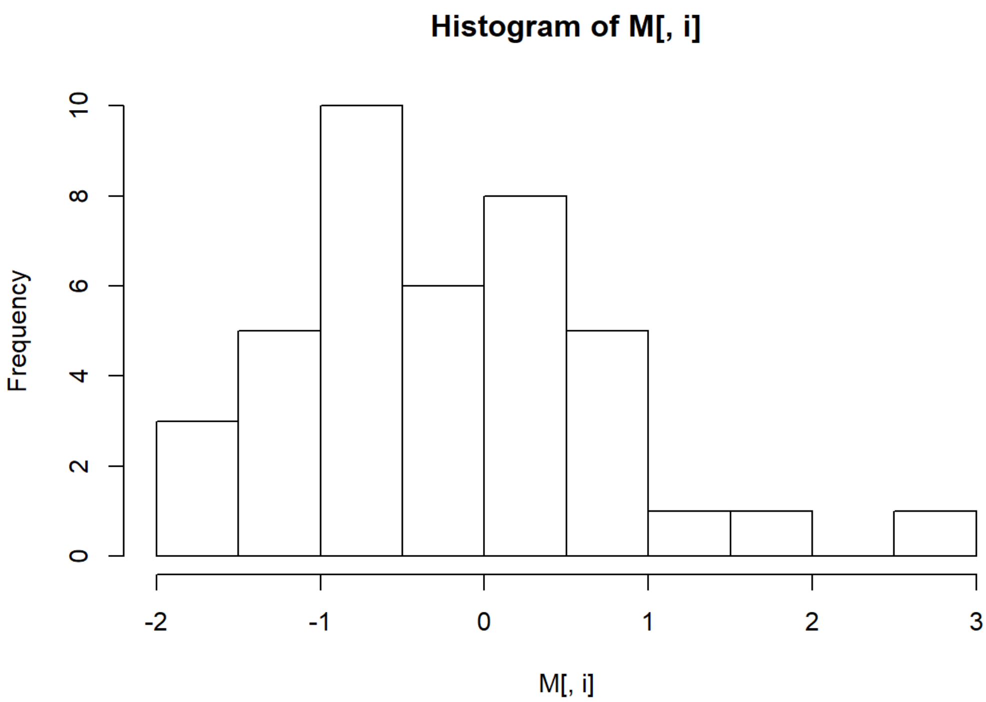
Comment interpréter l'histogramme : –> on doit retrouver la même tendance que dans la boite à moustache. –> On remarque très vite la répartition des données, certaines sont centrées et ont donc des valeurs symétriques, d'autre prenne une forme qui s'apparente plus à une distribution du Chi-square (qui tire vers la droite …).

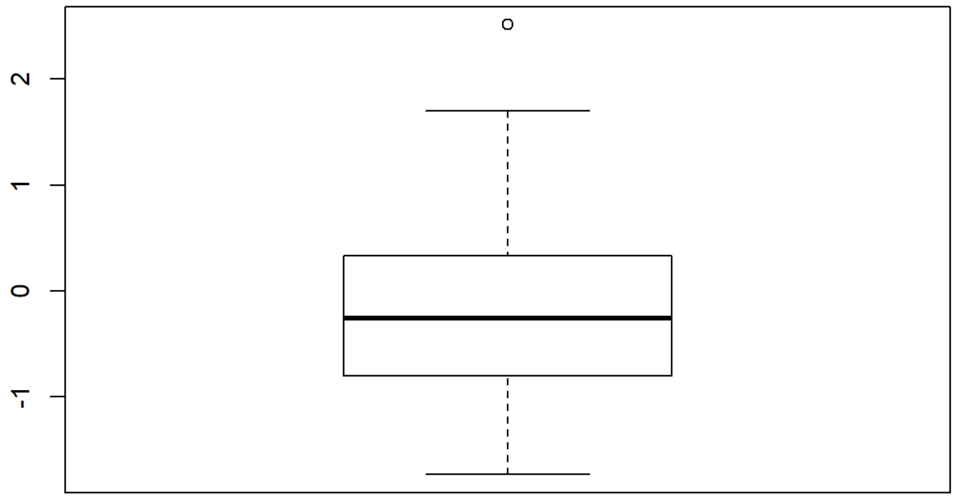
(Ici on se limitera au 40 première variables pour des raisons évidentes de tailles des annexes)

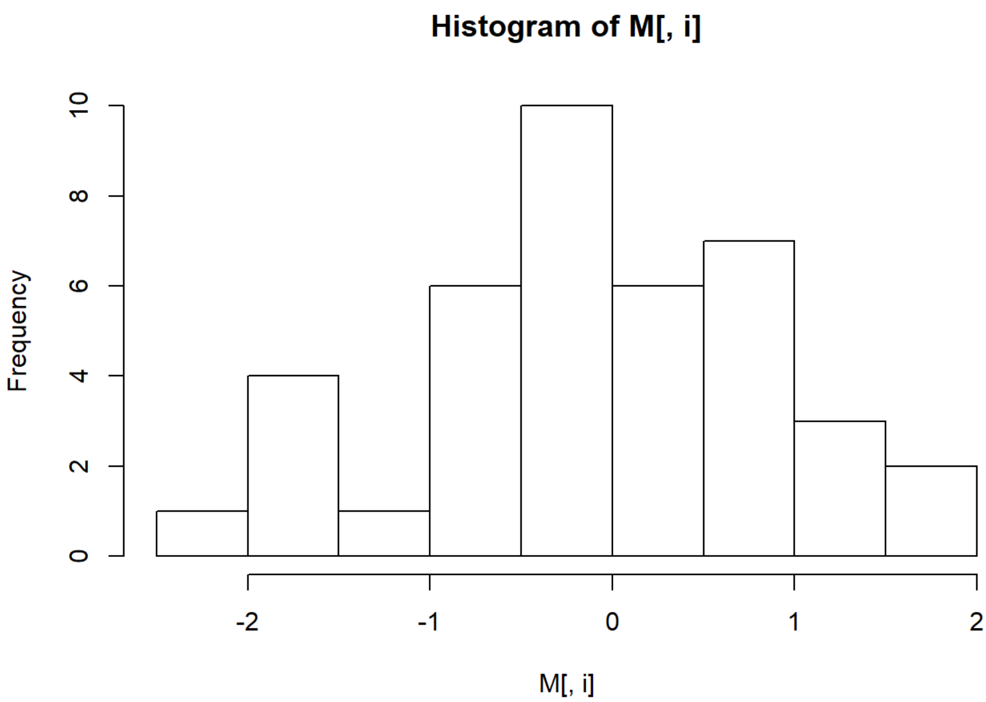
```r
explainDataset(data[,1:40], c(1:40))
```

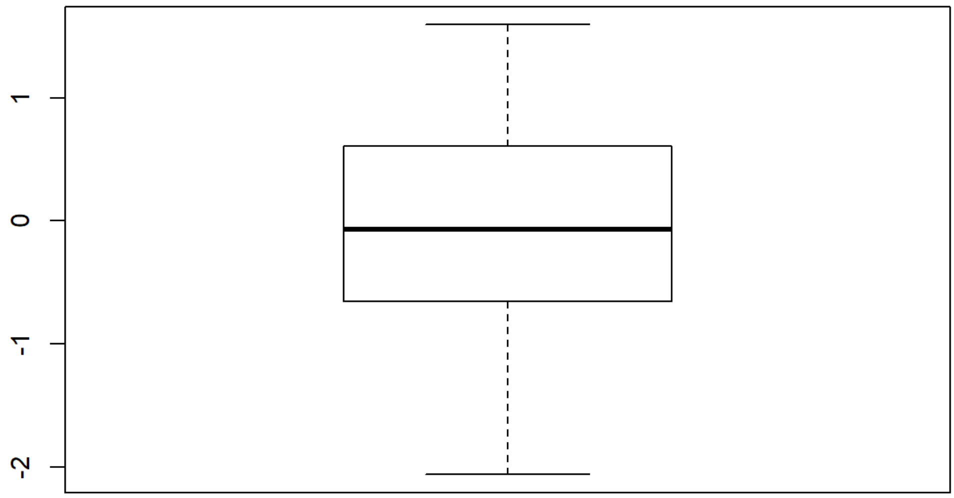



2
1
0
-1
-2

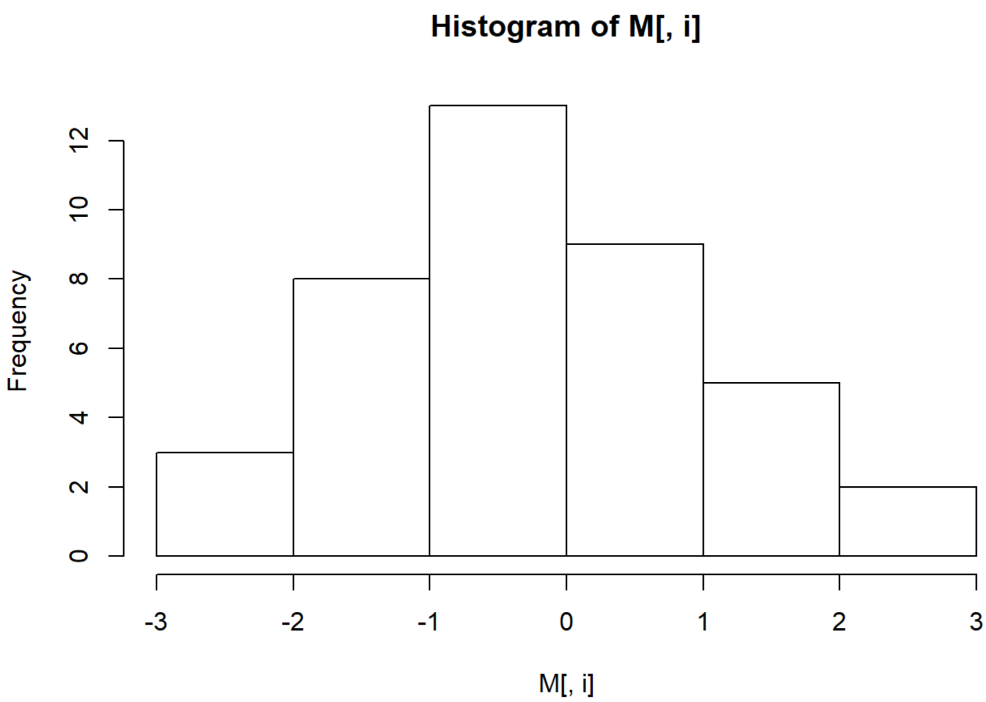

Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
3
M[, i]


-1
0
1
2

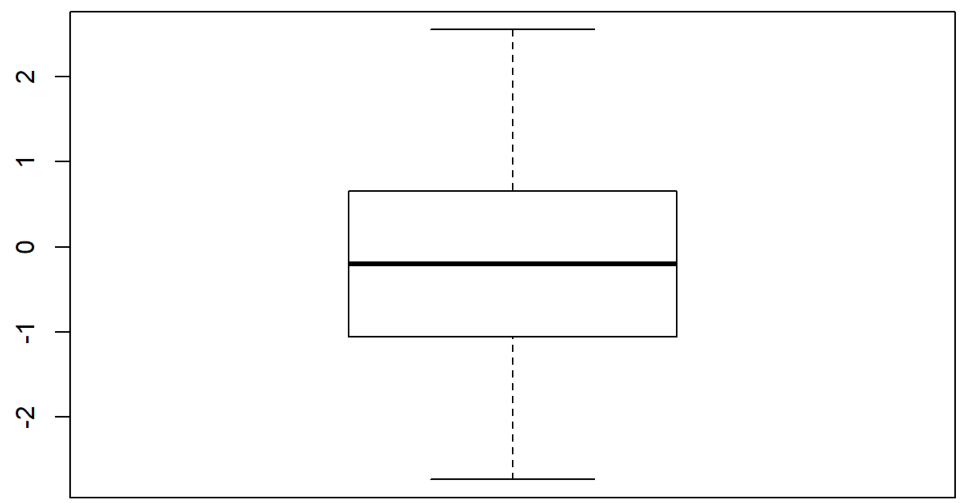

Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]



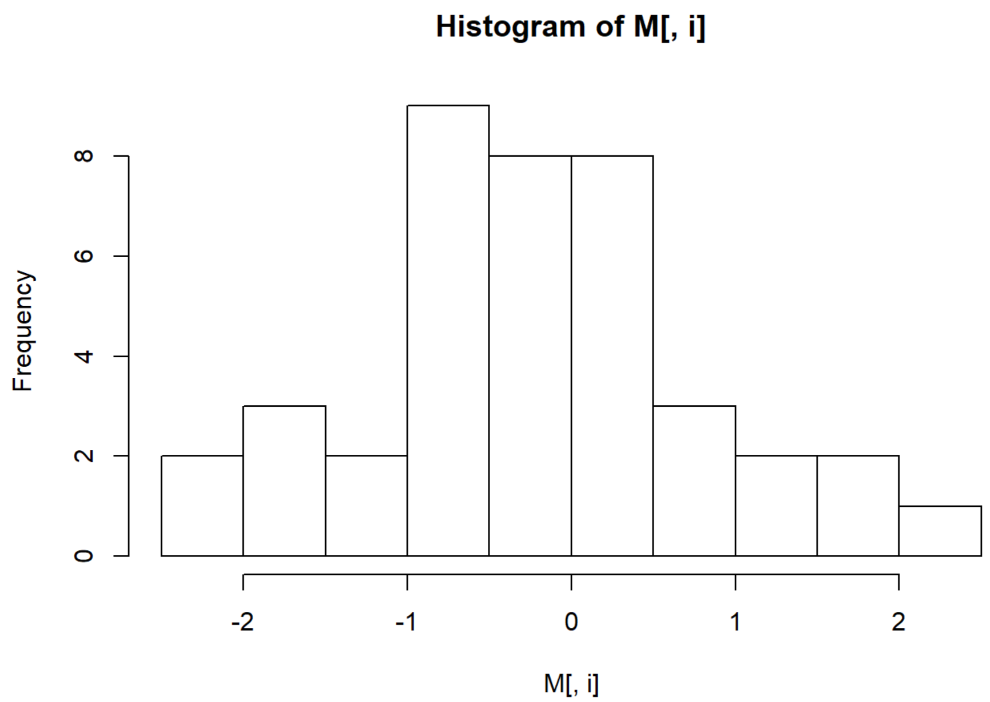
1
0
-1
-2



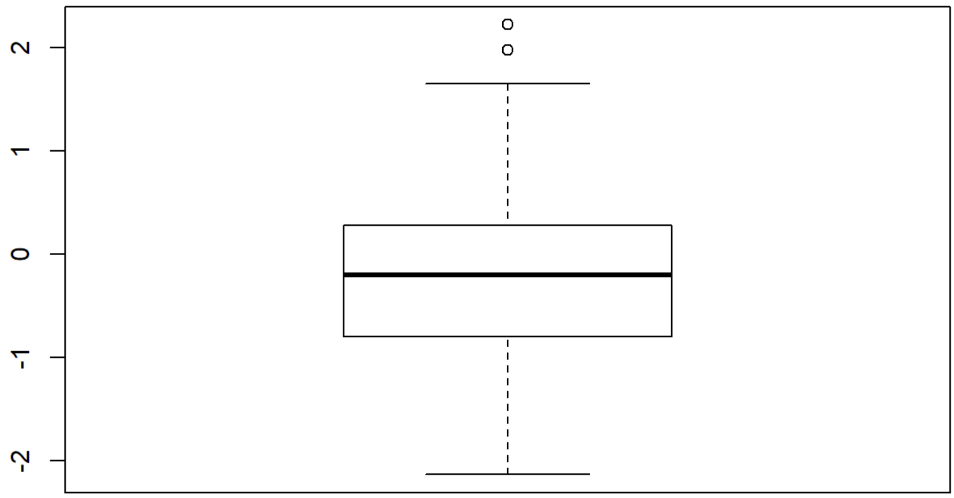
Histogram of M[, i]
Frequency
0
2
4
6
8
10
12
-3
-2
-1
0
1
2
3
M[, i]



2
1
0
-1
-2

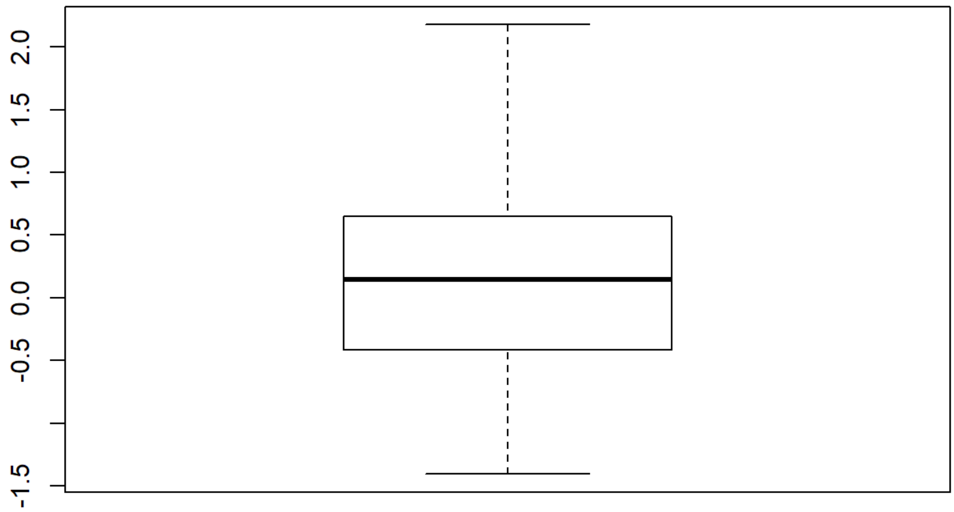


Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]

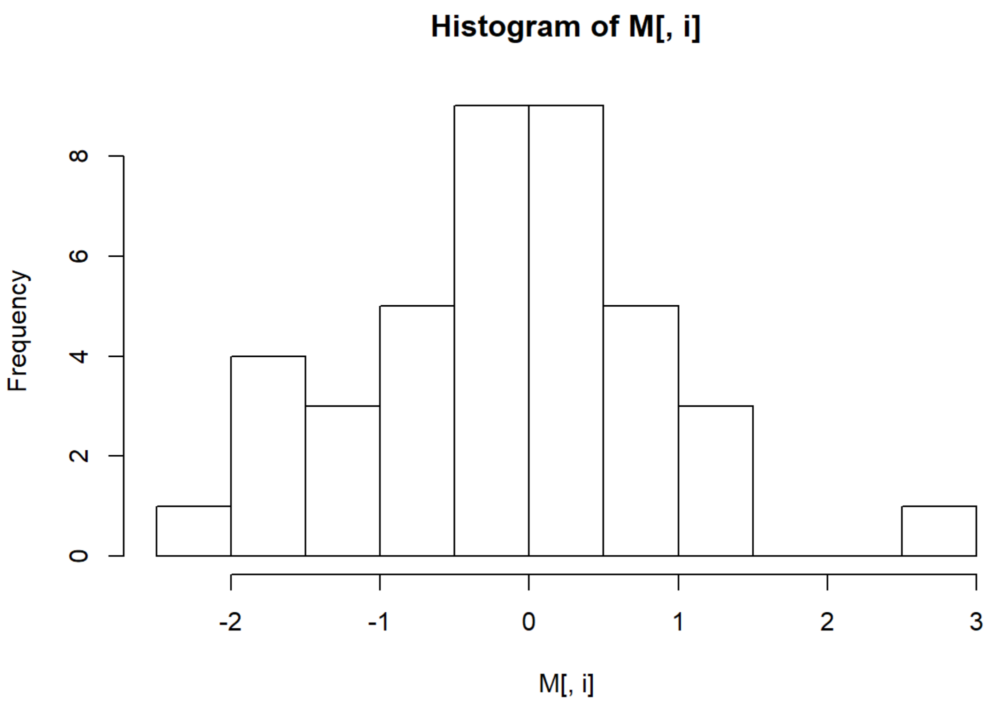


2
1
0
-1
-2

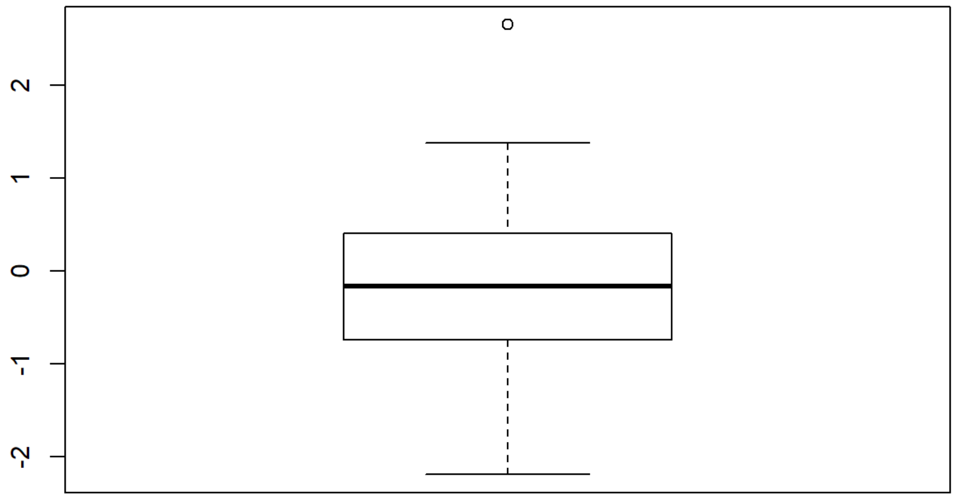
Histogram of M[, i]
Frequency
0
2
4
6
8
-1
0
1
2
M[, i]



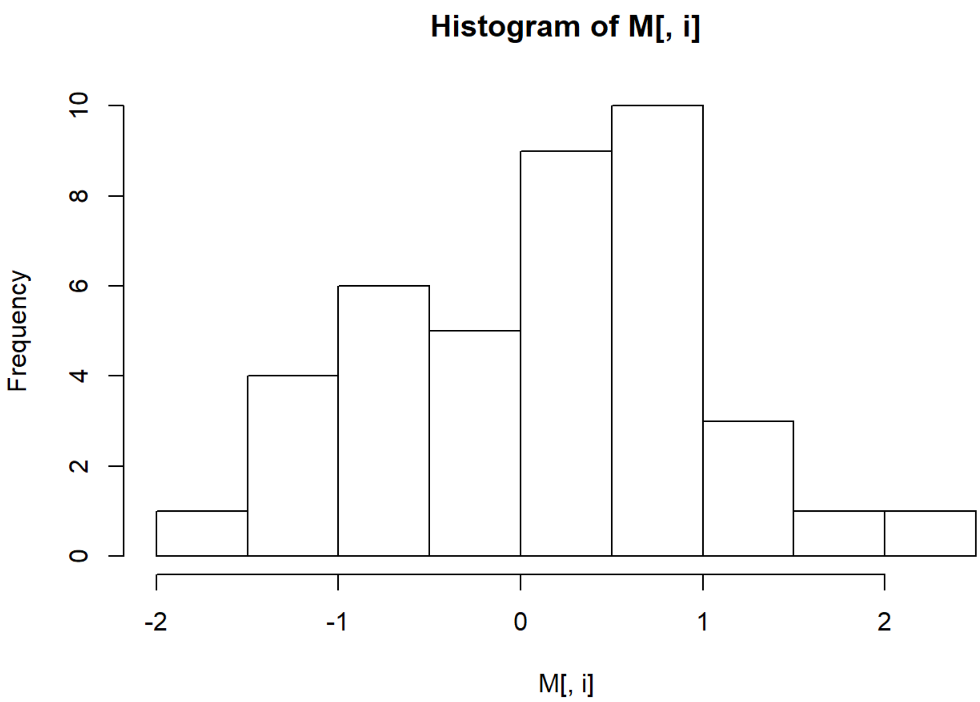
2.0
1.5
1.0
0.5
0.0
-0.5
-1.5



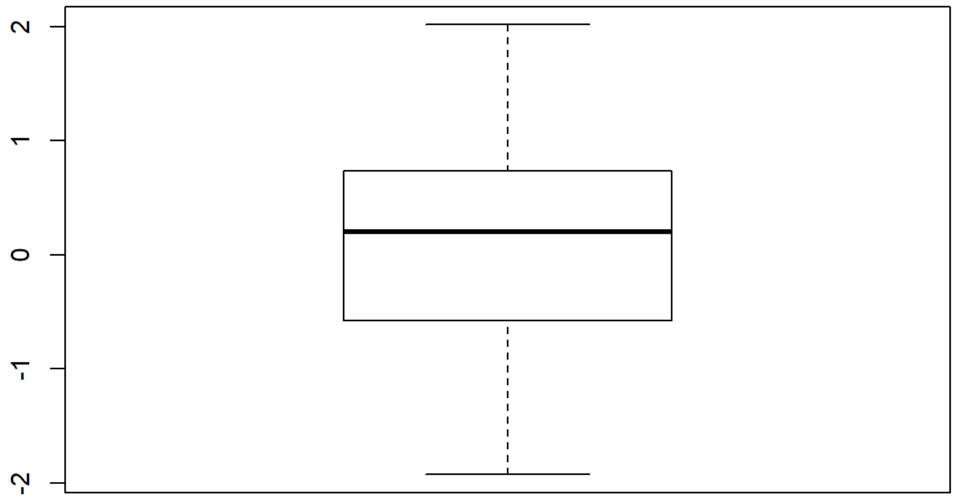
Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
3
M[, i]

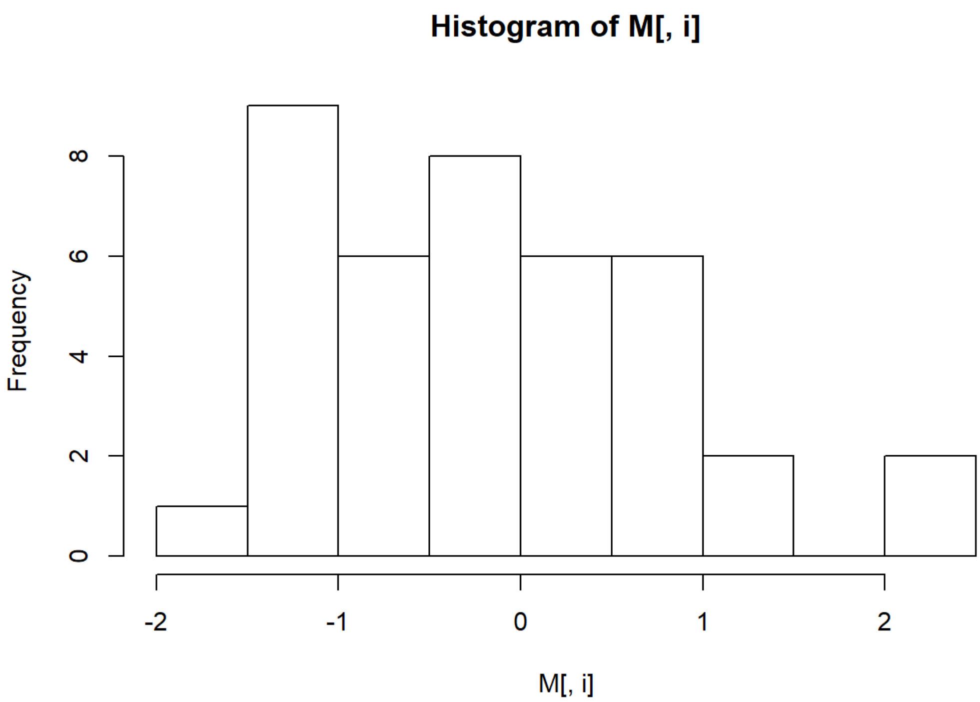


2
1
0
-1
-2

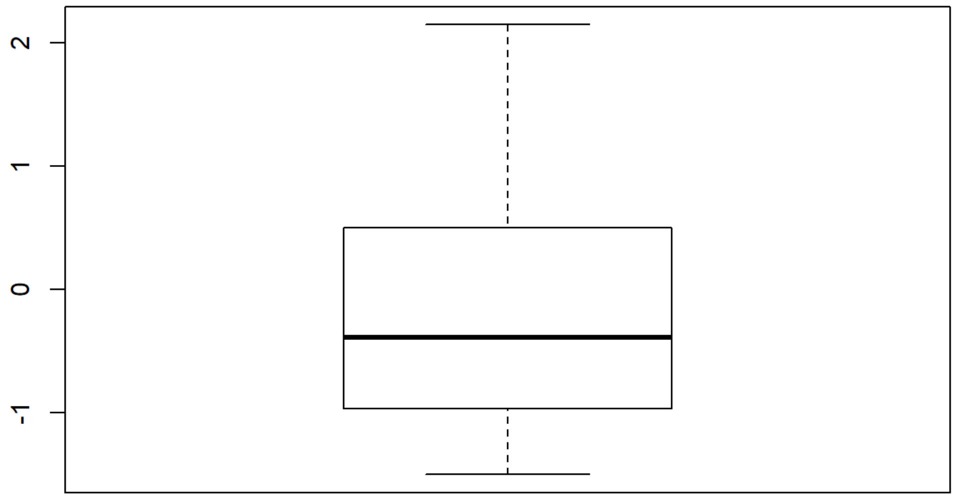


Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]

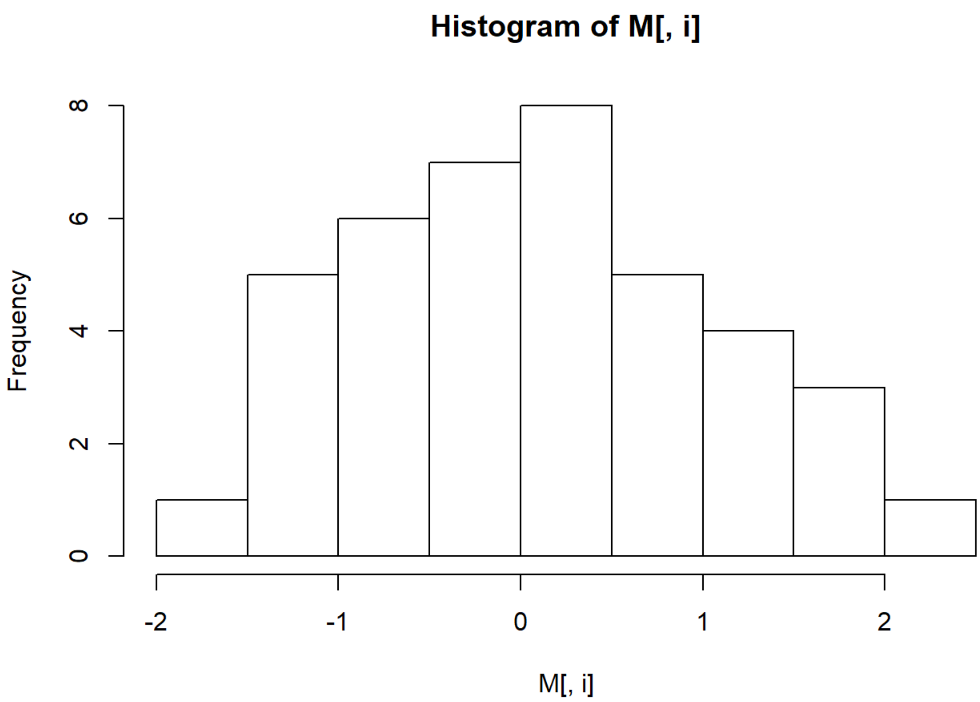




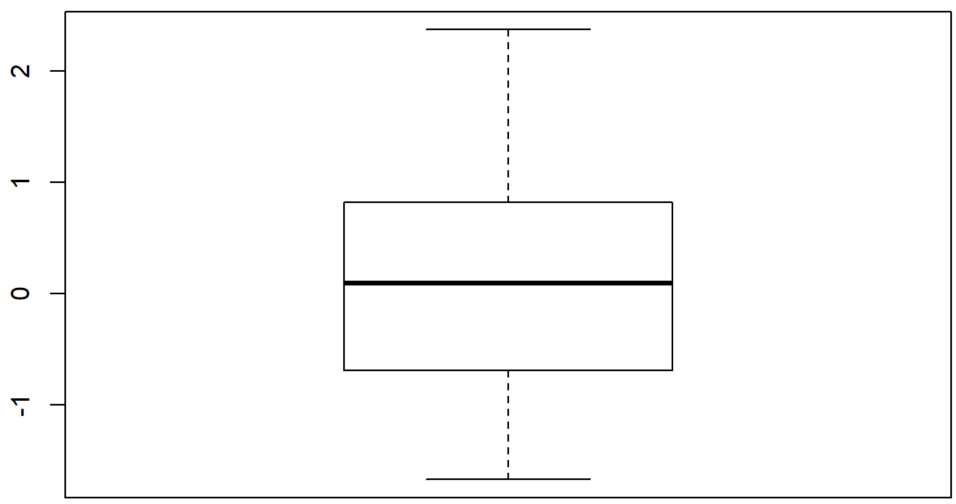
Histogram of M[, i]
Frequency
M[, i]



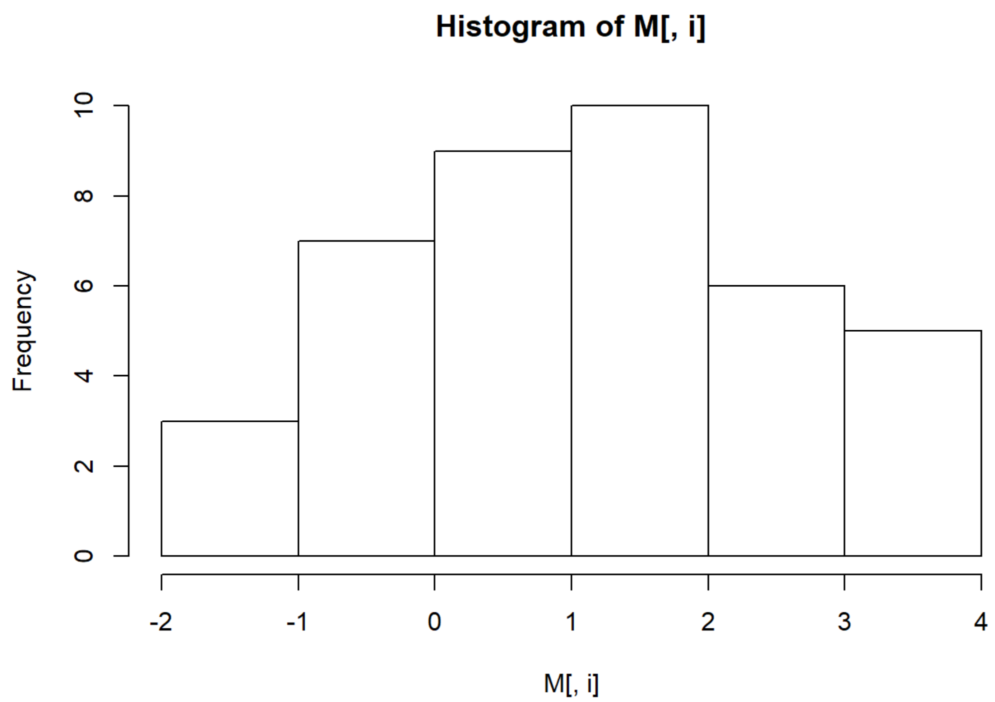
2
1
0
-1



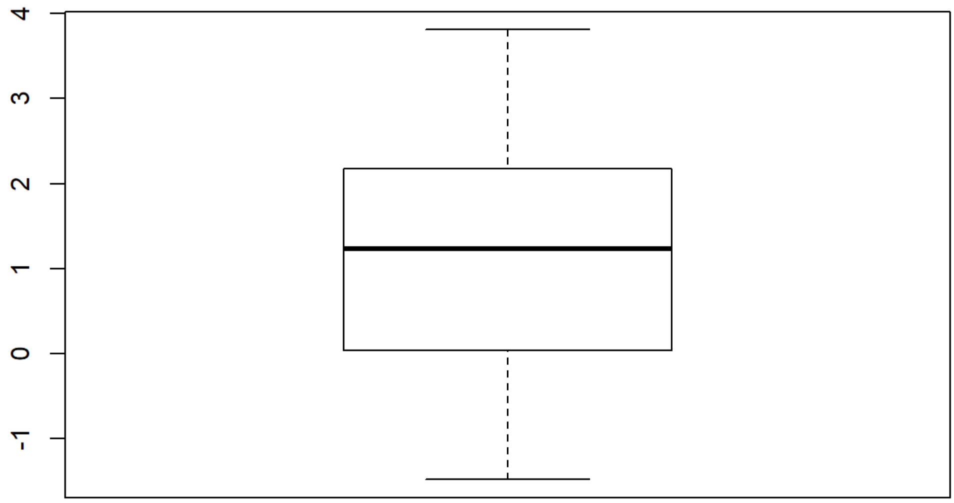
Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]

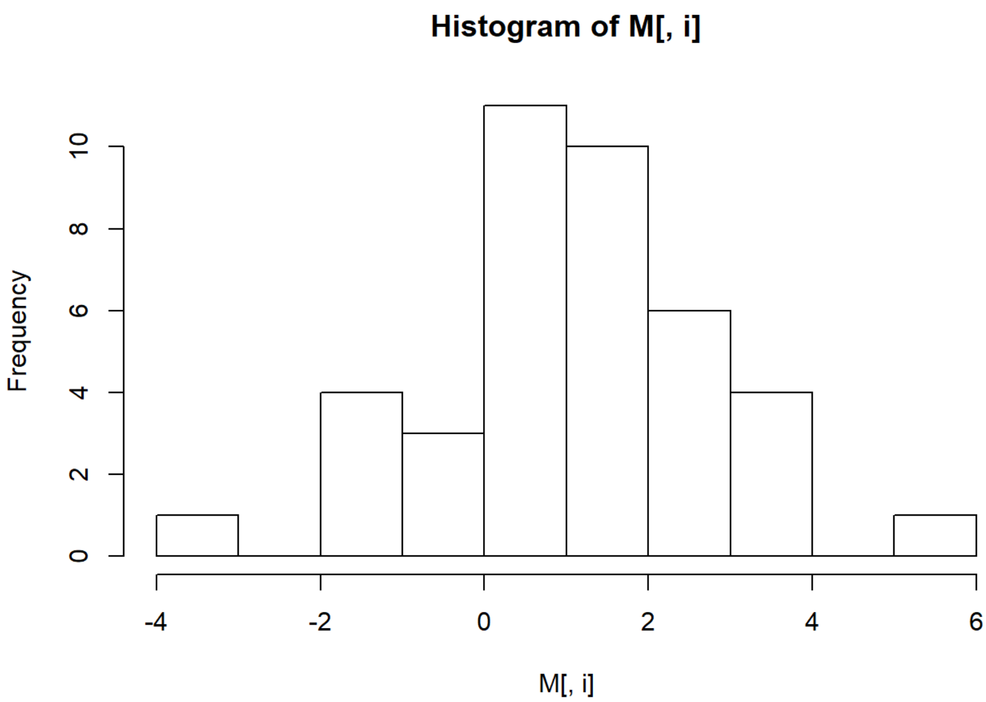


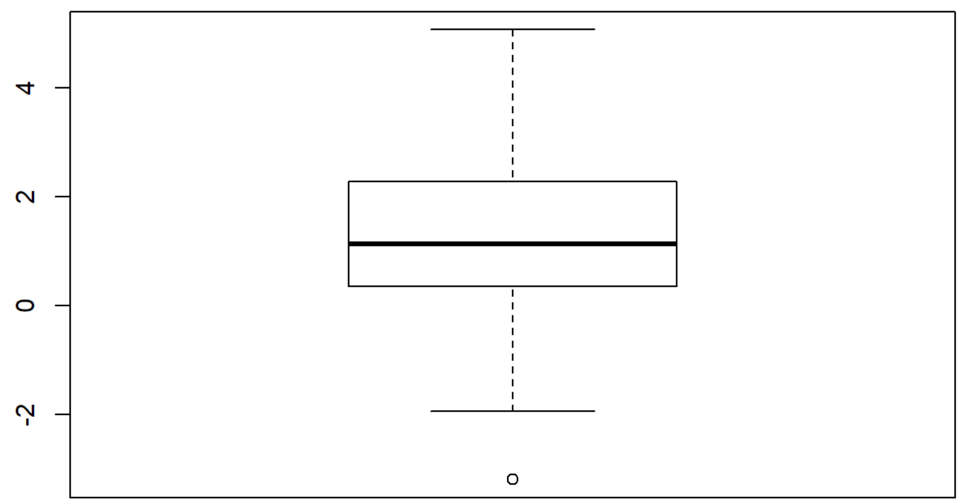
2
1
0
-1



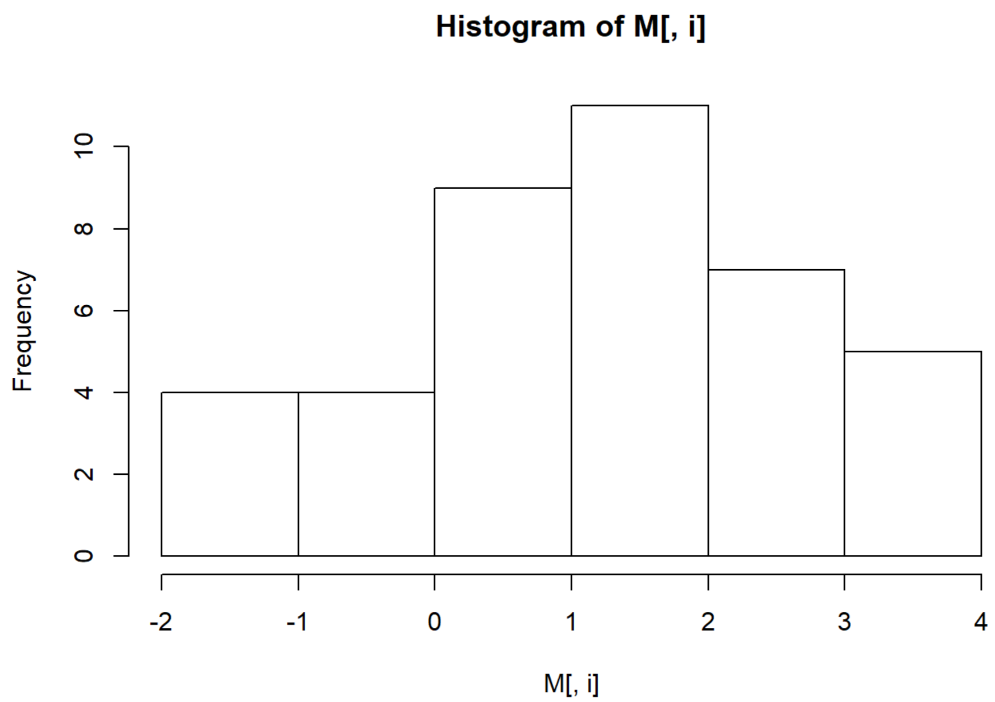
Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
3
4
M[, i]


4
3
2
1
0
-1

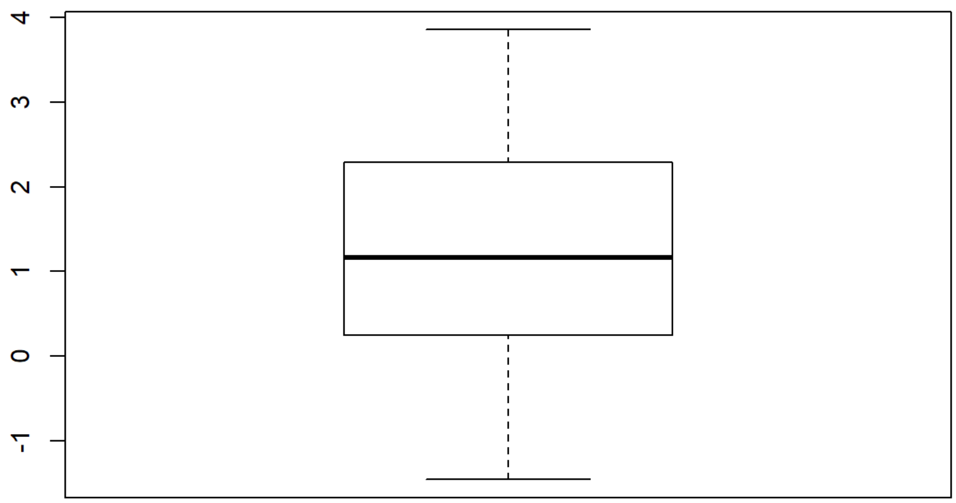

Histogram of M[, i]
Frequency
10
8
6
4
2
0
-4
-2
0
2
4
6
M[, i]

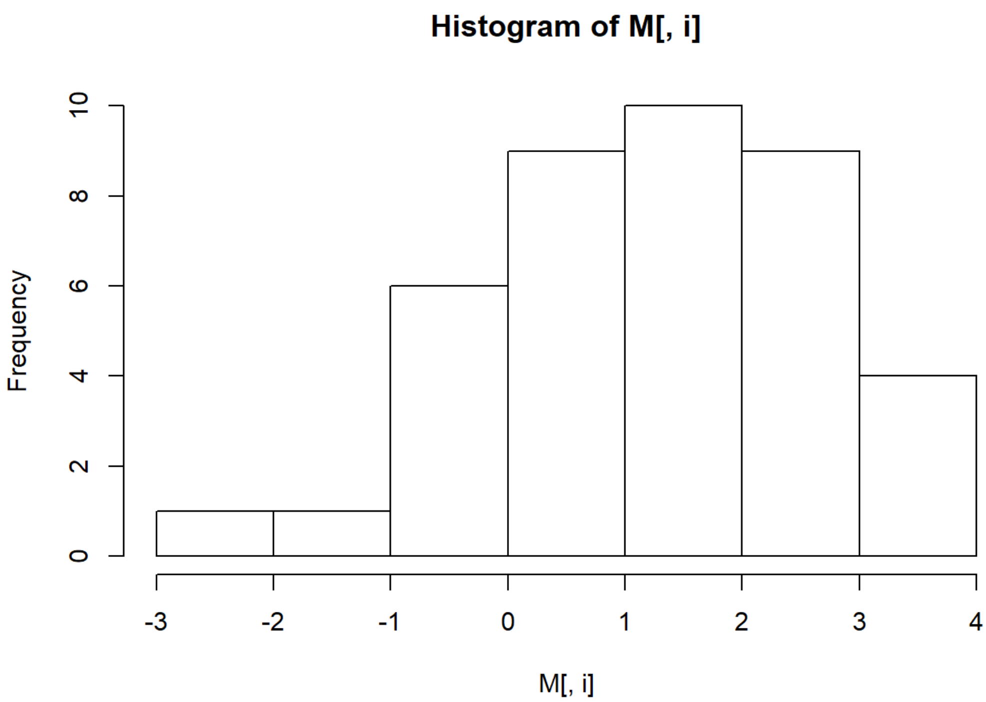


4
2
0
-2



Histogram of M[, i]
Frequency
10
8
6
4
2
0
-2
-1
0
1
2
3
4
M[, i]


-1
0
1
2
3
4


Histogram of M[, i]
Frequency
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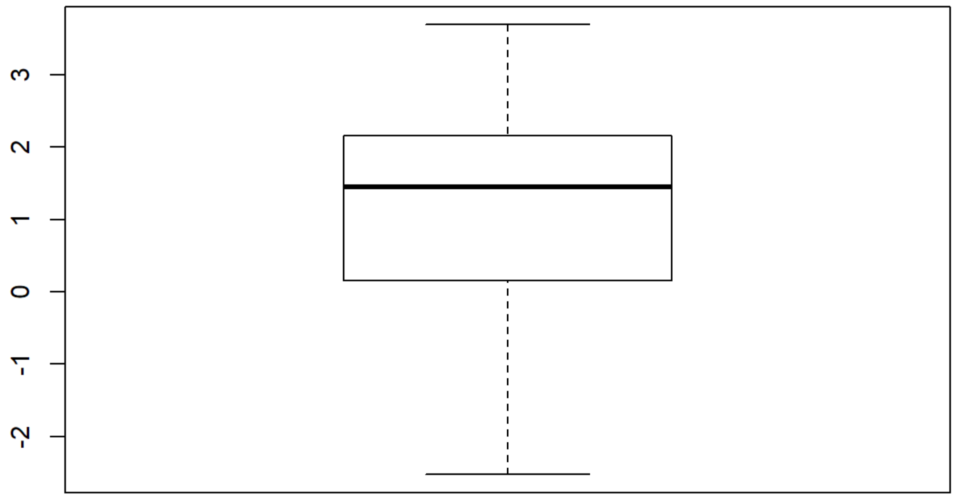
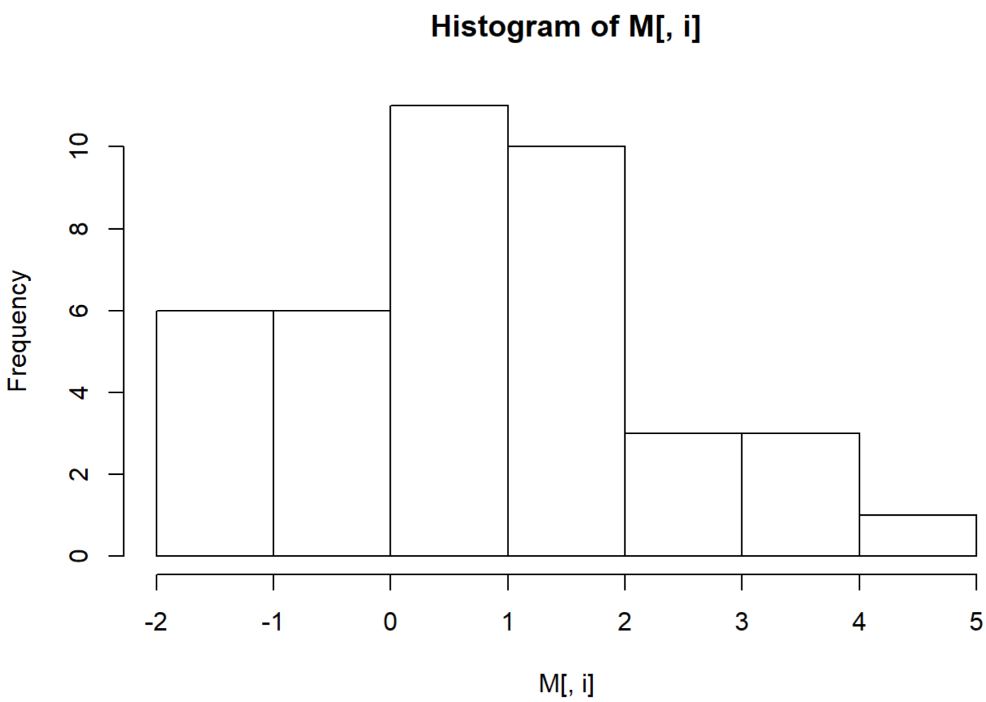
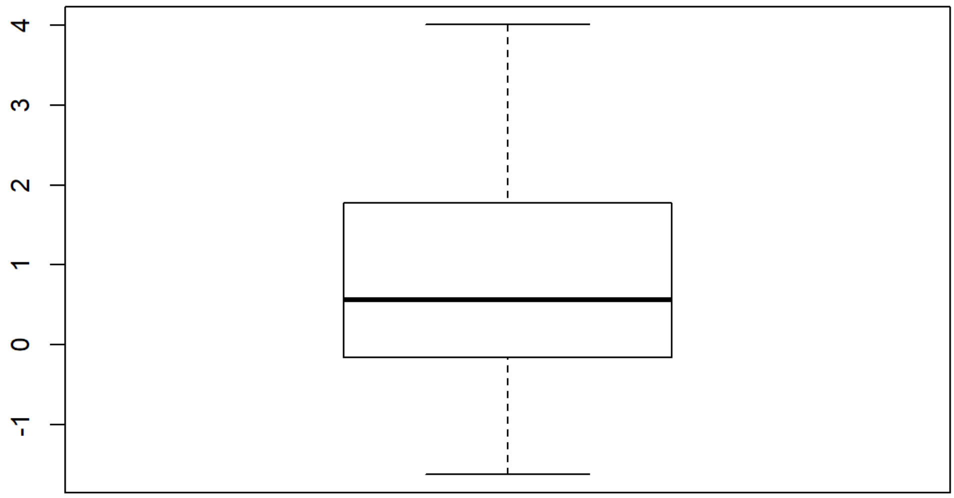
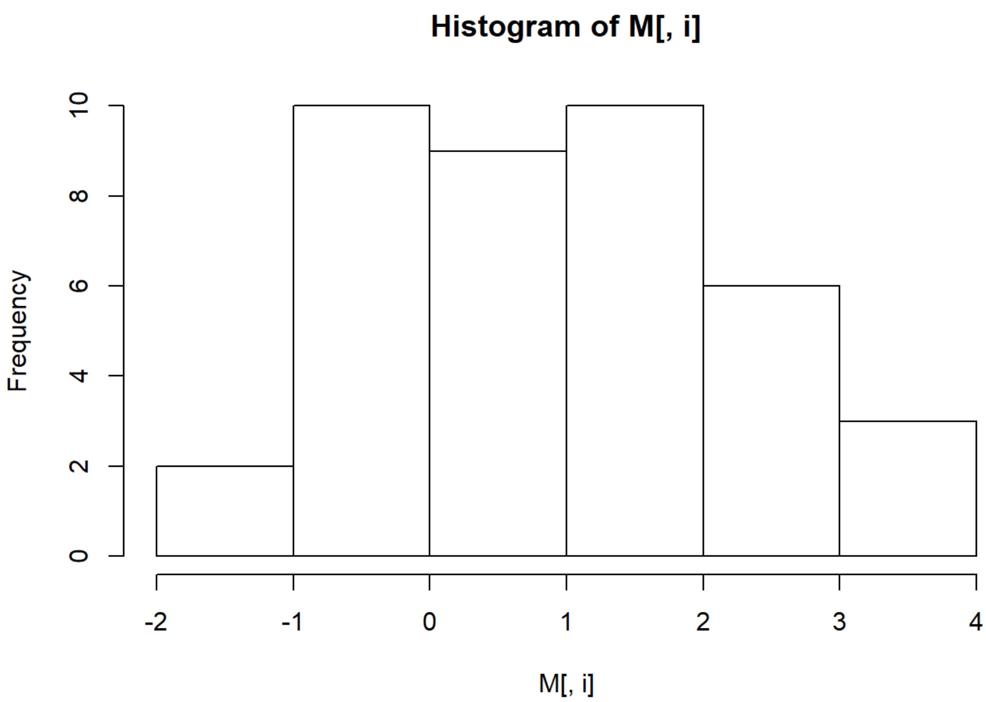
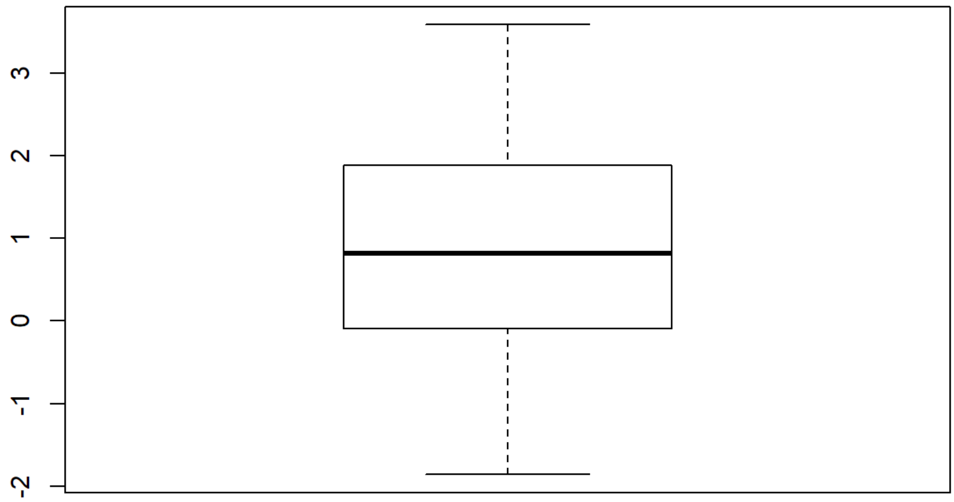
2
4
6
8
10
-3
-2
-1
0
1
2
3
4
M[, i]


3
2
1
0
-1
-2

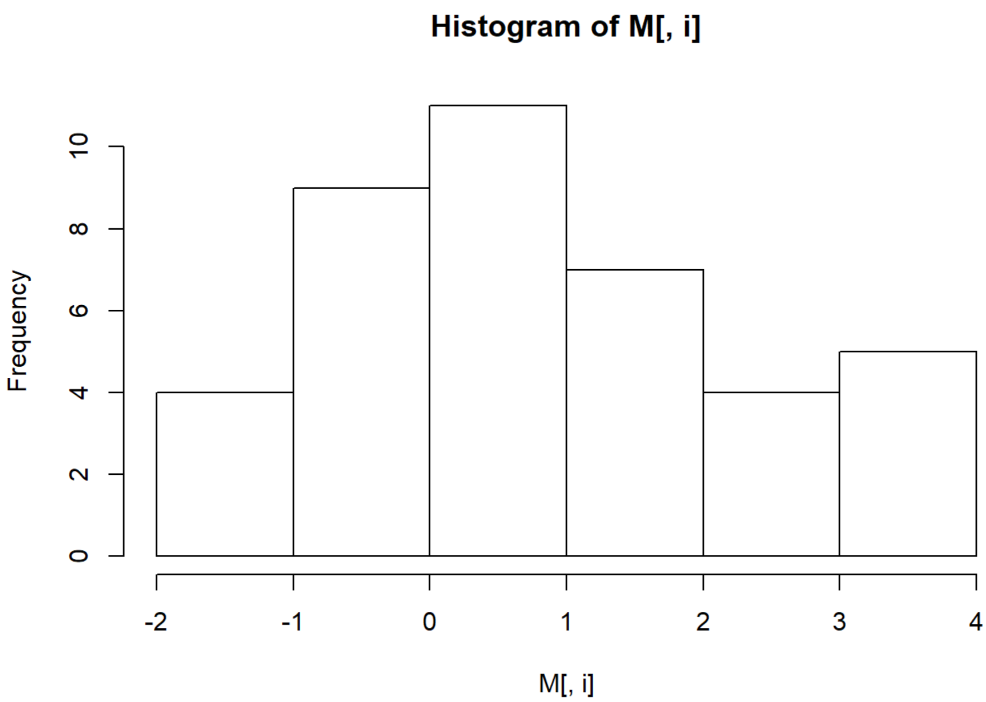

Histogram of M[, i]
Frequency
10
8
6
4
2
0
-2
-1
0
1
2
3
4
5
M[, i]


4
3
2
1
0
-1

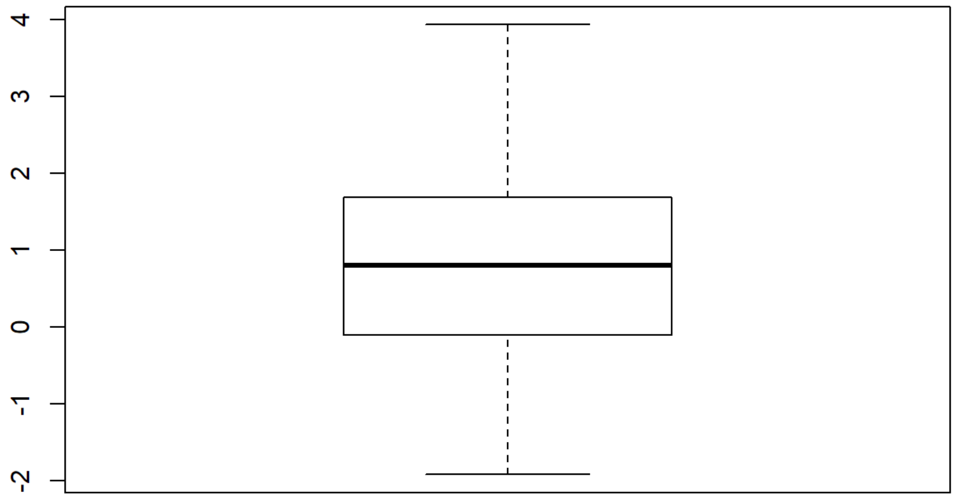

Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
3
4
M[, i]



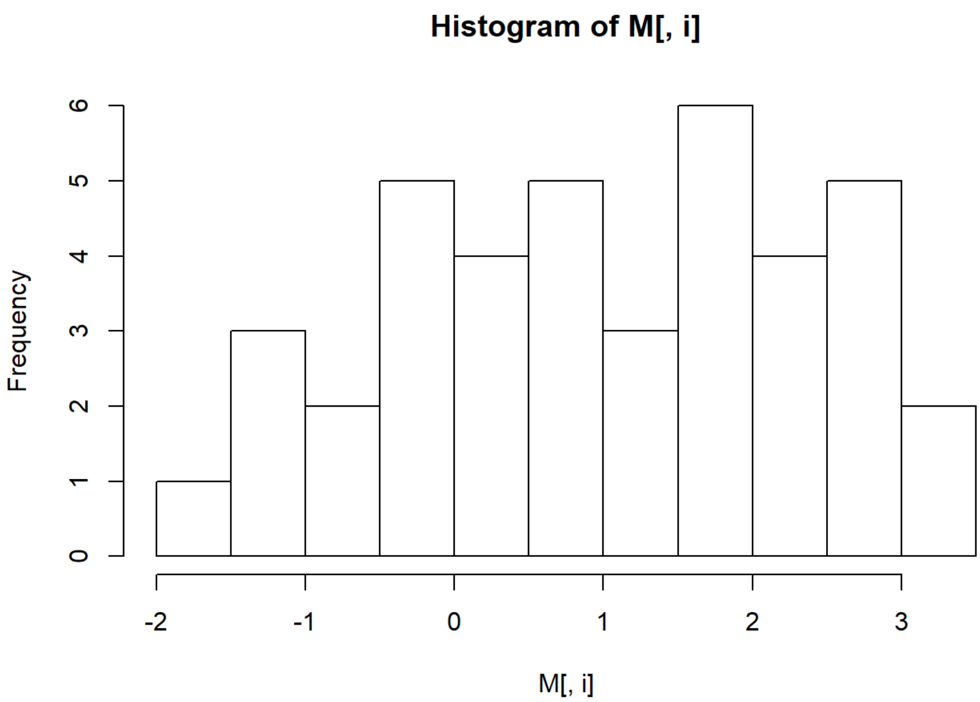
3
2
1
0
-1
-2



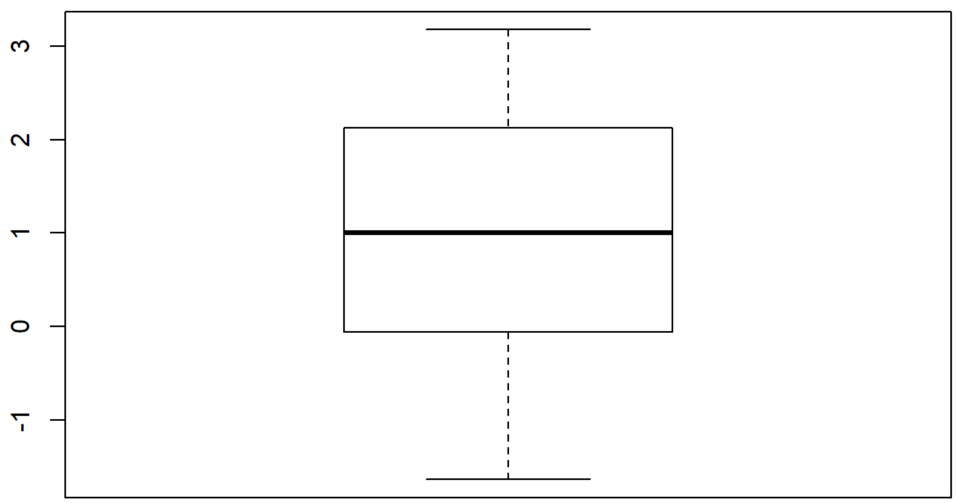
Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
3
4
M[, i]



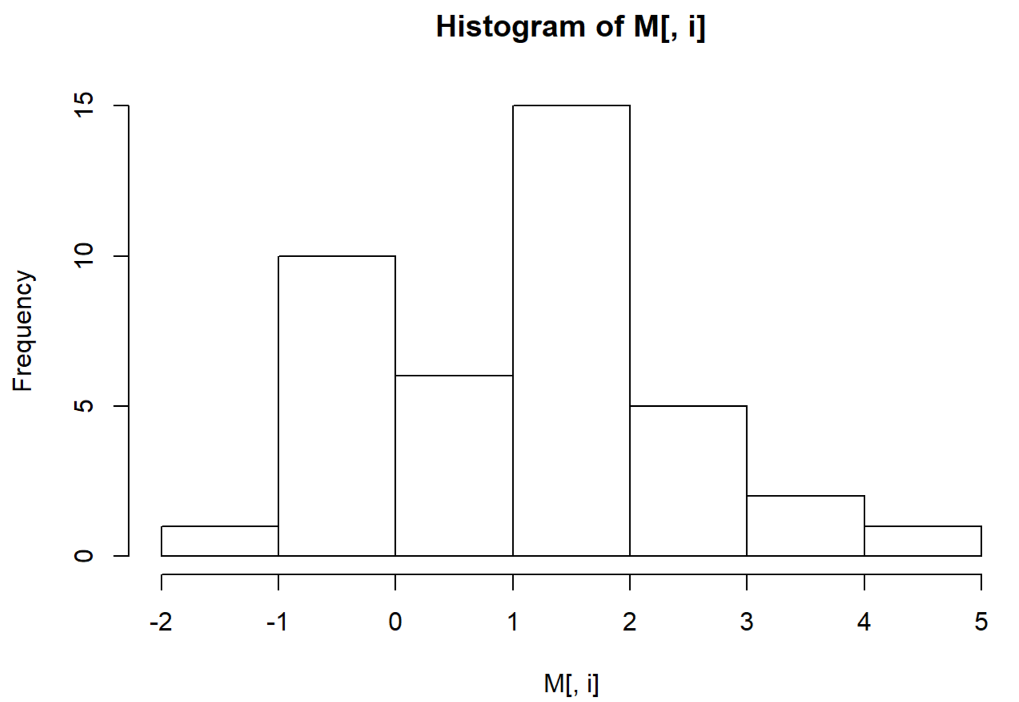
4
3
2
1
0
-1
-2



Histogram of M[, i]
Frequency
0
1
2
3
4
5
6
-2
-1
0
1
2
3
M[, i]



3
2
1
0
-1



Histogram of M[, i]
Frequency
0
5
10
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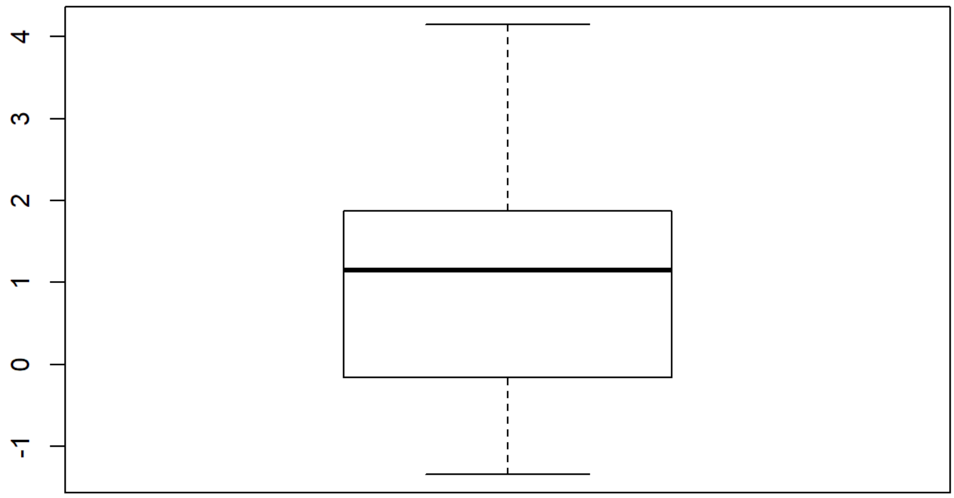
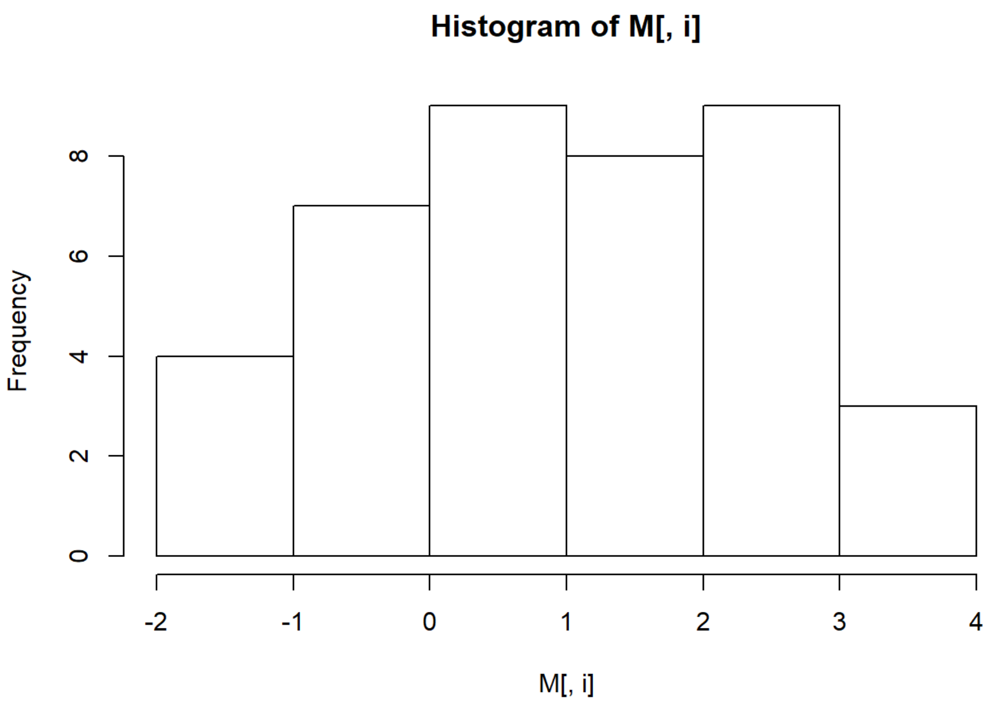
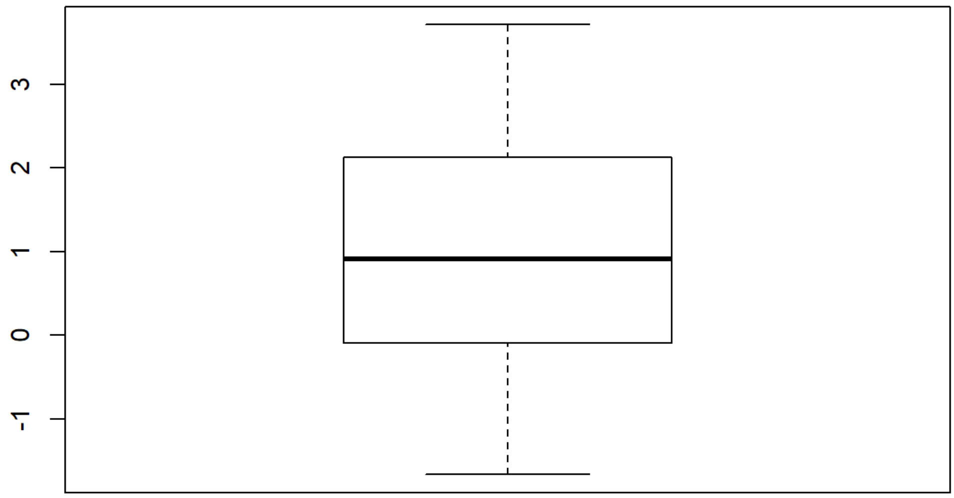
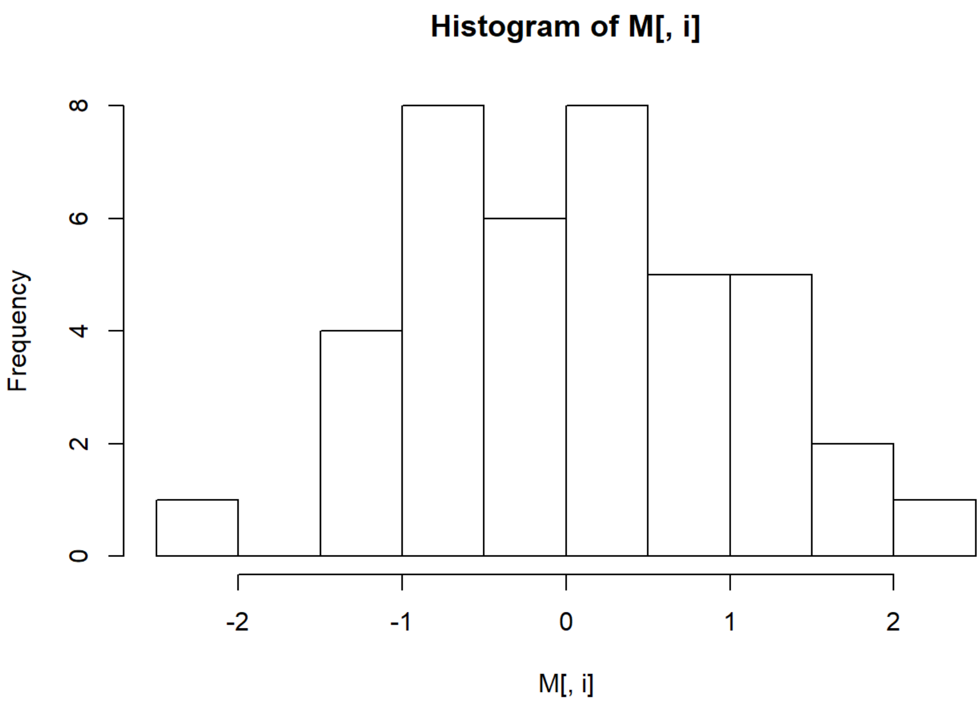
-2
-1
0
1
2
3
4
5
M[, i]


-1
0
1
2
3
4

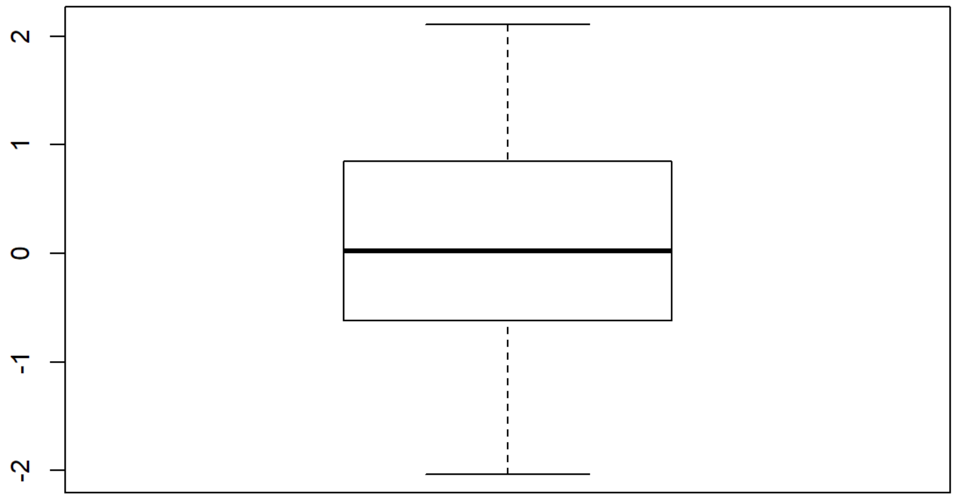

Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
3
4
M[, i]

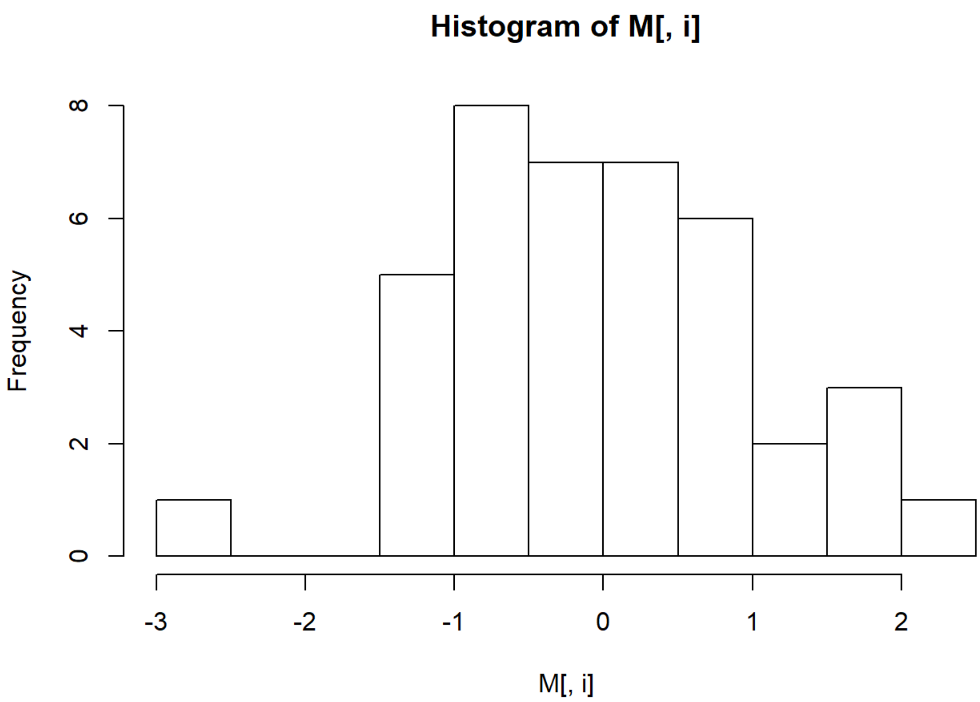


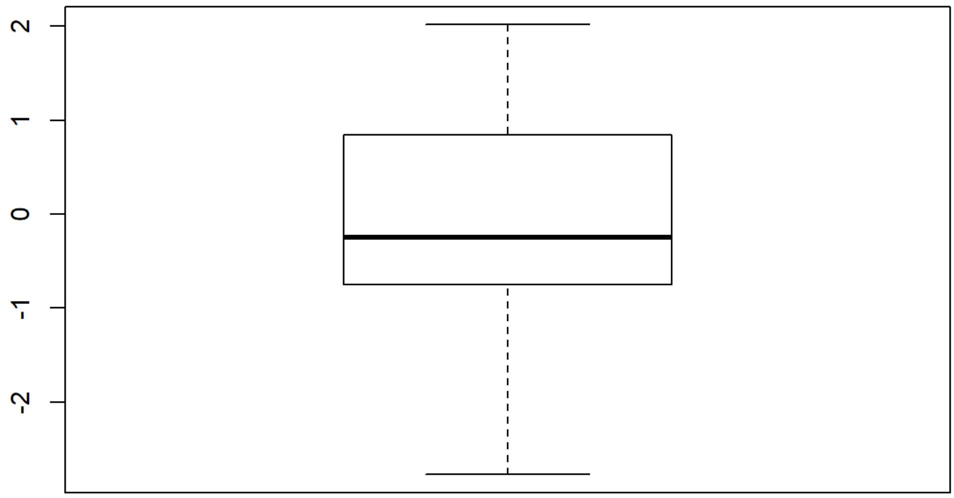
-1
0
1
2
3

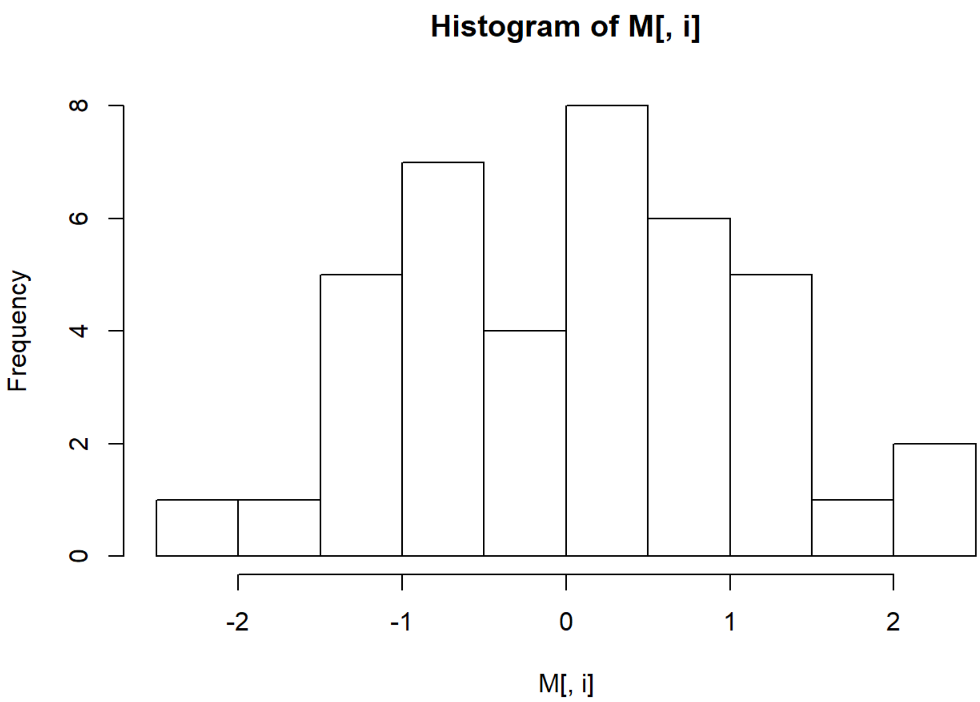


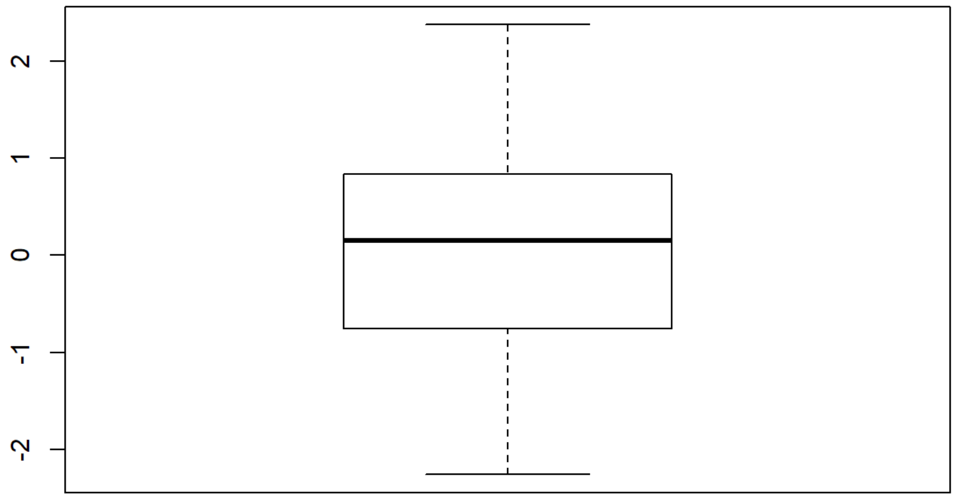
Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]


2
1
0
-1
-2

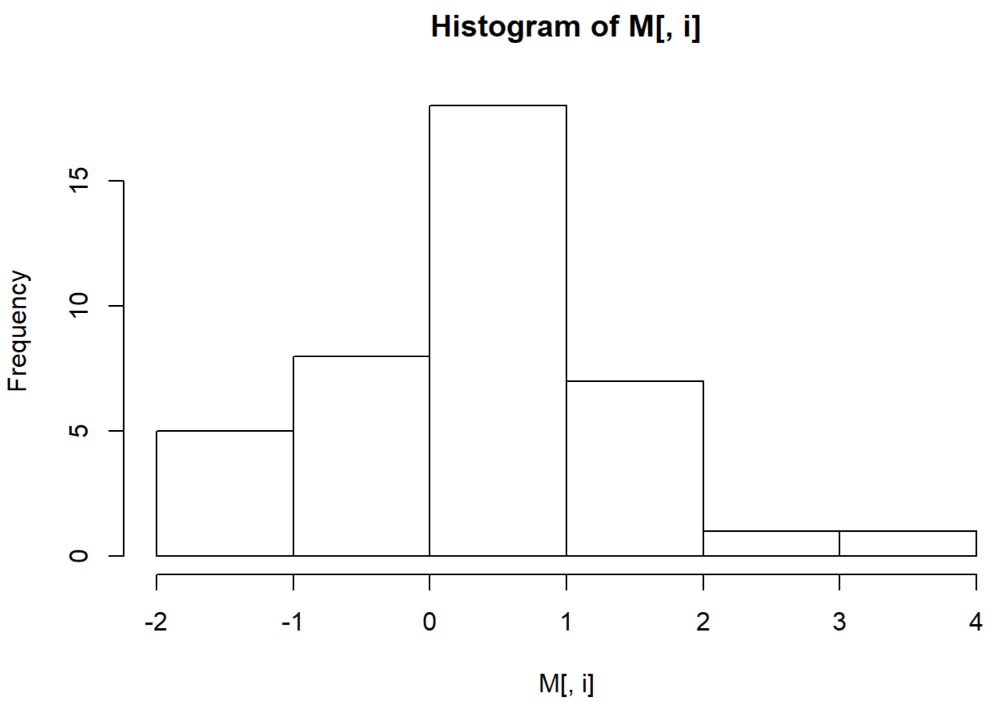

Histogram of M[, i]
Frequency
M[, i]
0
2
4
6
8
-3
-2
-1
0
1
2


2
1
0
-1
-2

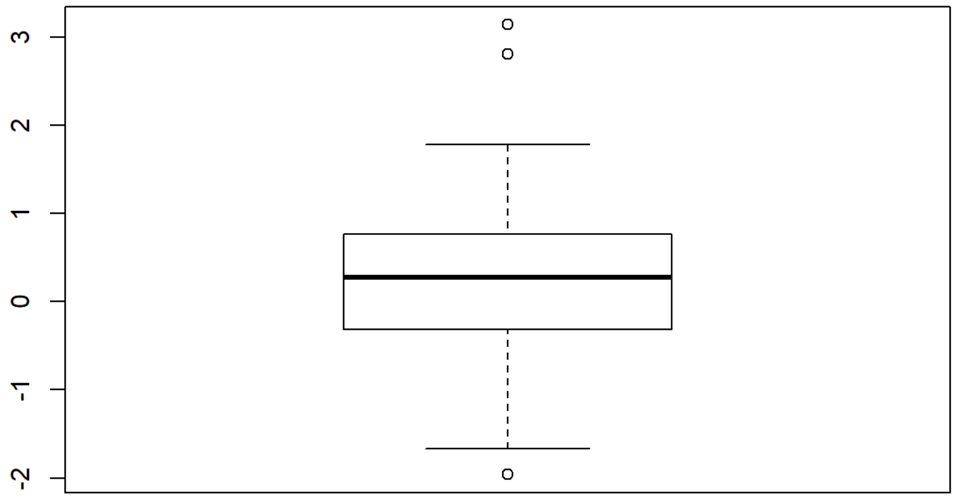

Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]



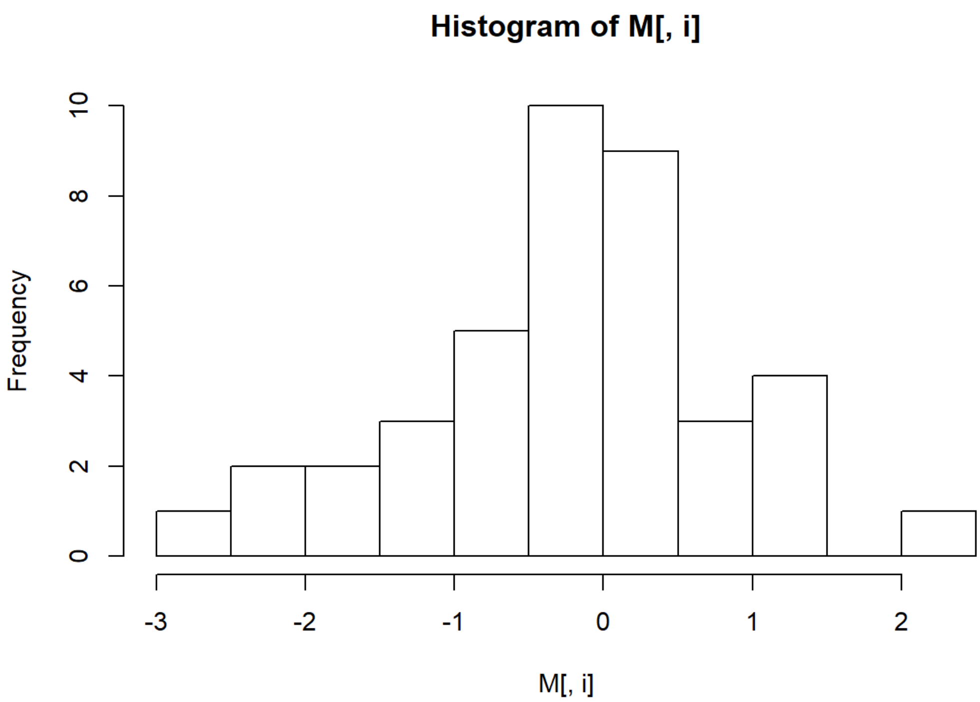
2
1
0
-1
-2



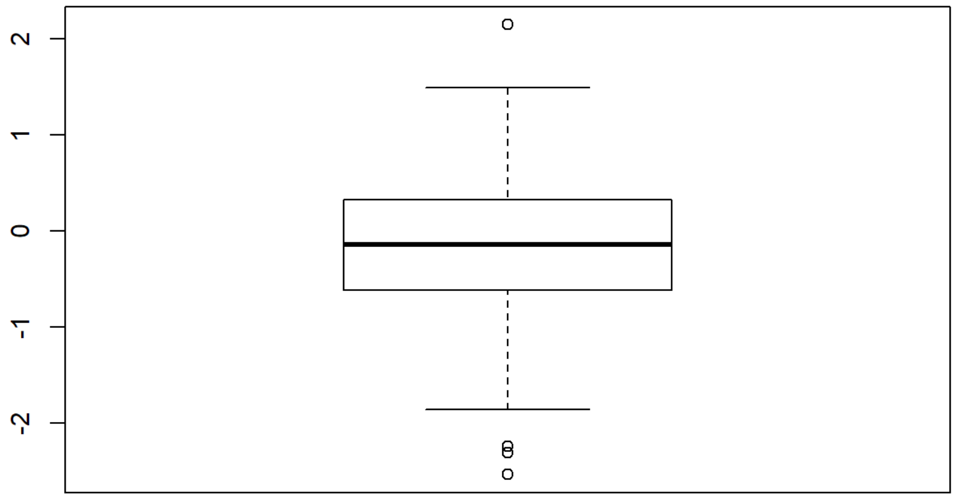
Histogram of M[, i]
Frequency
0
5
10
15
-2
-1
0
1
2
3
4
M[, i]



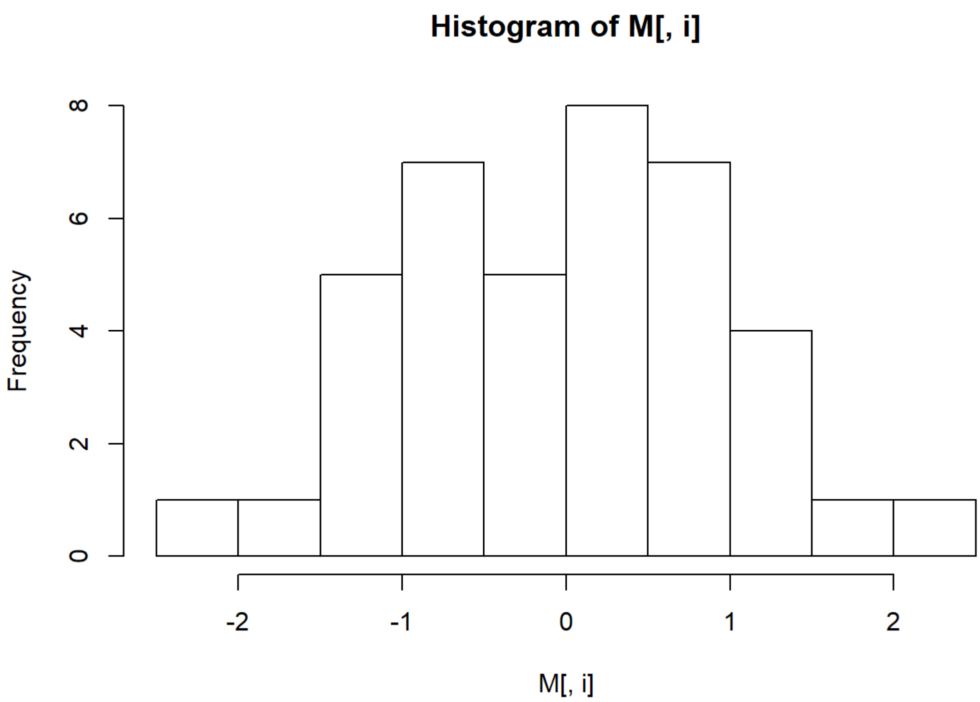
-2
-1
0
1
2
3



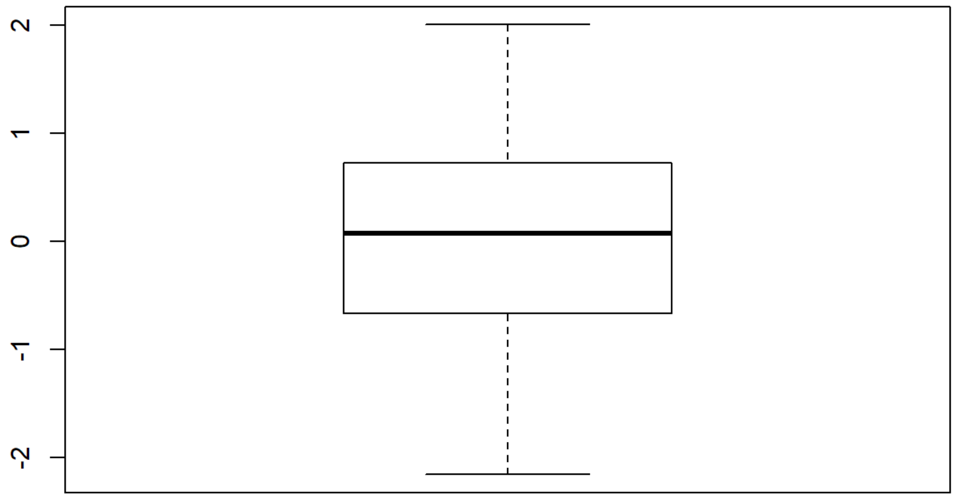
Histogram of M[, i]
Frequency
0
2
4
6
8
10
-3
-2
-1
0
1
2
M[, i]

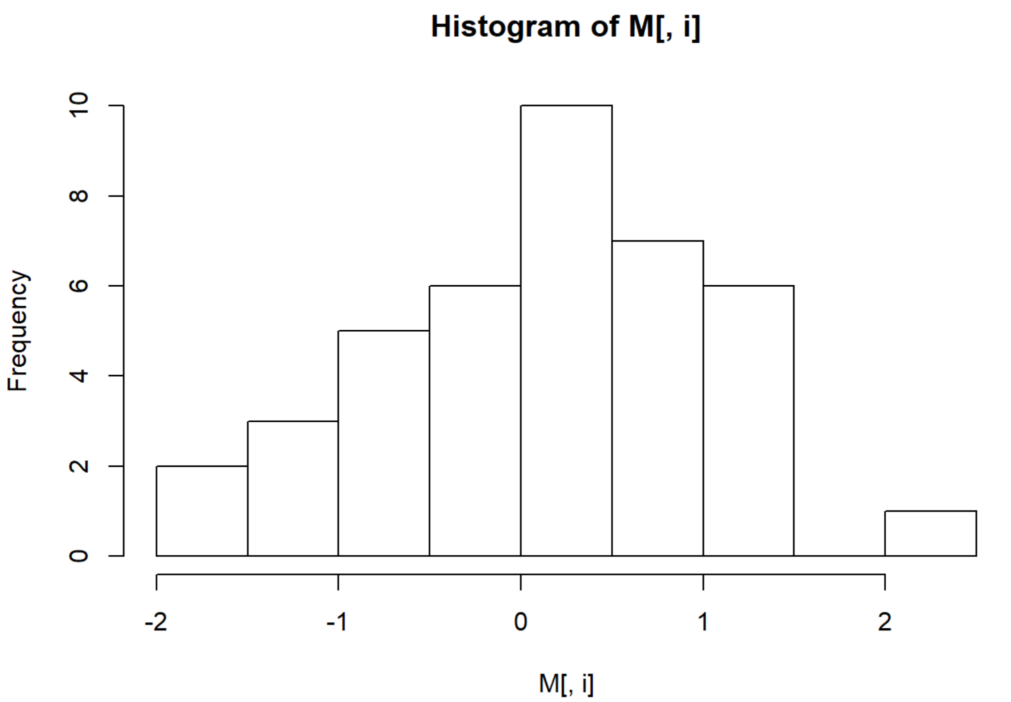


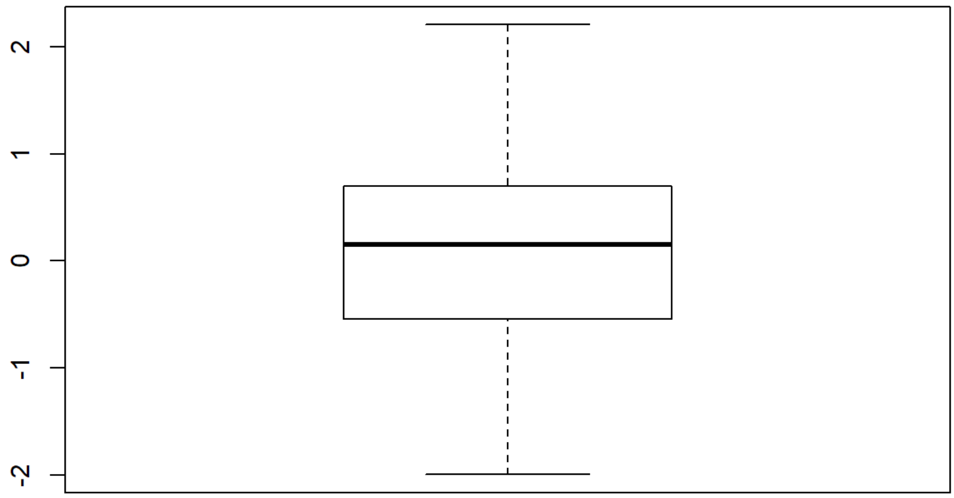
2
1
0
-1
-2

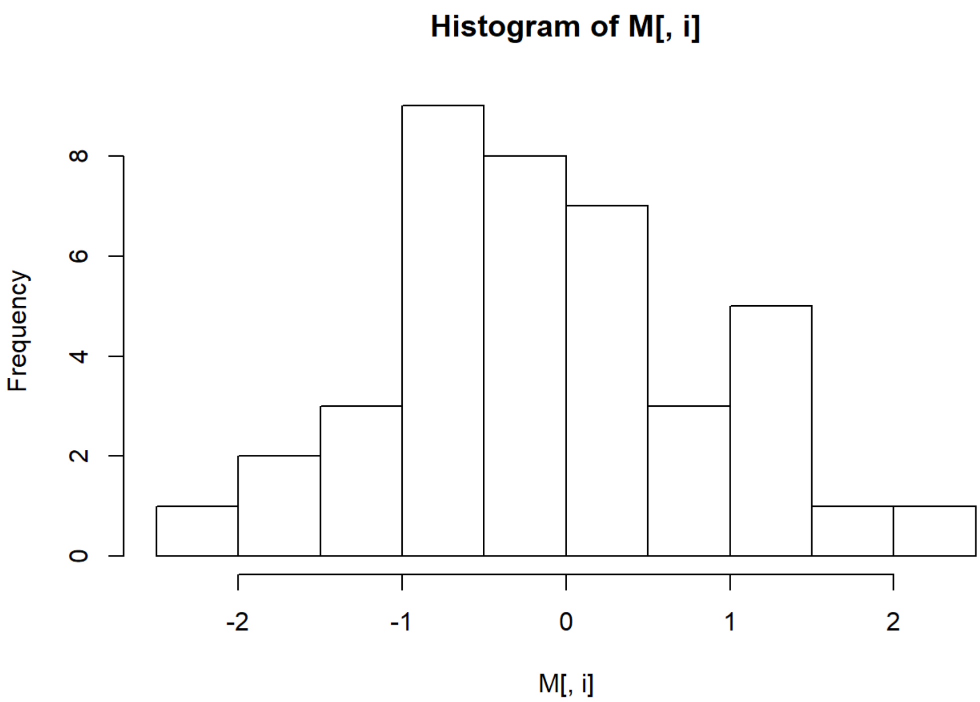


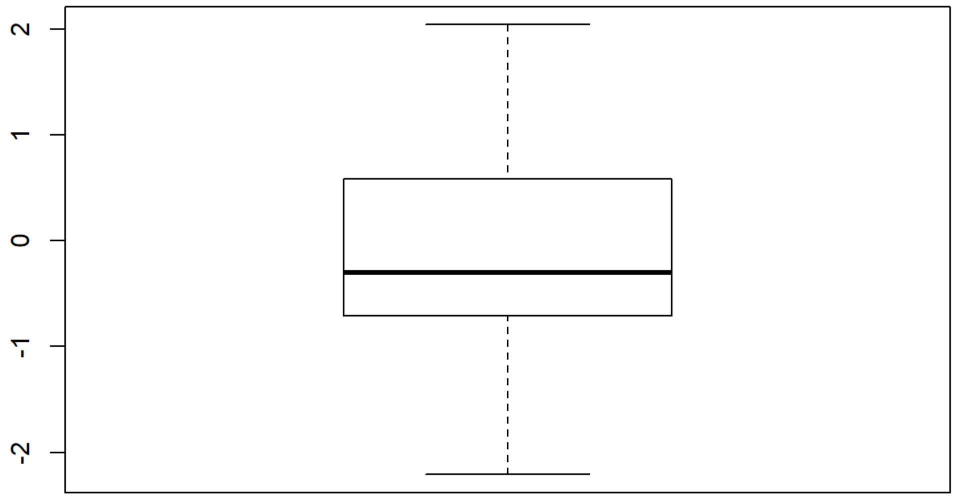
Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]

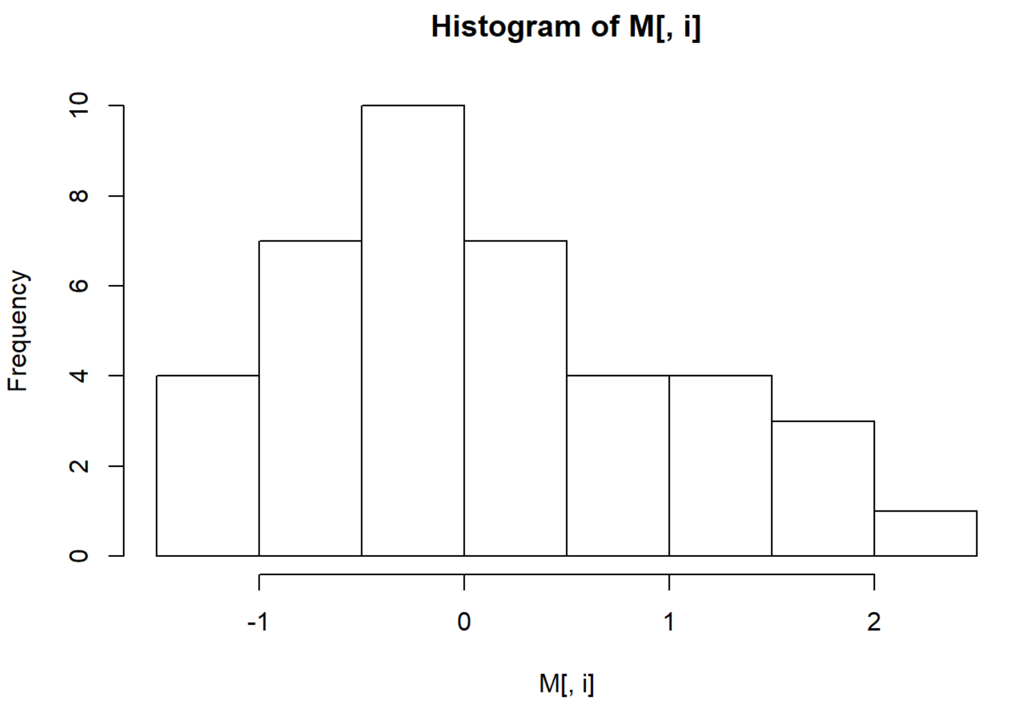

2
1
0
-1
-2

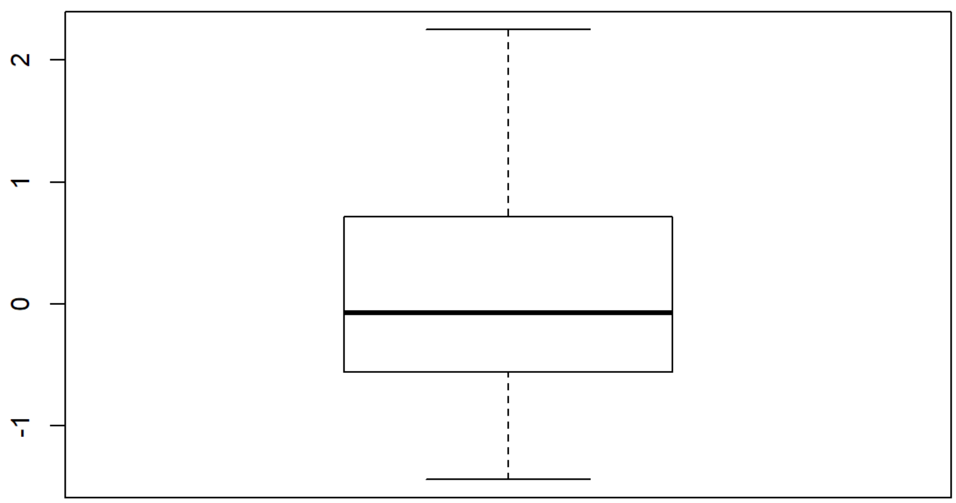

Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]



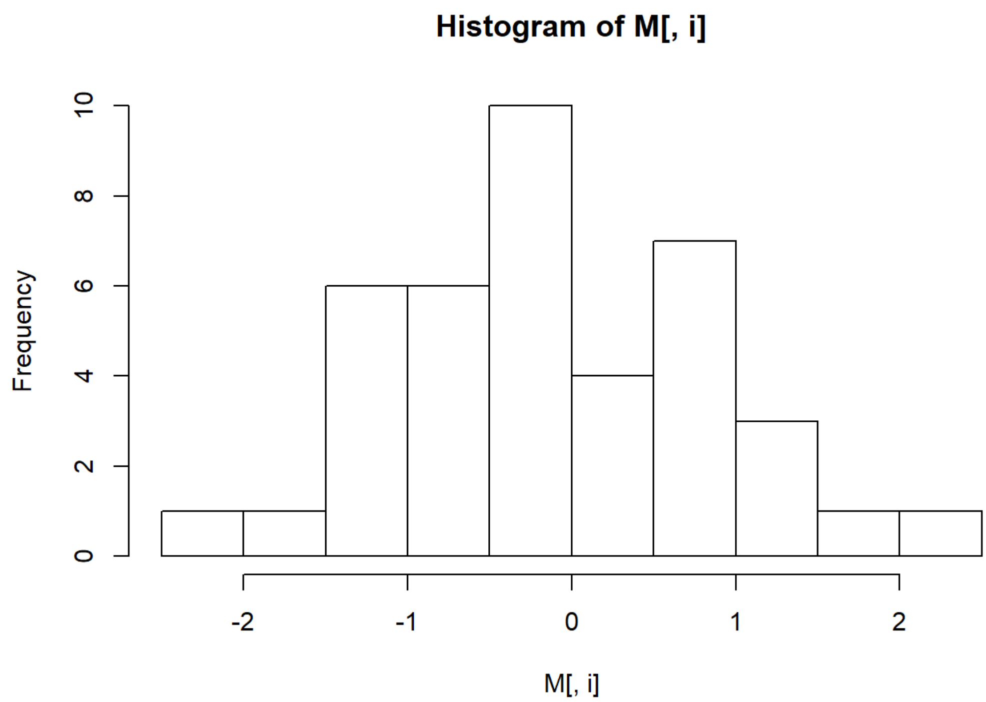

Histogram of M[, i]
Frequency
M[, i]


2
1
0
-1
-2

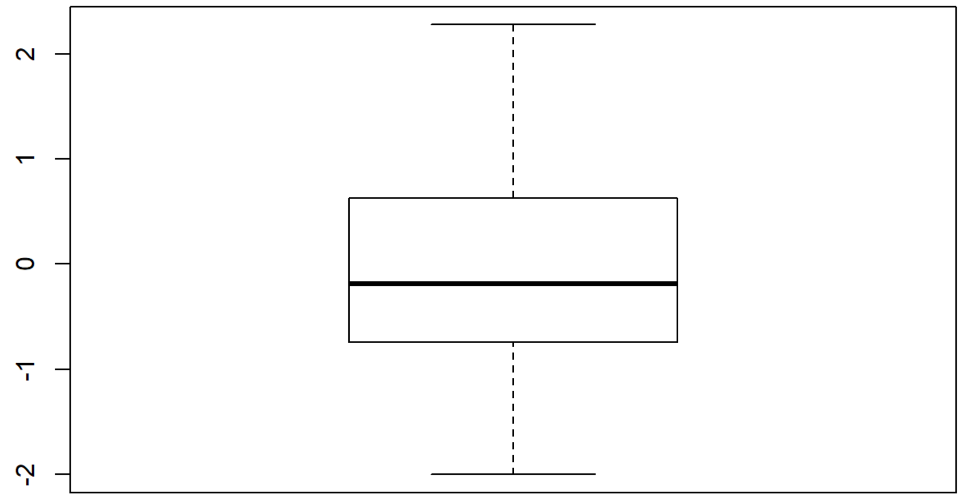

Histogram of M[, i]
Frequency
0
2
4
6
8
10
-1
0
1
2
M[, i]

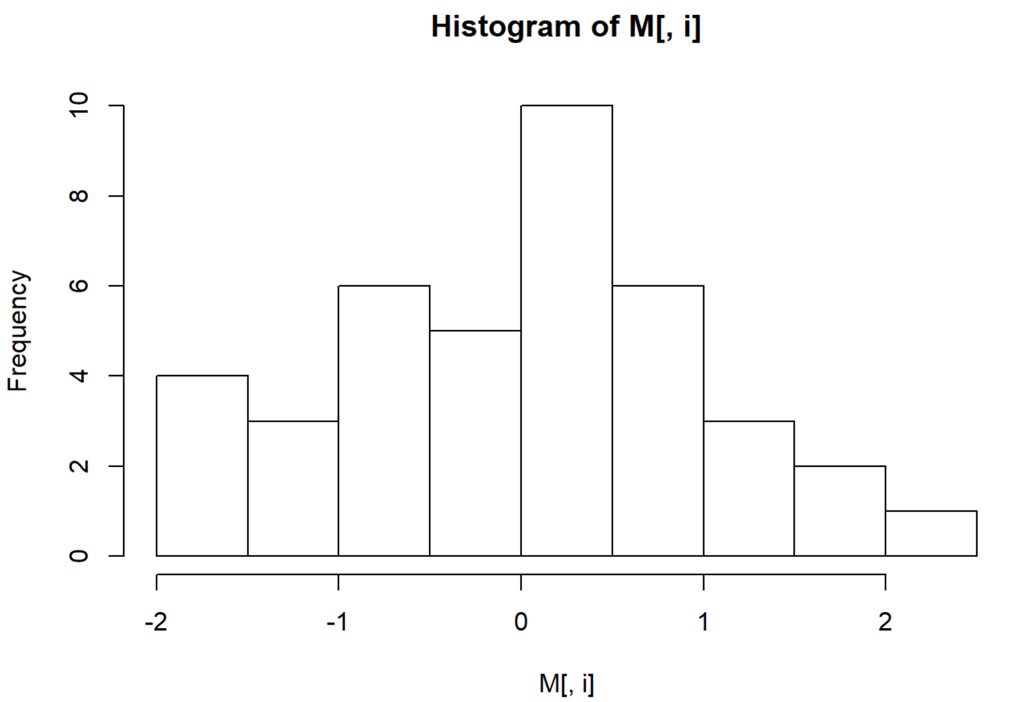


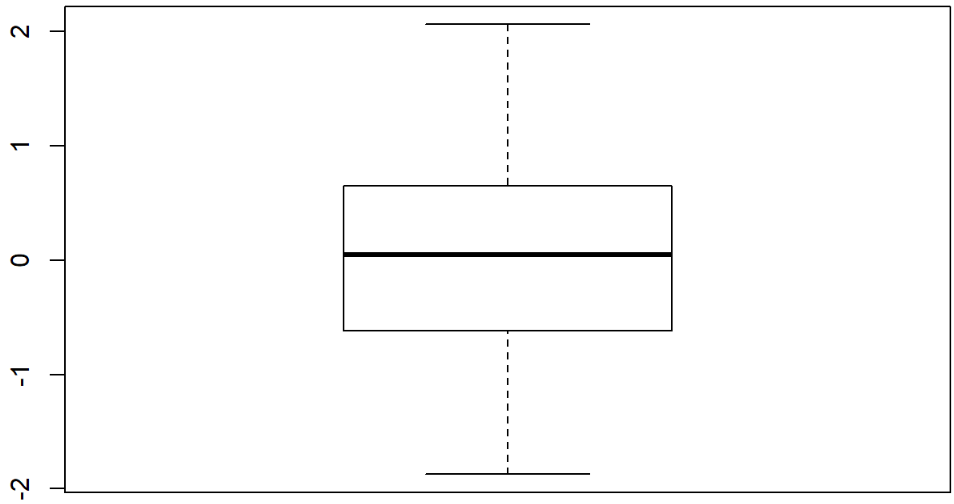
2
1
0
-1

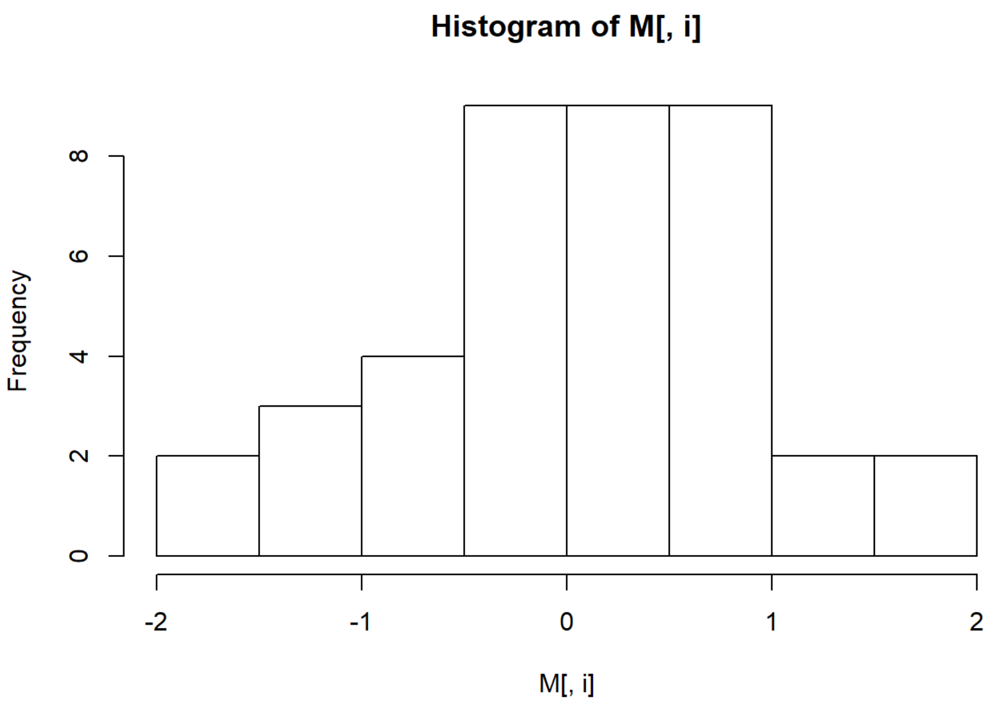


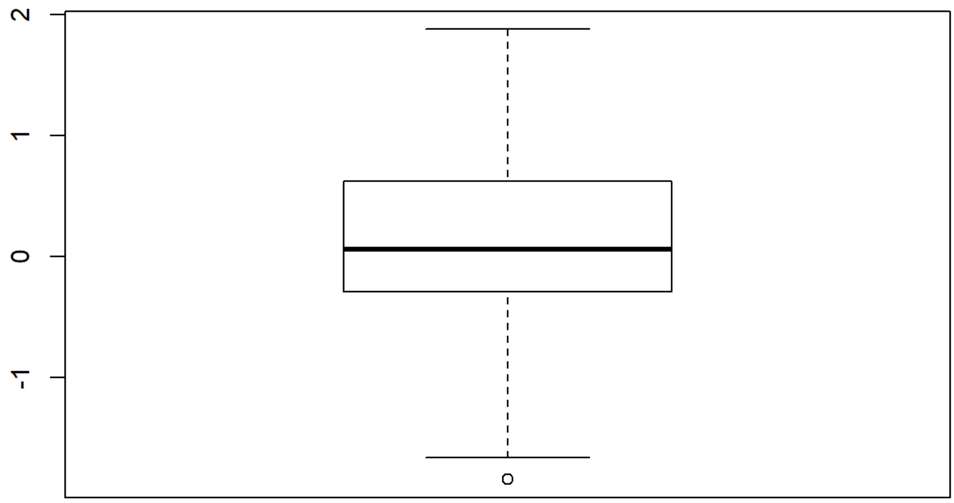
Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]

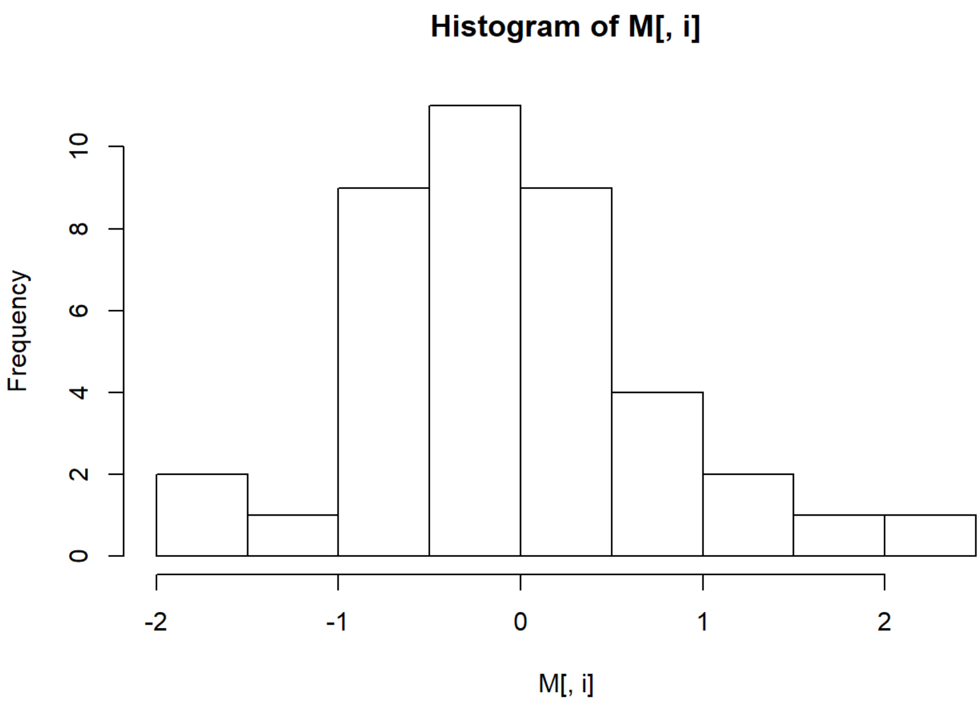

2
1
0
-1
-2

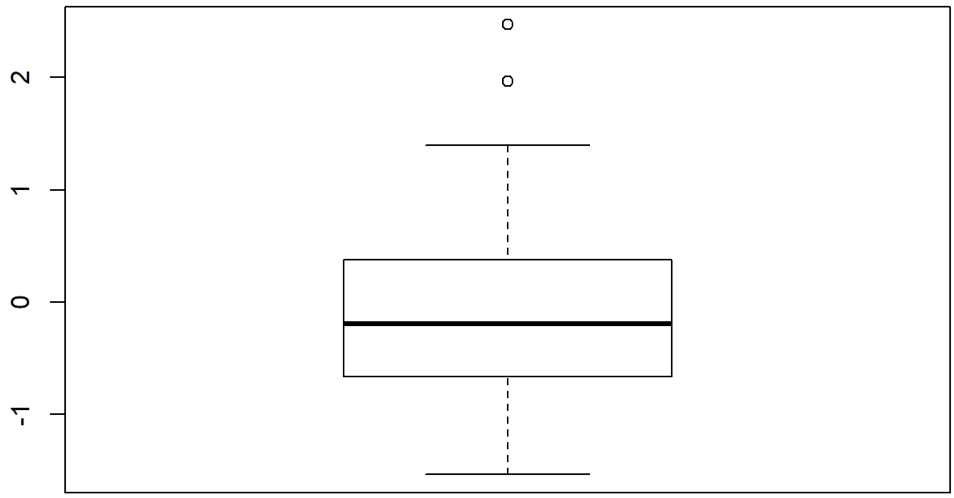

Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]


2
1
0
-1
-2


Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]

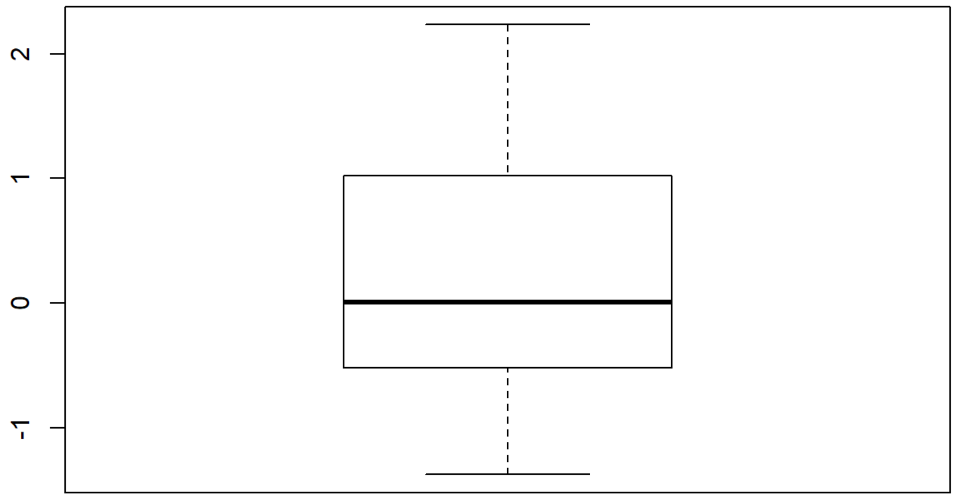

2
1
0
-1


Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]

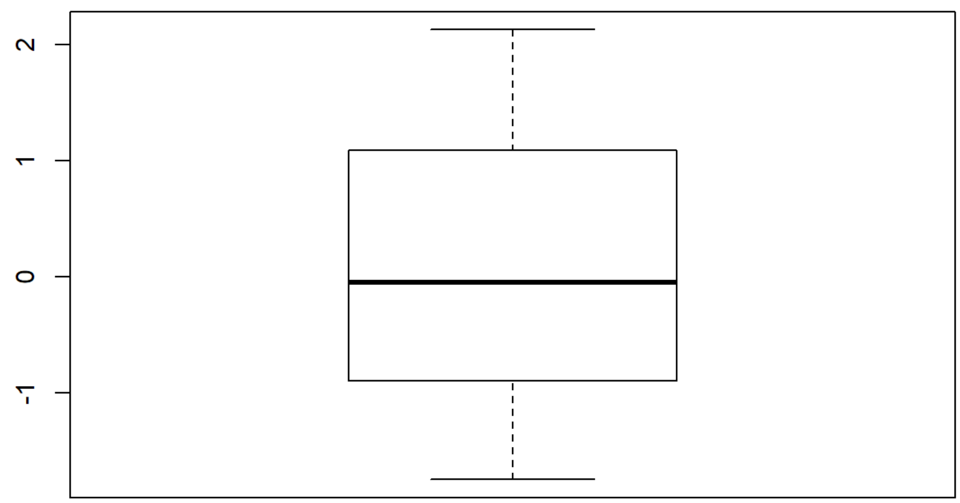


2
1
0
-1

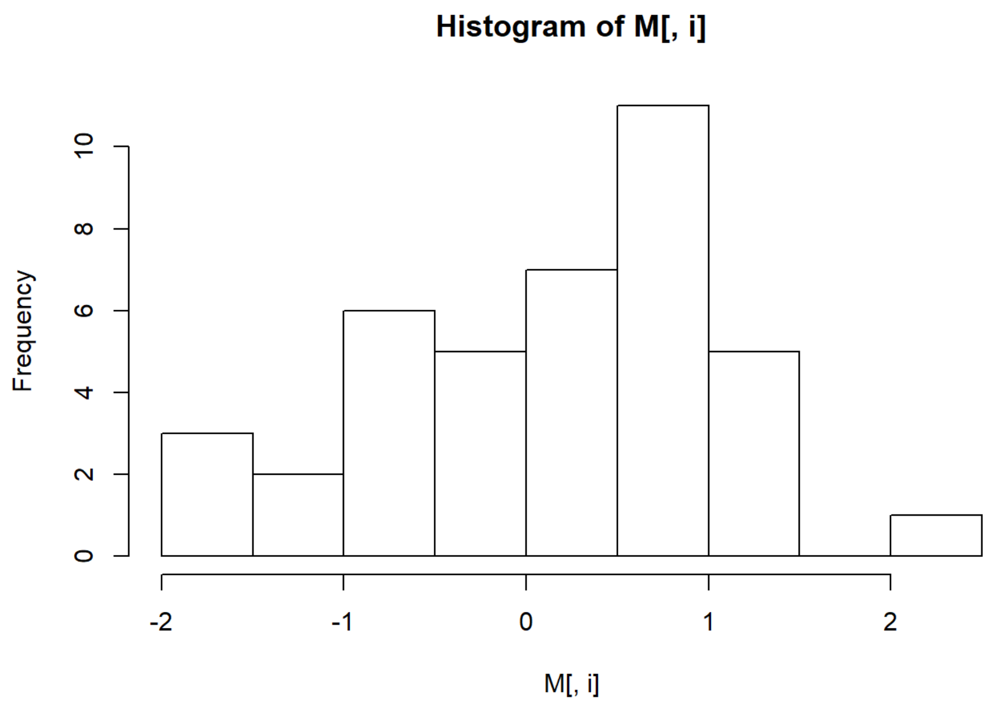
Histogram of M[, i]
Frequency
0
2
4
6
8
10
-1
0
1
2
M[, i]


-1
0
1
2

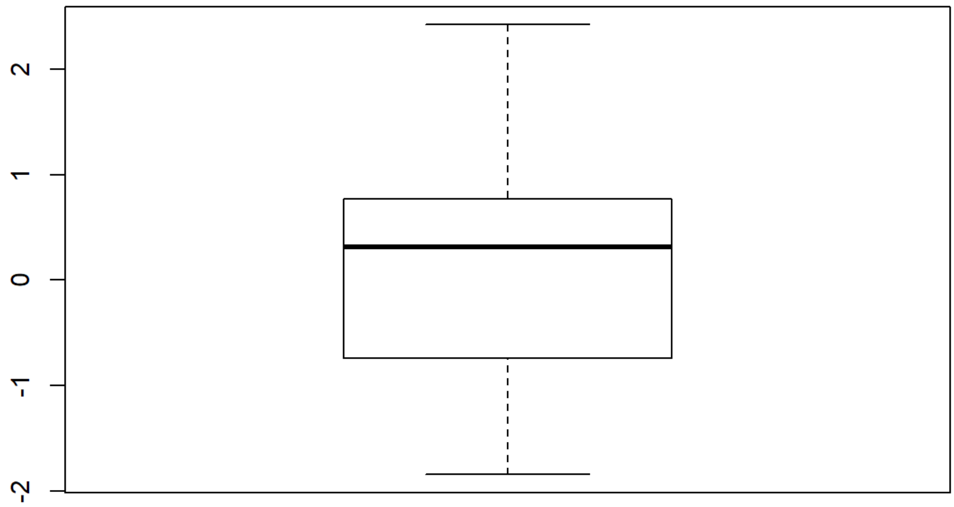

Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]



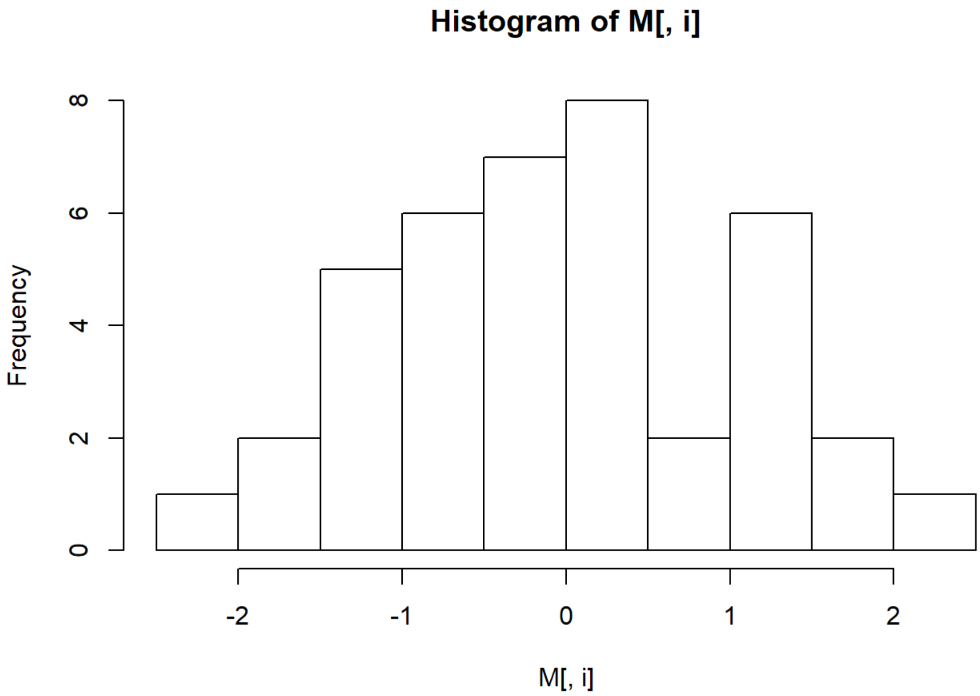
2
1
0
-1



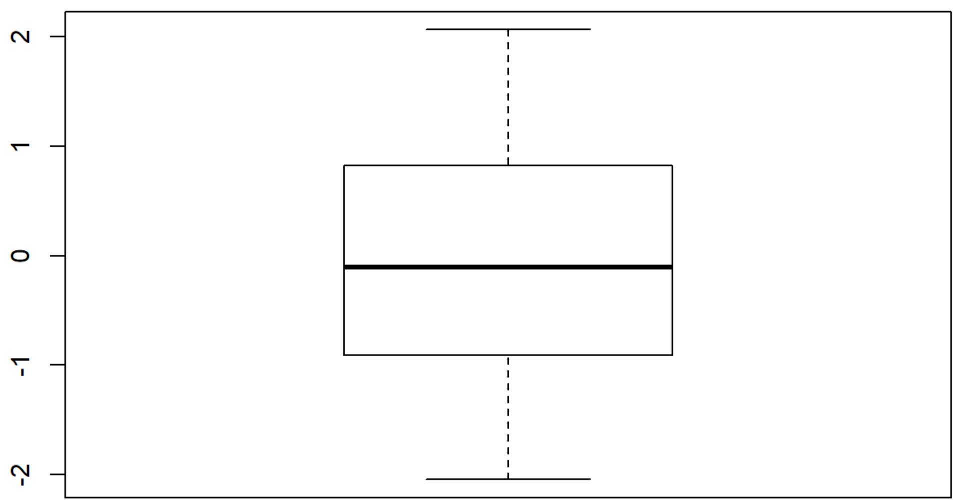
Histogram of M[, i]
Frequency
10
8
6
4
2
0
-2
-1
0
1
2
M[, i]

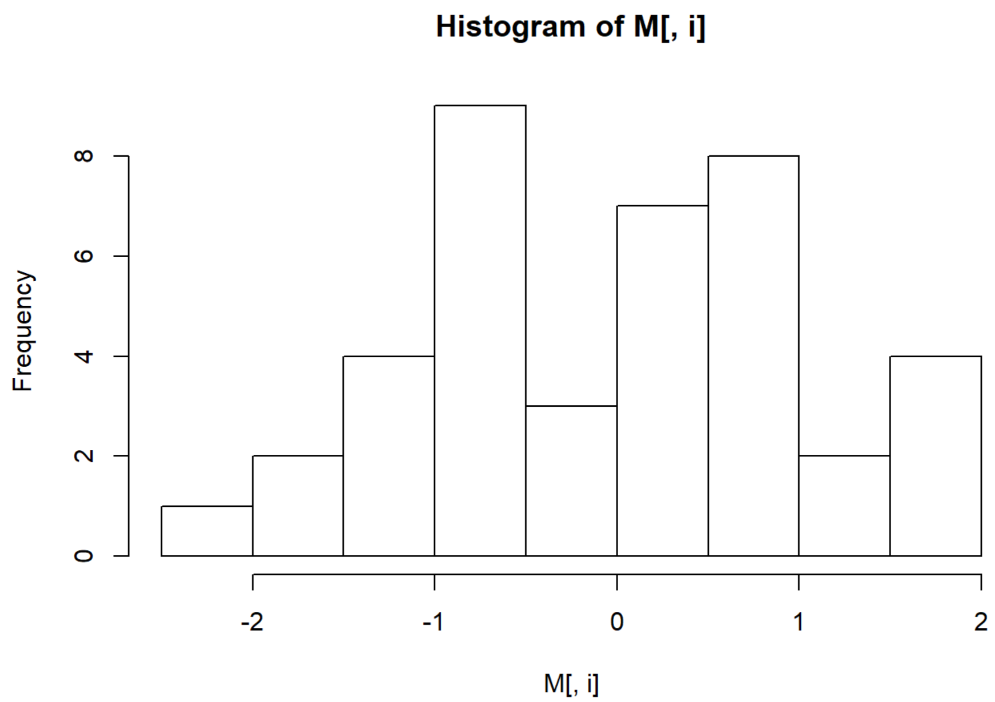


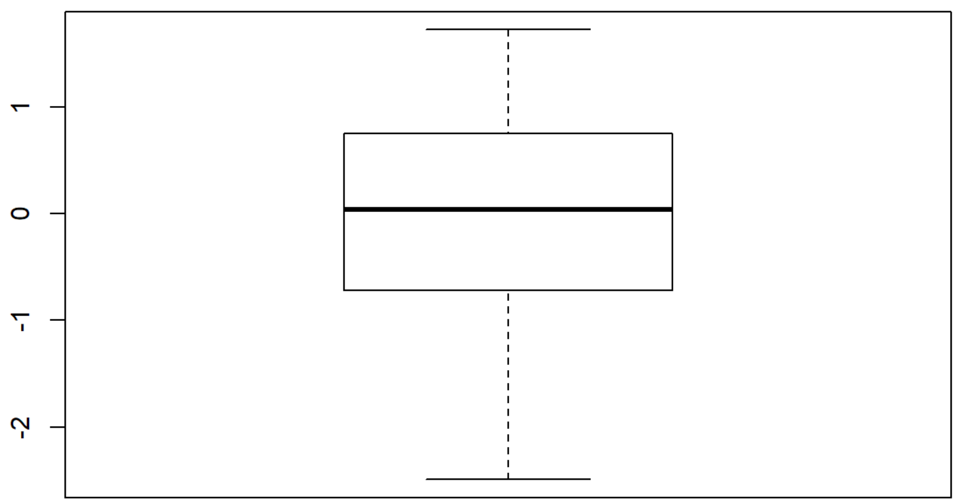
2
1
0
-1
-2



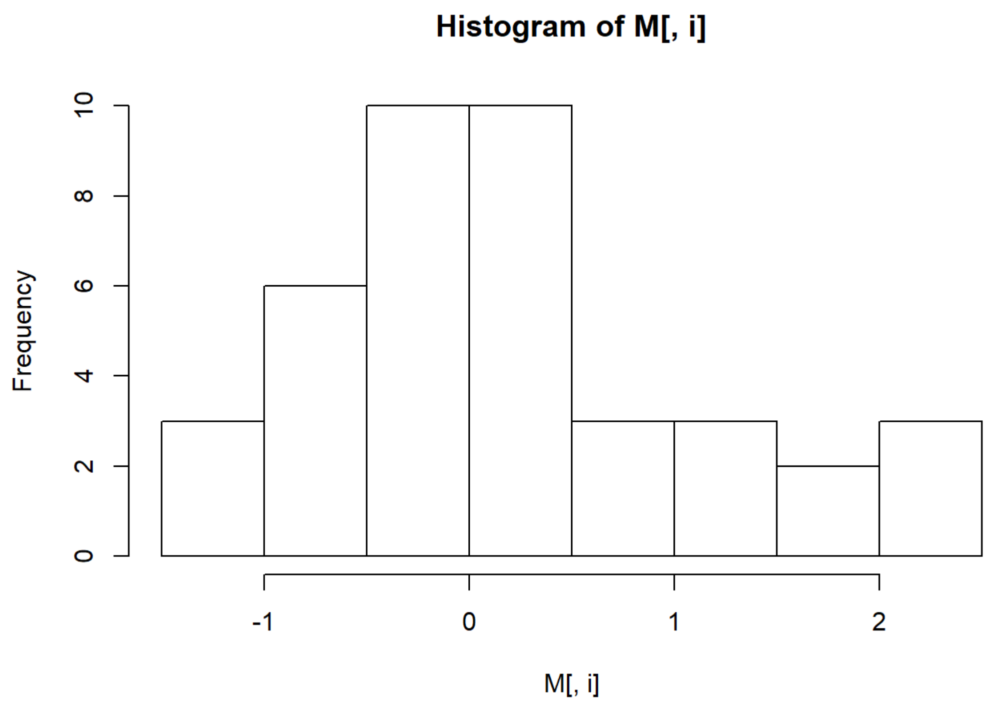
Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]


2
1
0
-1
-2

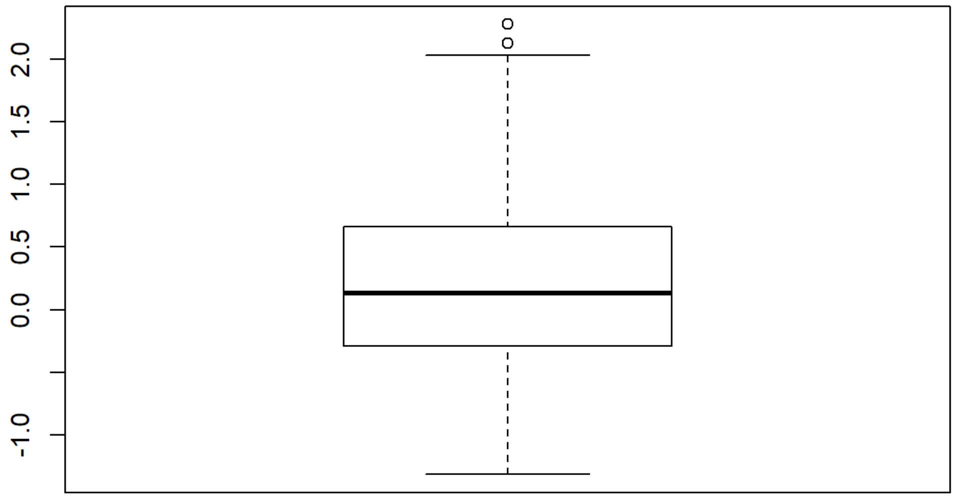

Histogram of M[, i]
Frequency
0
2
4
6
8
-2
-1
0
1
2
M[, i]

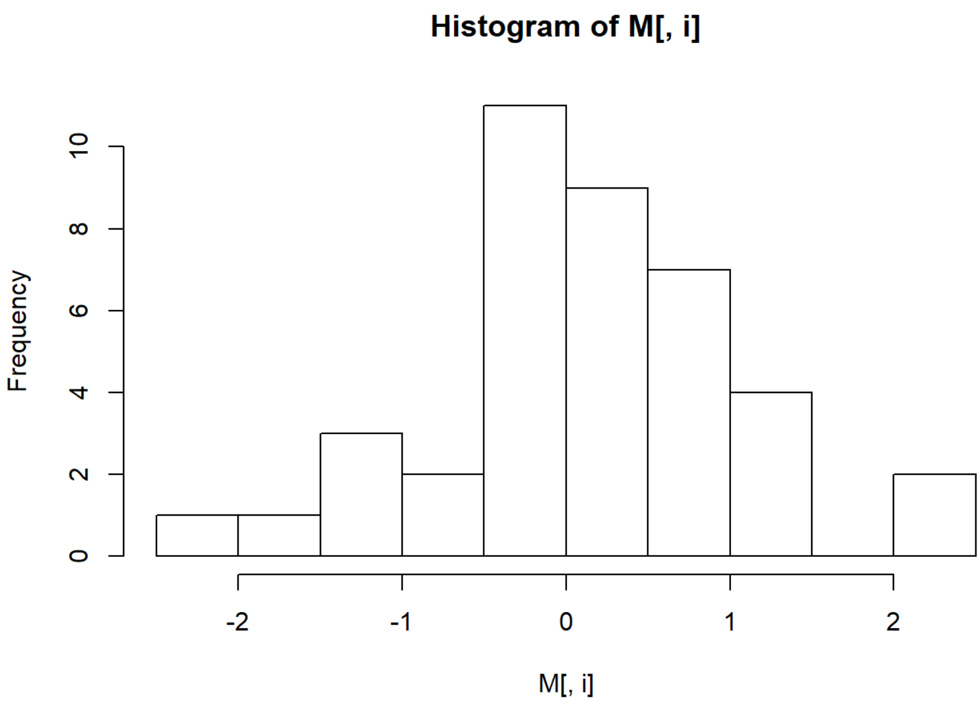


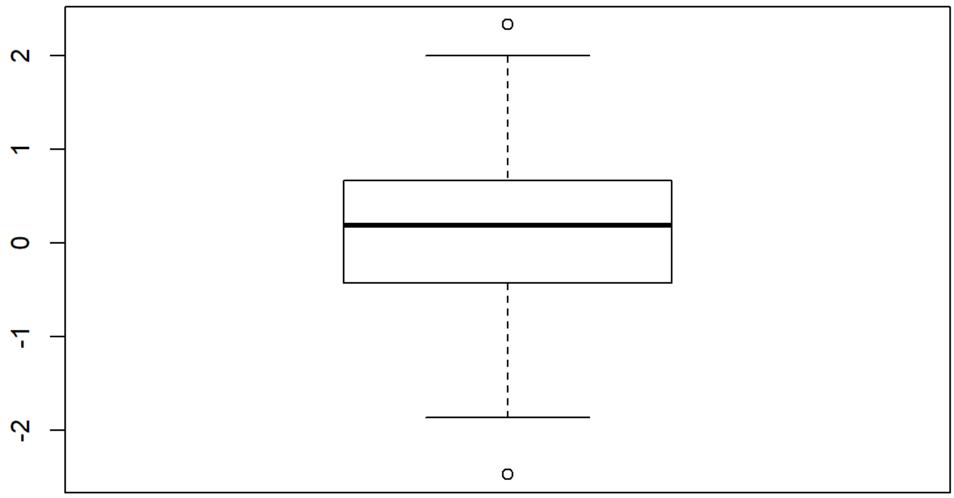
1
0
-1
-2



Histogram of M[, i]
Frequency
0
2
4
6
8
10
-1
0
1
2
M[, i]


-1.0
0.0
0.5
1.0
1.5
2.0


Histogram of M[, i]
Frequency
0
2
4
6
8
10
-2
-1
0
1
2
M[, i]




```
## [1] "# ------------------------ # Comparison of position # ------------------------ # "
## v 1  :
##     mean :  0.0922434
##    median :  -0.05973598
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 2  :
##     mean :  -0.2064043
##    median :  -0.2543572
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 3  :
##     mean :  -0.05350774
##    median :  -0.06776417
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 4  :
##     mean :  -0.1263033
##    median :  -0.199703
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 5  :
##     mean :  -0.183271
##    median :  -0.2038343
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 6  :
##     mean :  0.1205776
##    median :  0.1475267
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 7  :
##     mean :  -0.1521483
##    median :  -0.1613708
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 8  :
##     mean :  0.1267978
```

```
##    median :  0.20086
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 9  :
##     mean :  -0.1834272
##    median :  -0.3911593
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 10  :
##     mean :  0.09272112
##    median :  0.0940468
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 11  :
##     mean :  1.114824
##    median :  1.232061
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 12  :
##     mean :  1.112381
##    median :  1.139895
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 13  :
##     mean :  1.186396
##    median :  1.168286
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 14  :
##     mean :  1.139412
##    median :  1.446314
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 15  :
##     mean :  0.761329
##    median :  0.5604151
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 16  :
##     mean :  0.8978206
##    median :  0.8204293
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 17  :
##     mean :  0.824292
##    median :  0.8090658
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 18  :
##     mean :  0.9991085
##    median :  1.005732
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 19  :
##     mean :  1.023416
##    median :  1.150283
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 20  :
##     mean :  1.01199
##    median :  0.9147747
```

```
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 21  :
##     mean :  0.1004932
##    median :  0.02123613
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 22  :
##     mean :  -0.02051518
##    median :  -0.2434468
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 23  :
##     mean :  0.06899979
##    median :  0.1552082
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 24  :
##     mean :  0.267821
##    median :  0.2726539
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 25  :
##     mean :  -0.2122548
##    median :  -0.1433251
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 26  :
##     mean :  0.01010607
##    median :  0.07145817
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 27  :
##     mean :  0.09182854
##    median :  0.1518679
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 28  :
##     mean :  -0.0959991
##    median :  -0.2997504
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 29  :
##     mean :  0.1171888
##    median :  -0.06995254
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 30  :
##     mean :  -0.0903858
##    median :  -0.1848445
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 31  :
##     mean :  0.002324748
##    median :  0.05032398
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 32  :
##     mean :  0.07187474
##    median :  0.0575903
```

```
##    mode :  numeric
##    Comparison between mean and median :  Not centred but no outliersNULL
## [1] "------------------------"
## v 33  :
##     mean :  -0.0675194
##    median :  -0.1961629
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 34  :
##     mean :  0.165205
##    median :  0.0044761
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 35  :
##     mean :  0.07450696
##    median :  -0.05313932
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 36  :
##     mean :  0.1162721
##    median :  0.3145054
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 37  :
##     mean :  -0.05387374
##    median :  -0.1065932
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 38  :
##     mean :  -0.04382338
##    median :  0.03523949
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 39  :
##     mean :  0.2080751
##    median :  0.1336019
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## v 40  :
##     mean :  0.1209213
##    median :  0.1865468
##    mode :  numeric
##    Comparison between mean and median :  Outliers detectedNULL
## [1] "------------------------"
## [1] "# ------------------------ # Comparison of dispersion # ------------------------ # "
## v 1  :
##     standart deviation :  0.8543854
##    scope (outliers can affect) :  0.084873
##    interquantile deviation :  0.1842919NULL
## [1] "------------------------"
## v 2  :
##     standart deviation :  0.9271814
##    scope (outliers can affect) :  0.77949
##    interquantile deviation :  -0.4232877NULL
## [1] "------------------------"
## v 3  :
##     standart deviation :  0.945413
##    scope (outliers can affect) :  -0.4668
##    interquantile deviation :  -0.037026NULL
## [1] "------------------------"
## v 4  :
##     standart deviation :  1.178657
##    scope (outliers can affect) :  -0.184306
##    interquantile deviation :  -0.4109311NULL
## [1] "------------------------"
## v 5  :
```

```
##     standart deviation :  1.033089
##    scope (outliers can affect) :  0.089027
##    interquantile deviation :  -0.4926243NULL
## [1] "------------------------"
## v 6  :
##     standart deviation :  0.8326408
##    scope (outliers can affect) :  0.772521
##    interquantile deviation :  0.2277552NULL
## [1] "------------------------"
## v 7  :
##     standart deviation :  0.9923999
##    scope (outliers can affect) :  0.459381
##    interquantile deviation :  -0.3390718NULL
## [1] "------------------------"
## v 8  :
##     standart deviation :  0.9083191
##    scope (outliers can affect) :  0.089795
##    interquantile deviation :  0.1722215NULL
## [1] "------------------------"
## v 9  :
##     standart deviation :  0.9313489
##    scope (outliers can affect) :  0.646169
##    interquantile deviation :  -0.4481893NULL
## [1] "------------------------"
## v 10  :
##     standart deviation :  0.9754354
##    scope (outliers can affect) :  0.699544
##    interquantile deviation :  0.09040785NULL
## [1] "------------------------"
## v 11  :
##     standart deviation :  1.379792
##    scope (outliers can affect) :  2.328874
##    interquantile deviation :  2.076136NULL
## [1] "------------------------"
## v 12  :
##     standart deviation :  1.640974
##    scope (outliers can affect) :  1.878098
##    interquantile deviation :  1.852311NULL
## [1] "------------------------"
## v 13  :
##     standart deviation :  1.392337
##    scope (outliers can affect) :  2.400192
##    interquantile deviation :  1.927375NULL
## [1] "------------------------"
## v 14  :
##     standart deviation :  1.421502
##    scope (outliers can affect) :  1.165899
##    interquantile deviation :  1.957816NULL
## [1] "------------------------"
## v 15  :
##     standart deviation :  1.448691
##    scope (outliers can affect) :  2.37882
##    interquantile deviation :  1.605899NULL
## [1] "------------------------"
## v 16  :
##     standart deviation :  1.381953
##    scope (outliers can affect) :  1.727983
##    interquantile deviation :  1.814171NULL
## [1] "------------------------"
## v 17  :
##     standart deviation :  1.453593
##    scope (outliers can affect) :  2.021382
##    interquantile deviation :  1.560802NULL
## [1] "------------------------"
## v 18  :
##     standart deviation :  1.343201
##    scope (outliers can affect) :  1.535493
##    interquantile deviation :  2.063419NULL
## [1] "------------------------"
## v 19  :
##     standart deviation :  1.335168
##    scope (outliers can affect) :  2.800036
##    interquantile deviation :  1.729585NULL
```

```
## [1] "------------------------"
## v 20  :
##      standart deviation :  1.464446
##     scope (outliers can affect) :  2.047906
##     interquantile deviation :  2.036181NULL
## [1] "------------------------"
## v 21  :
##      standart deviation :  0.9338223
##     scope (outliers can affect) :  0.068945
##     interquantile deviation :  0.2390637NULL
## [1] "------------------------"
## v 22  :
##      standart deviation :  1.066322
##     scope (outliers can affect) :  -0.755132
##     interquantile deviation :  0.09306687NULL
## [1] "------------------------"
## v 23  :
##      standart deviation :  1.07162
##     scope (outliers can affect) :  0.118574
##     interquantile deviation :  0.07304133NULL
## [1] "------------------------"
## v 24  :
##      standart deviation :  1.111507
##     scope (outliers can affect) :  1.178907
##     interquantile deviation :  0.4629872NULL
## [1] "------------------------"
## v 25  :
##      standart deviation :  1.058628
##     scope (outliers can affect) :  -0.38518
##     interquantile deviation :  -0.2910256NULL
## [1] "------------------------"
## v 26  :
##      standart deviation :  0.9625162
##     scope (outliers can affect) :  -0.152945
##     interquantile deviation :  0.0691622NULL
## [1] "------------------------"
## v 27  :
##      standart deviation :  0.9114332
##     scope (outliers can affect) :  0.212002
##     interquantile deviation :  0.186962NULL
## [1] "------------------------"
## v 28  :
##      standart deviation :  0.9803974
##     scope (outliers can affect) :  -0.167199
##     interquantile deviation :  -0.1929979NULL
## [1] "------------------------"
## v 29  :
##      standart deviation :  0.947943
##     scope (outliers can affect) :  0.810104
##     interquantile deviation :  0.1101211NULL
## [1] "------------------------"
## v 30  :
##      standart deviation :  0.9579074
##     scope (outliers can affect) :  0.276581
##     interquantile deviation :  -0.1148191NULL
## [1] "------------------------"
## v 31  :
##      standart deviation :  0.9956299
##     scope (outliers can affect) :  0.189938
##     interquantile deviation :  0.06783078NULL
## [1] "------------------------"
## v 32  :
##      standart deviation :  0.827974
##     scope (outliers can affect) :  0.035032
##     interquantile deviation :  0.3761194NULL
## [1] "------------------------"
## v 33  :
##      standart deviation :  0.8652526
##     scope (outliers can affect) :  0.932323
##     interquantile deviation :  -0.2524897NULL
## [1] "------------------------"
## v 34  :
```

```
##     standart deviation :  0.9550502
##    scope (outliers can affect) :  0.855654
##    interquantile deviation :  0.5006797NULL
## [1] "------------------------"
## v 35  :
##     standart deviation :  1.129995
##    scope (outliers can affect) :  0.377206
##    interquantile deviation :  0.2041203NULL
## [1] "------------------------"
## v 36  :
##     standart deviation :  0.9527392
##    scope (outliers can affect) :  0.580336
##    interquantile deviation :  0.01478287NULL
## [1] "------------------------"
## v 37  :
##     standart deviation :  1.037091
##    scope (outliers can affect) :  0.018215
##    interquantile deviation :  -0.07434942NULL
## [1] "------------------------"
## v 38  :
##     standart deviation :  1.03385
##    scope (outliers can affect) :  -0.768153
##    interquantile deviation :  0.00550345NULL
## [1] "------------------------"
## v 39  :
##     standart deviation :  0.928664
##    scope (outliers can affect) :  0.962654
##    interquantile deviation :  0.3612045NULL
## [1] "------------------------"
## v 40  :
##     standart deviation :  0.9638568
##    scope (outliers can affect) :  -0.138493
##    interquantile deviation :  0.1917287NULL
## [1] "------------------------"
## [1] "# ------------------------ # Comparison of form # ------------------------ # "
## v 1  :
##     kurtosis rate :  -0.4517894
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.1203976
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 2  :
##     kurtosis rate :  0.3406293
##    interpretation :  more concentrated than Gauss
##    skewness rate :  0.6091765
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 3  :
##     kurtosis rate :  -0.6751105
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.2541091
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 4  :
##     kurtosis rate :  -0.3536173
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.01084144
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 5  :
##     kurtosis rate :  -0.2070474
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.2824775
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 6  :
##     kurtosis rate :  -0.5748995
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.1468898
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 7  :
##     kurtosis rate :  0.1270863
```

```
##    interpretation :  more concentrated than Gauss
##    skewness rate :  0.1834876
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 8  :
##     kurtosis rate :  -0.5245043
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.2221669
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 9  :
##     kurtosis rate :  -0.2279826
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.688116
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 10  :
##     kurtosis rate :  -0.7791891
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.2907725
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 11  :
##     kurtosis rate :  -0.900757
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.02438044
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 12  :
##     kurtosis rate :  0.1515898
##    interpretation :  more concentrated than Gauss
##    skewness rate :  -0.1319206
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 13  :
##     kurtosis rate :  -0.8556385
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.001137924
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 14  :
##     kurtosis rate :  -0.4335325
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.372344
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 15  :
##     kurtosis rate :  -0.7925215
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.2160104
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 16  :
##     kurtosis rate :  -0.7920279
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.1667434
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 17  :
##     kurtosis rate :  -0.6871923
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.158258
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 18  :
##     kurtosis rate :  -1.100011
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.2220522
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 19  :
##     kurtosis rate :  -0.6778968
##    interpretation :  more flattened gauss distribution
```

```
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.07486235
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 20  :
##     kurtosis rate :  -1.105354
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.0686701
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 21  :
##     kurtosis rate :  -0.6911655
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.03822469
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 22  :
##     kurtosis rate :  -0.3068429
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.06874904
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 23  :
##     kurtosis rate :  -0.6776382
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.09627936
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 24  :
##     kurtosis rate :  0.1800941
##    interpretation :  more concentrated than Gauss
##    skewness rate :  0.3003775
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 25  :
##     kurtosis rate :  -0.2210312
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.2215849
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 26  :
##     kurtosis rate :  -0.6842344
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.1146004
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 27  :
##     kurtosis rate :  -0.3808695
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.1634495
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 28  :
##     kurtosis rate :  -0.6145538
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.143755
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 29  :
##     kurtosis rate :  -0.7595305
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.4447693
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 30  :
##     kurtosis rate :  -0.5689176
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.2275988
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 31  :
##     kurtosis rate :  -0.7444575
##    interpretation :  more flattened gauss distribution
```

```
##    skewness rate :  -0.03340511
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 32  :
##     kurtosis rate :  -0.2525893
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.2715525
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 33  :
##     kurtosis rate :  0.6221224
##    interpretation :  more concentrated than Gauss
##    skewness rate :  0.7438404
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 34  :
##     kurtosis rate :  -0.9982892
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.241837
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 35  :
##     kurtosis rate :  -1.303804
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.0468173
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 36  :
##     kurtosis rate :  -0.5488813
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.1588854
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 37  :
##     kurtosis rate :  -0.9794019
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.1542855
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 38  :
##     kurtosis rate :  -0.7154845
##    interpretation :  more flattened gauss distribution
##    skewness rate :  -0.1456429
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
## v 39  :
##     kurtosis rate :  -0.4557405
##    interpretation :  more flattened gauss distribution
##    skewness rate :  0.493499
##    interpretation :  Converging to the right DistributionNULL
## [1] "------------------------"
## v 40  :
##     kurtosis rate :  0.3954447
##    interpretation :  more concentrated than Gauss
##    skewness rate :  -0.2380239
##    interpretation :  Converging to the left DistributionNULL
## [1] "------------------------"
```

On remarque que sur la globalité, il y a beaucoup de valeurs extrêmes qui ont tendance à tirer les répartitions. On ne trouve que très peu de répartition centrée. On en déduit ainsi que les variables (gènes) sont très dépendantes de chaque individu, certes ont retrouve tout de même un intervale commun entre le premier et le troisième quartile, mais en dehors, il y a souvent des valeurs extrêmes.

Interprétation du Chi-deux : –> Plus le X-square est élevé plus les variables sont fortement corrélées entre elles et inversement. En dessous d'un certain seuil de la p-value, on peut alors rejeté l'indépendance des deux variables.

Interprétation de la régression linéaire : –> visuellement, si la droite correspond bien à l'étalement des données, on suppose que les variables sont corréllées

```
explainDataset(data[,1:40], c(1:40), T)
```

```
## [1] "# ------------------------ # X2 # ------------------------ # "
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 17.469, df = 39, p-value = 0.9989
##
## [1] "Variables[1,2], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 18.158, df = 39, p-value = 0.9982
##
## [1] "Variables[2,3], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 22.099, df = 39, p-value = 0.9866
##
## [1] "Variables[3,4], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 20.217, df = 39, p-value = 0.9944
##
## [1] "Variables[4,5], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 14.006, df = 39, p-value = 0.9999
##
## [1] "Variables[5,6], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 19.094, df = 39, p-value = 0.9969
##
## [1] "Variables[6,7], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 14.242, df = 39, p-value = 0.9999
##
## [1] "Variables[7,8], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 13.229, df = 39, p-value = 1
##
## [1] "Variables[8,9], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 15.111, df = 39, p-value = 0.9998
##
## [1] "Variables[9,10], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendance
"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 27.06, df = 39, p-value = 0.9256
##
## [1] "Variables[10,11], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 33.754, df = 39, p-value = 0.7076
##
## [1] "Variables[11,12], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 27.3, df = 39, p-value = 0.9206
##
## [1] "Variables[12,13], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 27.443, df = 39, p-value = 0.9175
##
## [1] "Variables[13,14], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 29.656, df = 39, p-value = 0.8598
##
## [1] "Variables[14,15], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 34.036, df = 39, p-value = 0.6955
##
## [1] "Variables[15,16], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 31.048, df = 39, p-value = 0.8141
##
## [1] "Variables[16,17], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 24.253, df = 39, p-value = 0.969
##
## [1] "Variables[17,18], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 22.802, df = 39, p-value = 0.982
##
## [1] "Variables[18,19], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 28.658, df = 39, p-value = 0.8882
##
## [1] "Variables[19,20], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 14.341, df = 39, p-value = 0.9999
##
## [1] "Variables[20,21], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.53, df = 39, p-value = 0.9994
##
## [1] "Variables[21,22], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 15.928, df = 39, p-value = 0.9996
##
## [1] "Variables[22,23], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 26.053, df = 39, p-value = 0.9442
##
## [1] "Variables[23,24], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 24.076, df = 39, p-value = 0.9708
##
## [1] "Variables[24,25], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 14.658, df = 39, p-value = 0.9999
##
## [1] "Variables[25,26], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 15.693, df = 39, p-value = 0.9997
##
## [1] "Variables[26,27], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 14.662, df = 39, p-value = 0.9999
##
## [1] "Variables[27,28], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.914, df = 39, p-value = 0.9992
##
## [1] "Variables[28,29], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 13.886, df = 39, p-value = 0.9999
##
## [1] "Variables[29,30], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.47, df = 39, p-value = 0.9994
##
## [1] "Variables[30,31], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.043, df = 39, p-value = 0.9996
##
## [1] "Variables[31,32], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.708, df = 39, p-value = 0.9993
##
## [1] "Variables[32,33], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.225, df = 39, p-value = 0.9995
##
## [1] "Variables[33,34], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 11.303, df = 39, p-value = 1
##
## [1] "Variables[34,35], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 11.067, df = 39, p-value = 1
##
## [1] "Variables[35,36], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 14.102, df = 39, p-value = 0.9999
##
## [1] "Variables[36,37], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

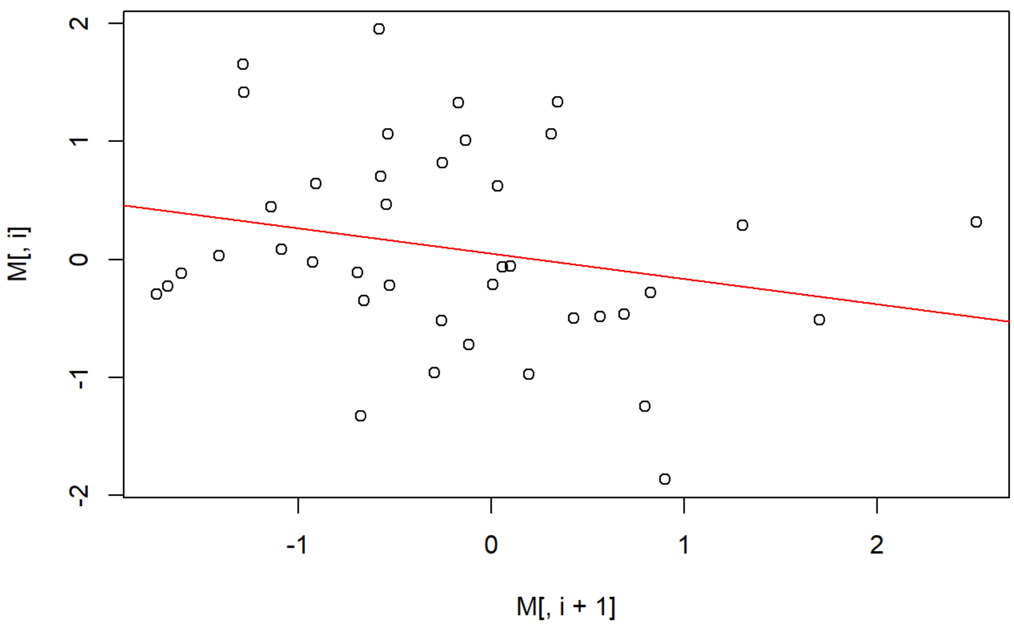
```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 16.061, df = 39, p-value = 0.9996
##
## [1] "Variables[37,38], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

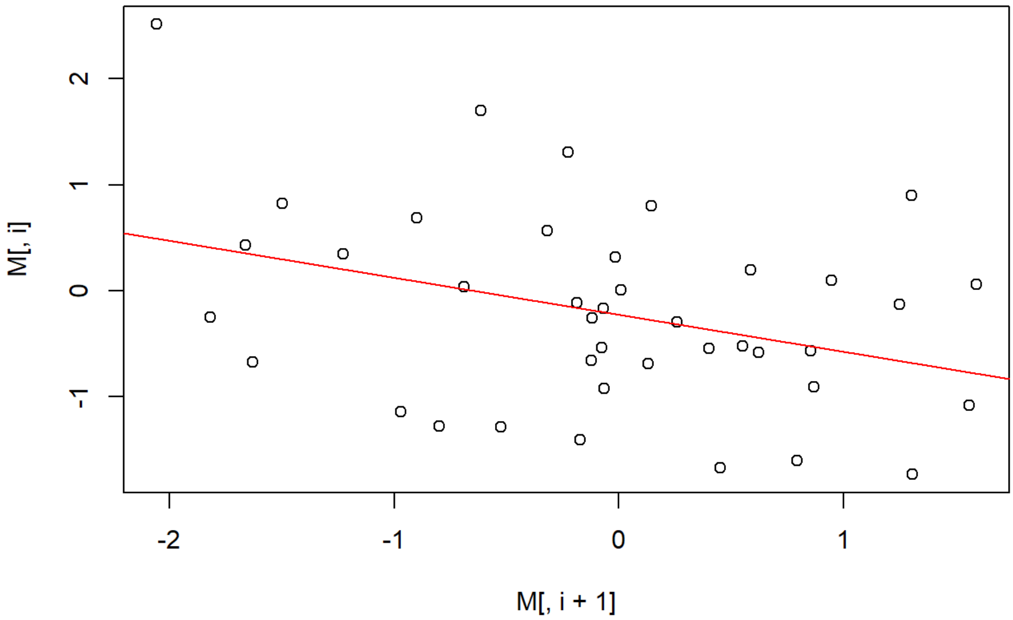
```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 20.343, df = 39, p-value = 0.994
##
## [1] "Variables[38,39], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
```

```
## Warning in chisq.test(newM): Chi-squared approximation may be incorrect
```

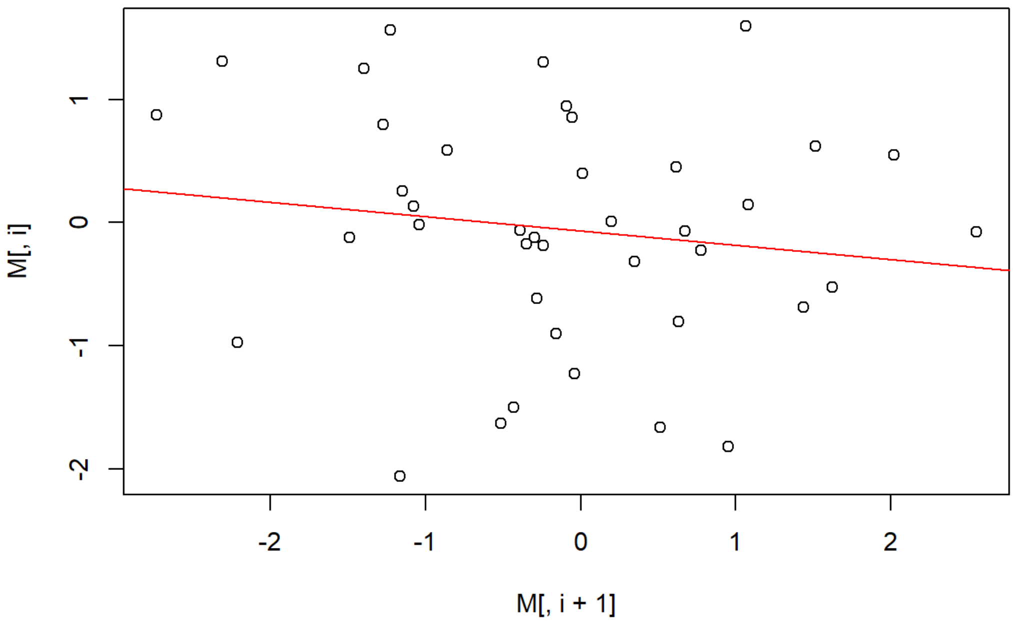
```
##
##  Chi-squared test for given probabilities
##
## data:  newM
## X-squared = 20.722, df = 39, p-value = 0.9928
##
## [1] "Variables[39,40], Considérons un seuil à 0.05, on peut alors rejeter l'hypothèse nulle d'indépendanc
e"
## [1] "------------------------"
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.7194 -0.5198 -0.1940  0.6167  1.7764
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.04799    0.13644   0.352    0.727
## M[, i + 1]  -0.21440    0.14538  -1.475    0.149
##
## Residual standard error: 0.8418 on 38 degrees of freedom
## Multiple R-squared:  0.05413,    Adjusted R-squared:  0.02924
## F-statistic: 2.175 on 1 and 38 DF,  p-value: 0.1485
```



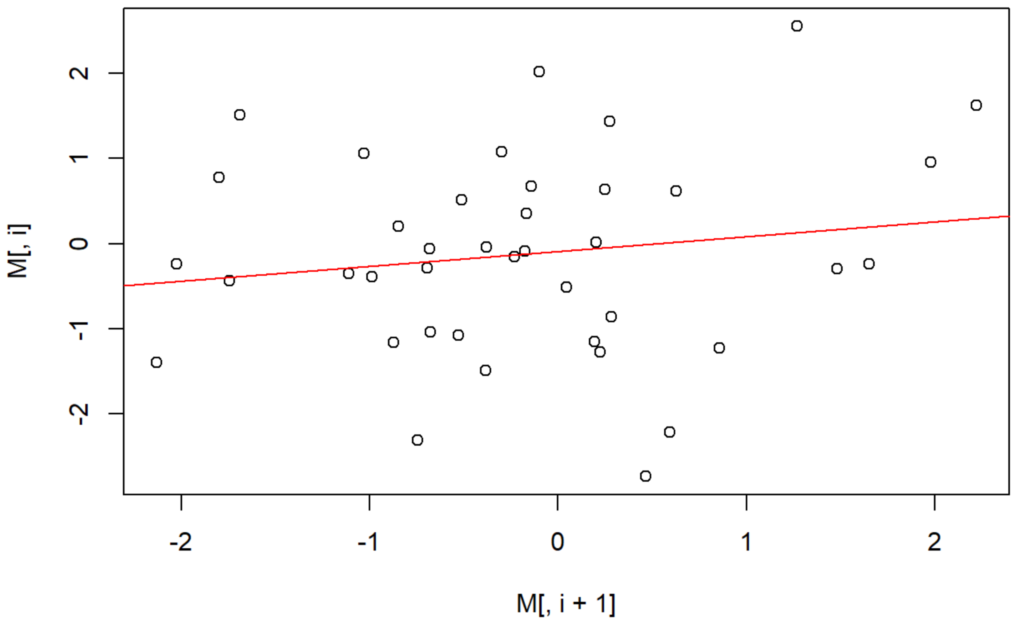

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.33522 -0.52077 -0.01378  0.54976  2.01881
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.2251     0.1390  -1.619   0.1138
## M[, i + 1]   -0.3489     0.1487  -2.346   0.0243 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8779 on 38 degrees of freedom
## Multiple R-squared:  0.1265, Adjusted R-squared:  0.1035
## F-statistic: 5.505 on 1 and 38 DF,  p-value: 0.02428
```



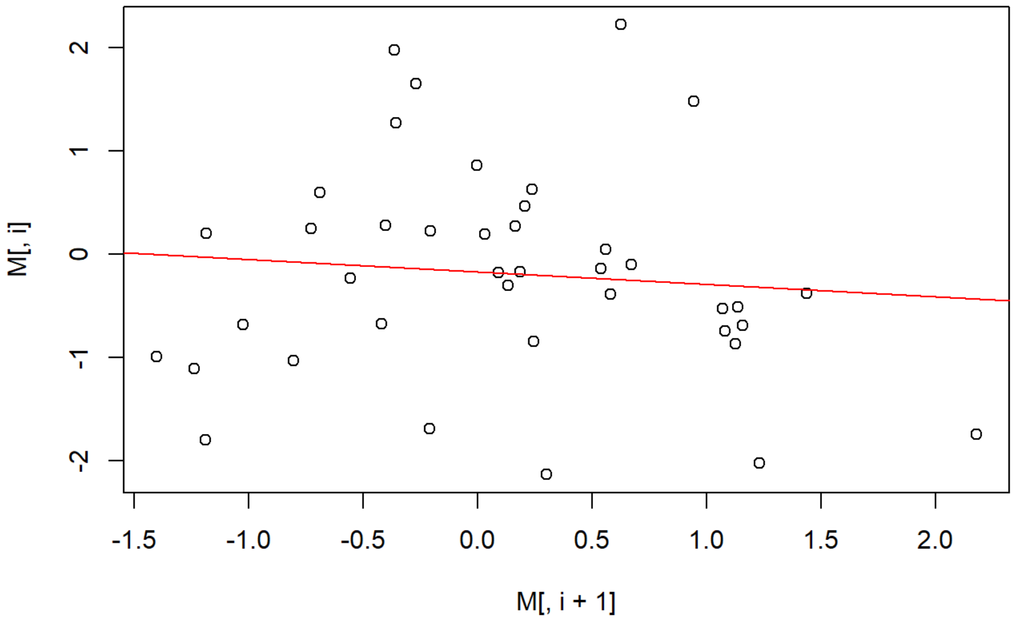

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.12550 -0.48607  0.01578  0.64497  1.78311
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.0681     0.1507  -0.452    0.654
## M[, i + 1]   -0.1155     0.1288  -0.897    0.375
##
## Residual standard error: 0.9478 on 38 degrees of freedom
## Multiple R-squared:  0.02075,    Adjusted R-squared:  -0.005024
## F-statistic: 0.805 on 1 and 38 DF,  p-value: 0.3752
```



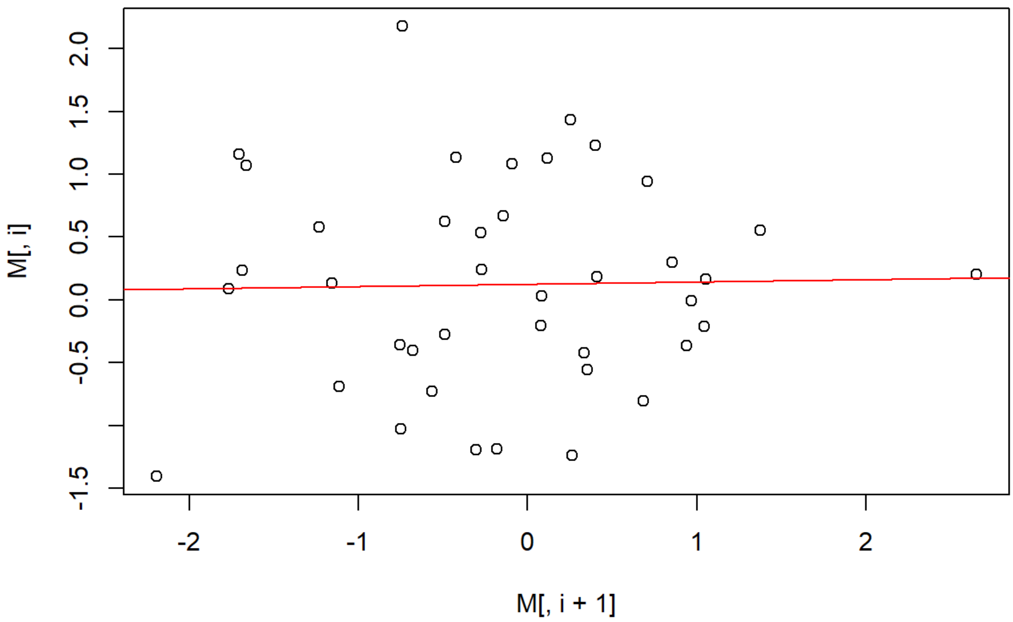
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.72218 -0.84660  0.00586  0.69828  2.42654
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.09455    0.18960  -0.499    0.621
## M[, i + 1]   0.17325    0.18293   0.947    0.350
##
## Residual standard error: 1.18 on 38 degrees of freedom
## Multiple R-squared:  0.02306,    Adjusted R-squared:  -0.00265
## F-statistic: 0.8969 on 1 and 38 DF,  p-value: 0.3496
```



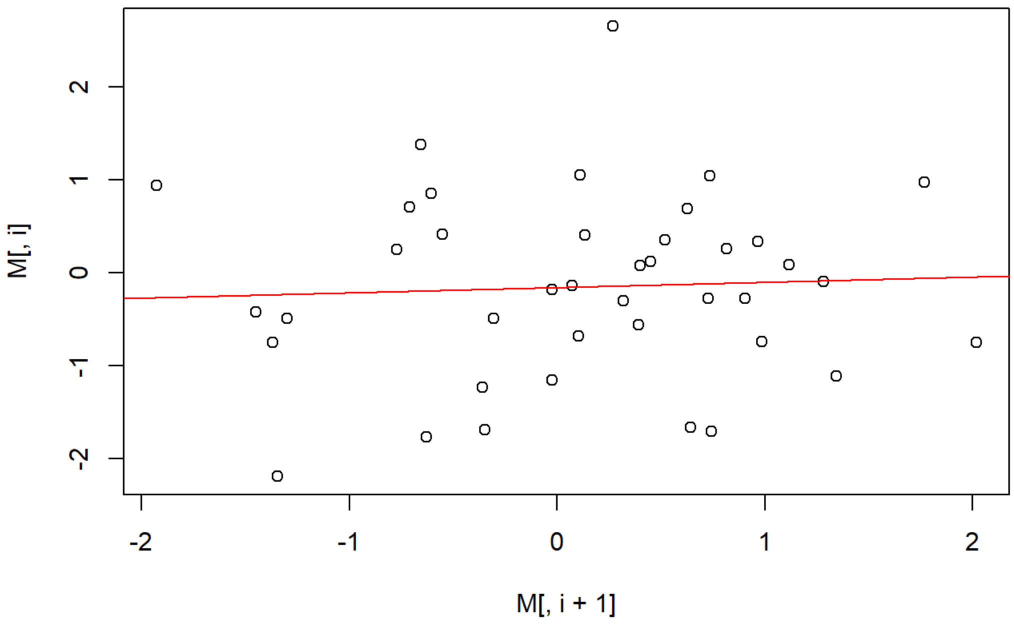

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.92678 -0.58333 -0.01709  0.41787  2.46496
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.1687     0.1665  -1.013    0.317
## M[, i + 1]   -0.1212     0.2003  -0.605    0.549
##
## Residual standard error: 1.042 on 38 degrees of freedom
## Multiple R-squared:  0.009548,   Adjusted R-squared:  -0.01652
## F-statistic: 0.3663 on 1 and 38 DF,  p-value: 0.5486
```



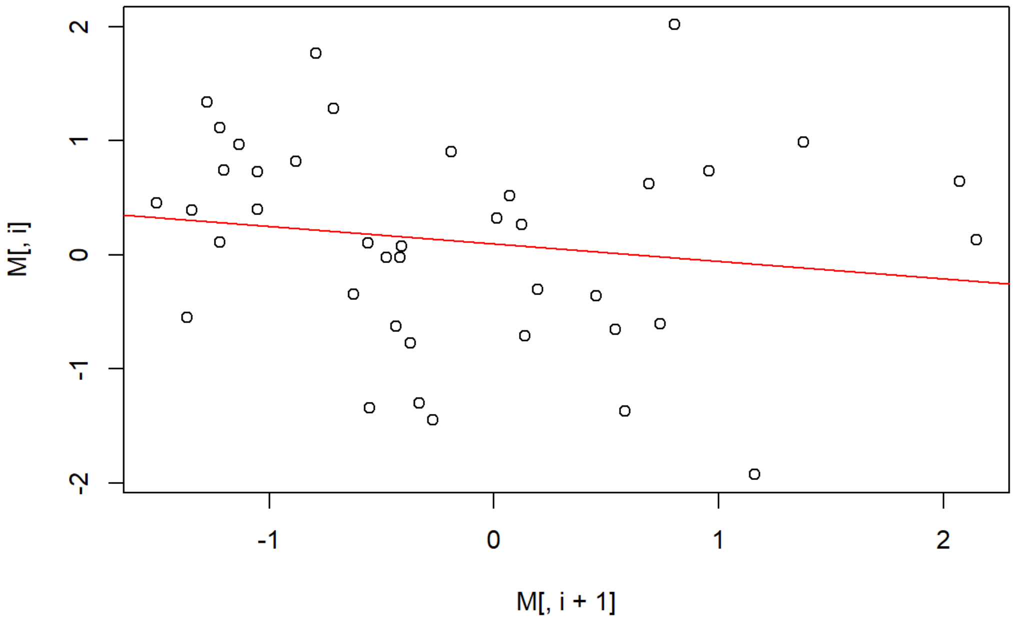

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.48685 -0.52379  0.02509  0.52007  2.06689
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.12339    0.13494   0.914    0.366
## M[, i + 1]   0.01851    0.13607   0.136    0.893
##
## Residual standard error: 0.8433 on 38 degrees of freedom
## Multiple R-squared:  0.0004868,  Adjusted R-squared:  -0.02582
## F-statistic: 0.01851 on 1 and 38 DF,  p-value: 0.8925
```



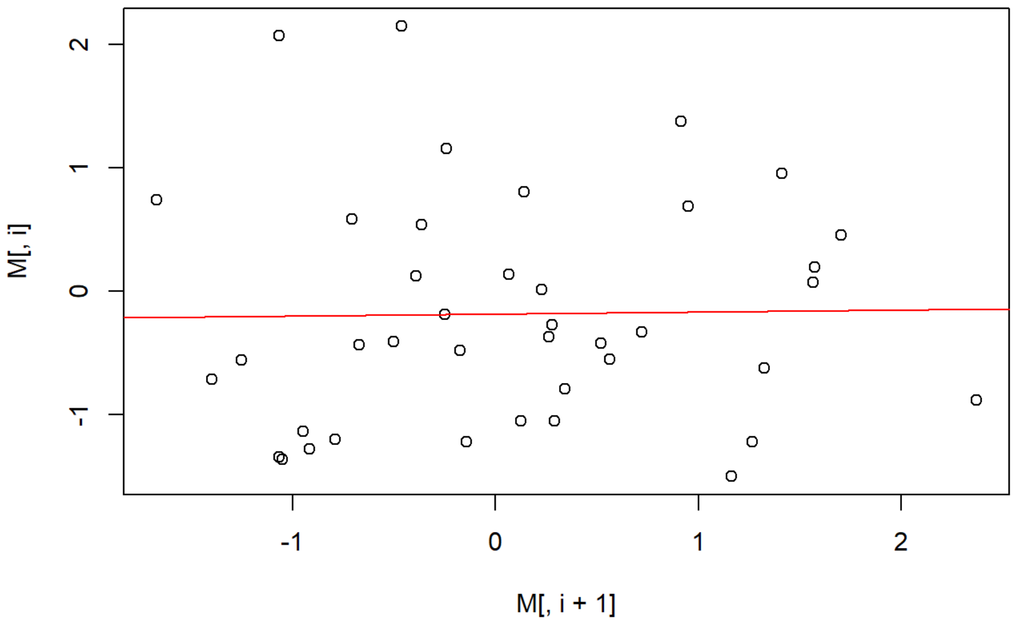
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.9565 -0.5528 -0.0122  0.5654  2.7958
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.1593     0.1603  -0.994    0.327
## M[, i + 1]    0.0568     0.1770   0.321    0.750
##
## Residual standard error: 1.004 on 38 degrees of freedom
## Multiple R-squared:  0.002702,	Adjusted R-squared:  -0.02354
## F-statistic: 0.103 on 1 and 38 DF,  p-value: 0.7501
```



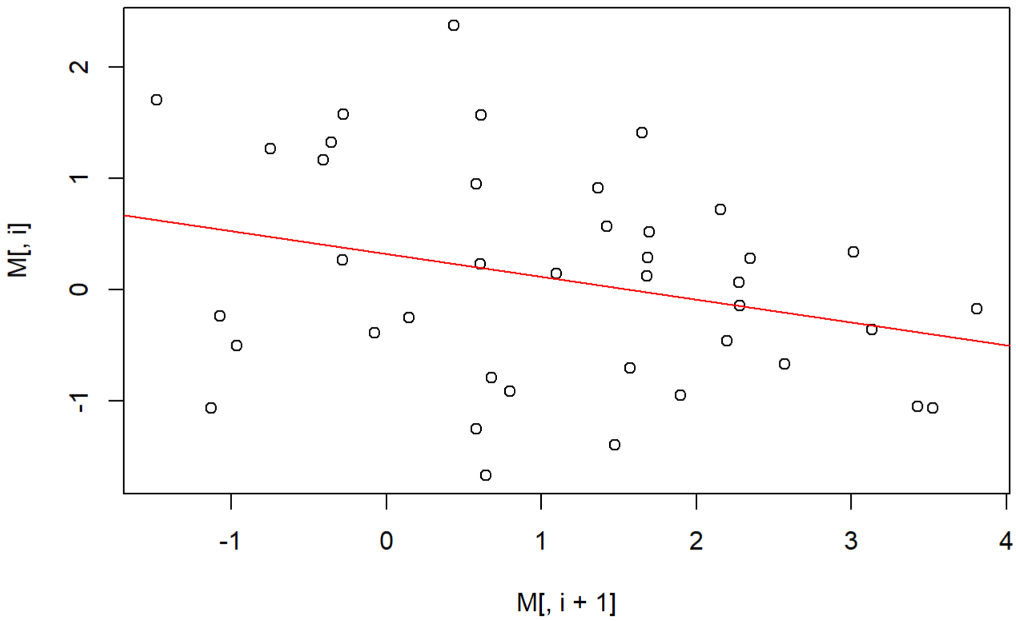

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.8488 -0.6107  0.1048  0.6477  2.0418
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.09872    0.14652   0.674    0.505
## M[, i + 1]  -0.15308    0.15625  -0.980    0.333
##
## Residual standard error: 0.9088 on 38 degrees of freedom
## Multiple R-squared:  0.02464,	Adjusted R-squared:  -0.00103
## F-statistic: 0.9599 on 1 and 38 DF,  p-value: 0.3334
```



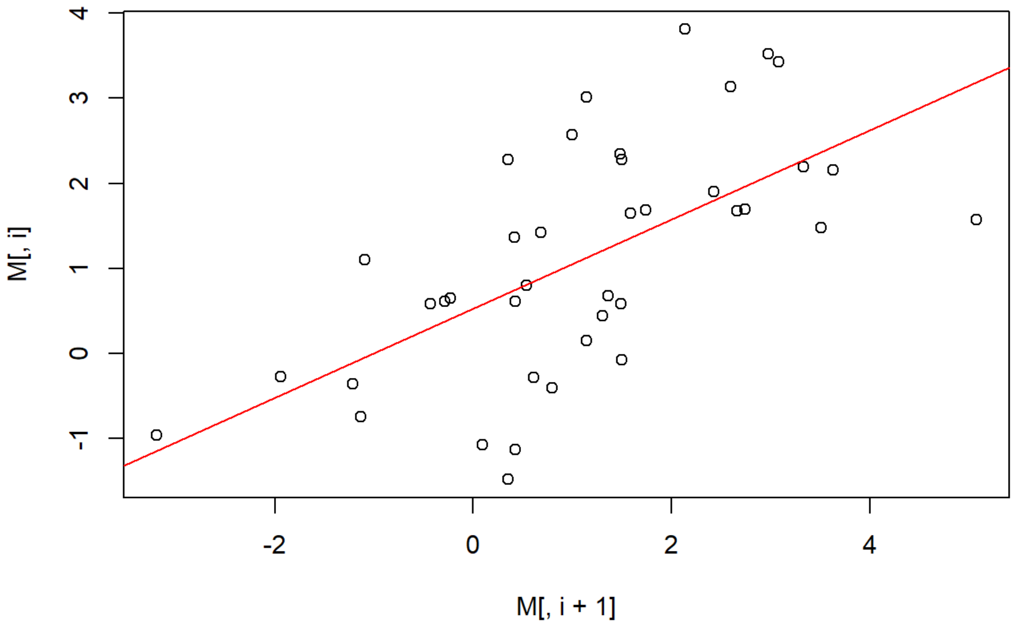

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q  Median       3Q      Max
## -1.3347 -0.7686 -0.2043  0.6420  2.3396
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.18491    0.14985  -1.234    0.225
## M[, i + 1]   0.01599    0.15487   0.103    0.918
##
## Residual standard error: 0.9434 on 38 degrees of freedom
## Multiple R-squared:  0.0002804,  Adjusted R-squared:  -0.02603
## F-statistic: 0.01066 on 1 and 38 DF,  p-value: 0.9183
```



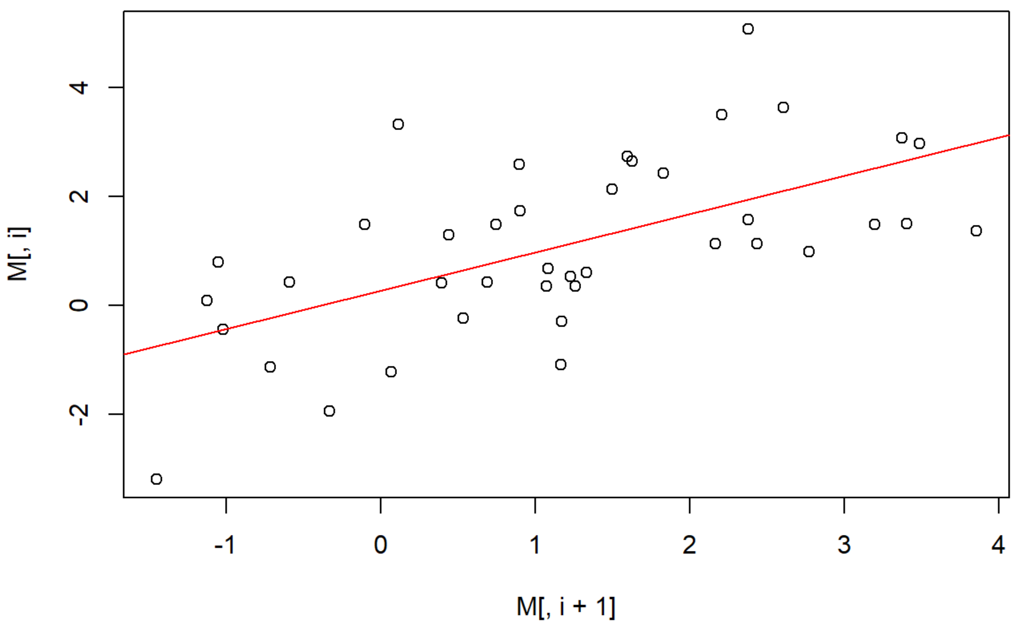
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.8619 -0.7127  0.0368  0.7501  2.1407
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.3217     0.1932   1.665    0.104
## M[, i + 1]   -0.2054     0.1097  -1.871    0.069 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9456 on 38 degrees of freedom
## Multiple R-squared:  0.08439,    Adjusted R-squared:  0.0603
## F-statistic: 3.502 on 1 and 38 DF,  p-value: 0.06899
```



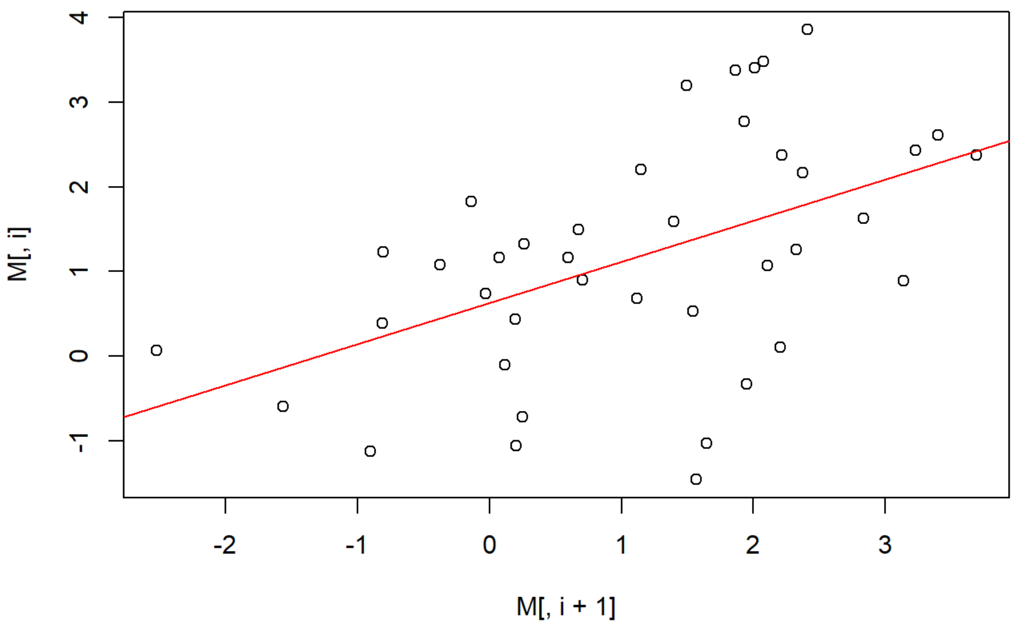

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.19694 -0.74306  0.04019  0.70426  2.16208
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.5315     0.2096   2.536   0.0154 *
## M[, i + 1]    0.5244     0.1066   4.918 1.72e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.093 on 38 degrees of freedom
## Multiple R-squared:  0.3889, Adjusted R-squared:  0.3728
## F-statistic: 24.18 on 1 and 38 DF,  p-value: 1.716e-05
```



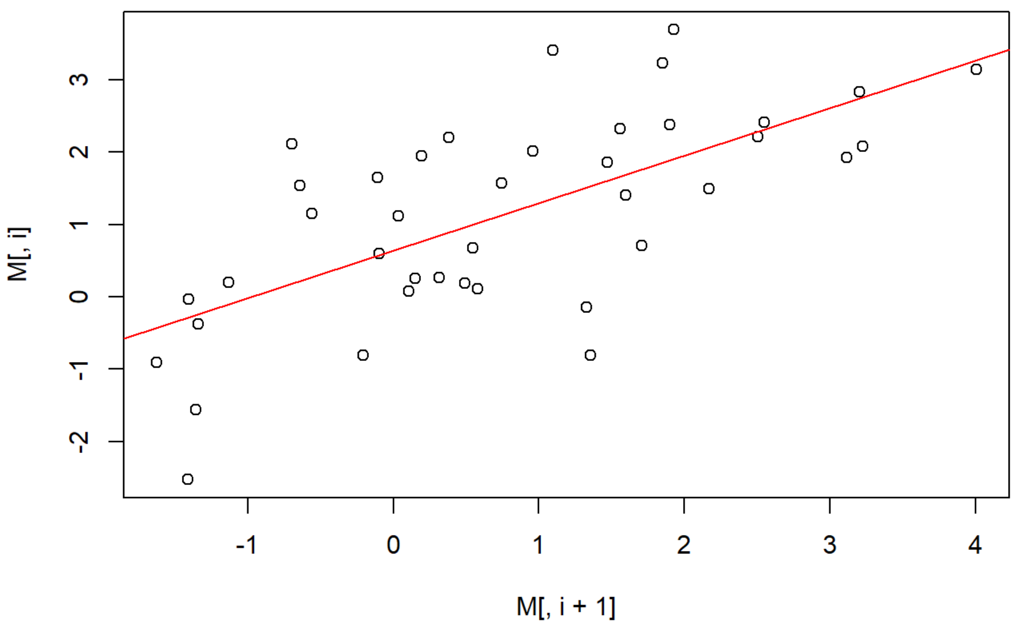

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.4489 -0.8873 -0.2378  0.8379  3.1221
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.2789     0.2788   1.000    0.323
## M[, i + 1]    0.7025     0.1535   4.576 4.94e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.335 on 38 degrees of freedom
## Multiple R-squared:  0.3553, Adjusted R-squared:  0.3384
## F-statistic: 20.94 on 1 and 38 DF,  p-value: 4.938e-05
```



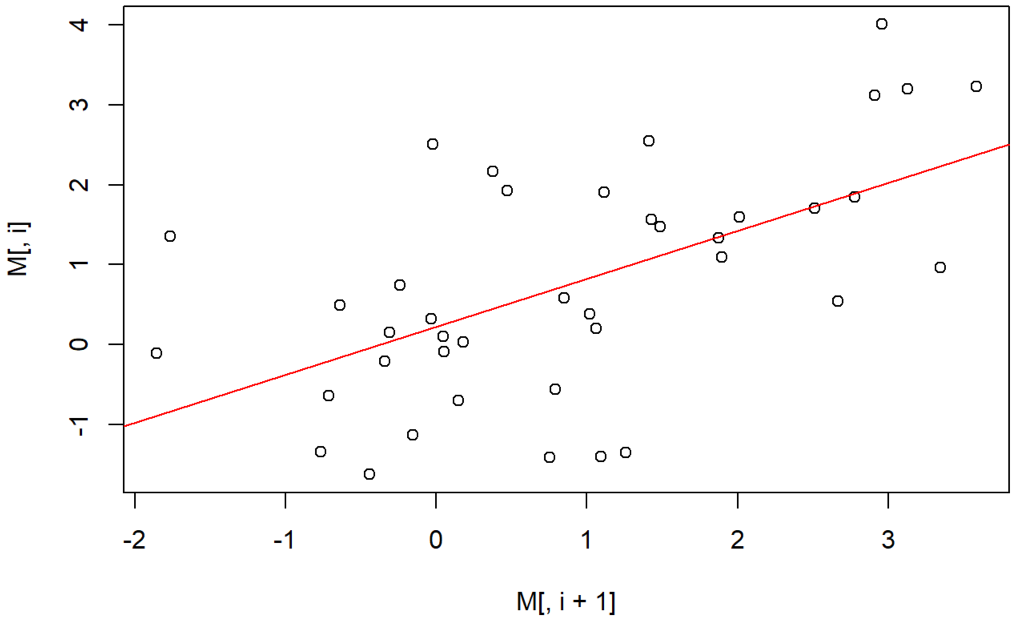

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.8481 -0.6397  0.1940  0.6629  2.0497
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.6316     0.2492   2.534   0.0155 *
## M[, i + 1]    0.4869     0.1379   3.532   0.0011 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.224 on 38 degrees of freedom
## Multiple R-squared:  0.2471, Adjusted R-squared:  0.2273
## F-statistic: 12.47 on 1 and 38 DF,  p-value: 0.001101
```



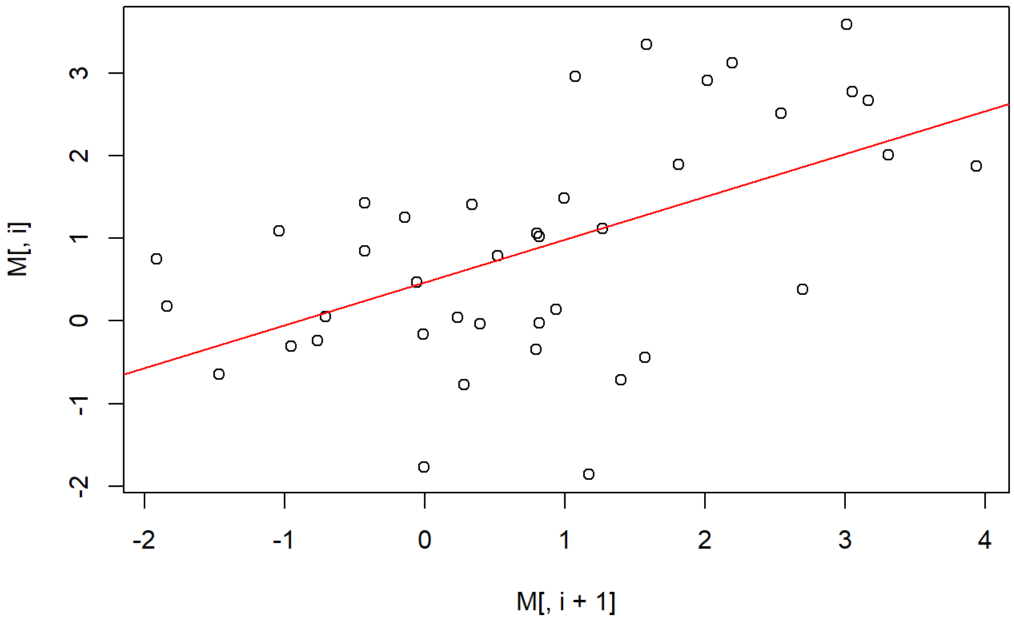

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.33501 -0.64387 -0.02558  0.67949  2.04227
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.6397     0.1917   3.336  0.00191 **
## M[, i + 1]    0.6563     0.1183   5.547 2.38e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.07 on 38 degrees of freedom
## Multiple R-squared:  0.4474, Adjusted R-squared:  0.4329
## F-statistic: 30.77 on 1 and 38 DF,  p-value: 2.381e-06
```



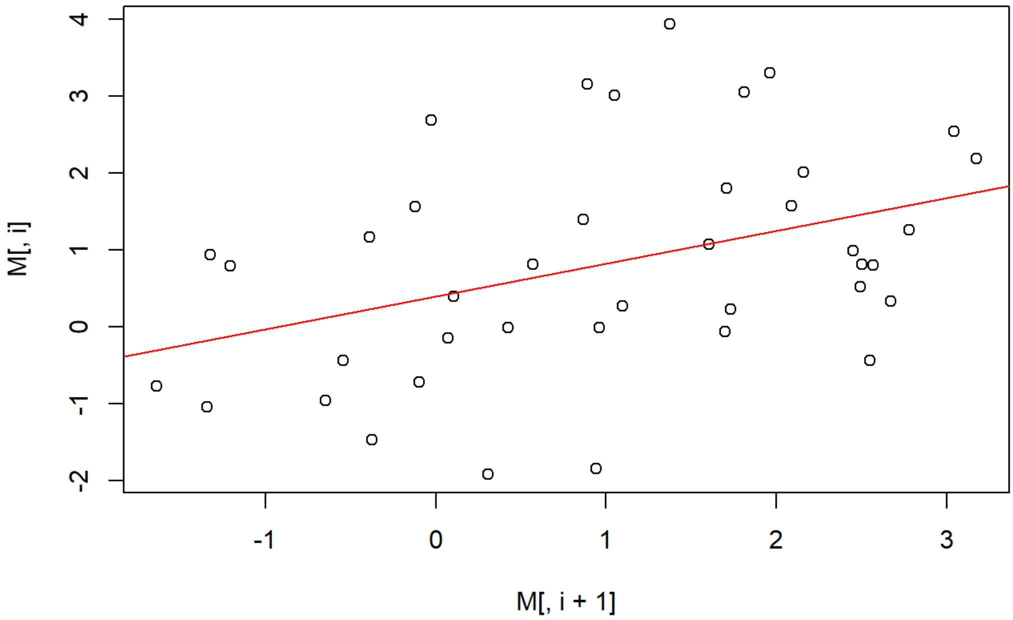

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.33757 -0.75088 -0.03647  0.80114  2.29800
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.2212     0.2275   0.972 0.337069
## M[, i + 1]    0.6016     0.1393   4.320 0.000108 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.202 on 38 degrees of freedom
## Multiple R-squared:  0.3294, Adjusted R-squared:  0.3117
## F-statistic: 18.66 on 1 and 38 DF,  p-value: 0.000108
```



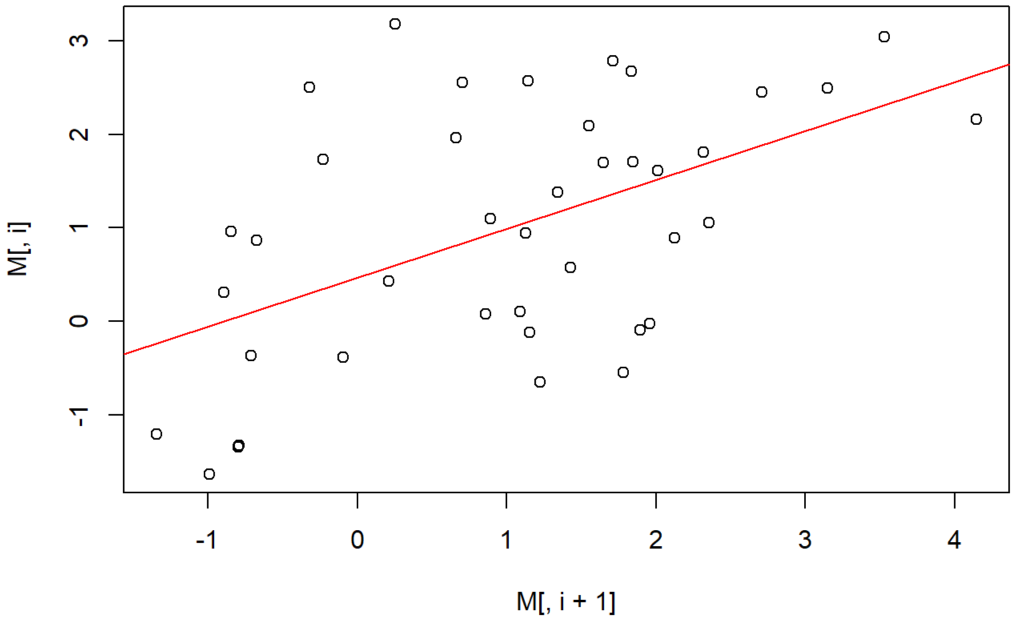

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.9368 -0.6543  0.0396  0.7384  2.0569
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.4706     0.2140   2.199 0.034042 *
## M[, i + 1]    0.5183     0.1293   4.009 0.000275 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.174 on 38 degrees of freedom
## Multiple R-squared:  0.2973, Adjusted R-squared:  0.2788
## F-statistic: 16.07 on 1 and 38 DF,  p-value: 0.0002747
```



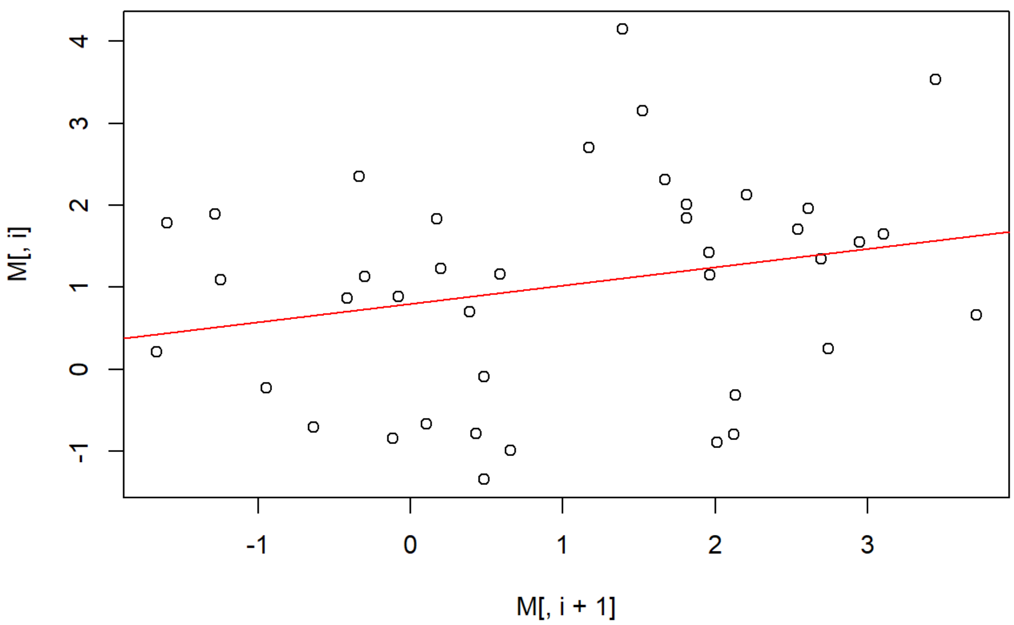

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.6379 -0.8730 -0.3842  0.8637  2.9503
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.3981     0.2679   1.486   0.1455
## M[, i + 1]    0.4266     0.1613   2.644   0.0118 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.353 on 38 degrees of freedom
## Multiple R-squared:  0.1554, Adjusted R-squared:  0.1331
## F-statistic:  6.99 on 1 and 38 DF,  p-value: 0.01184
```



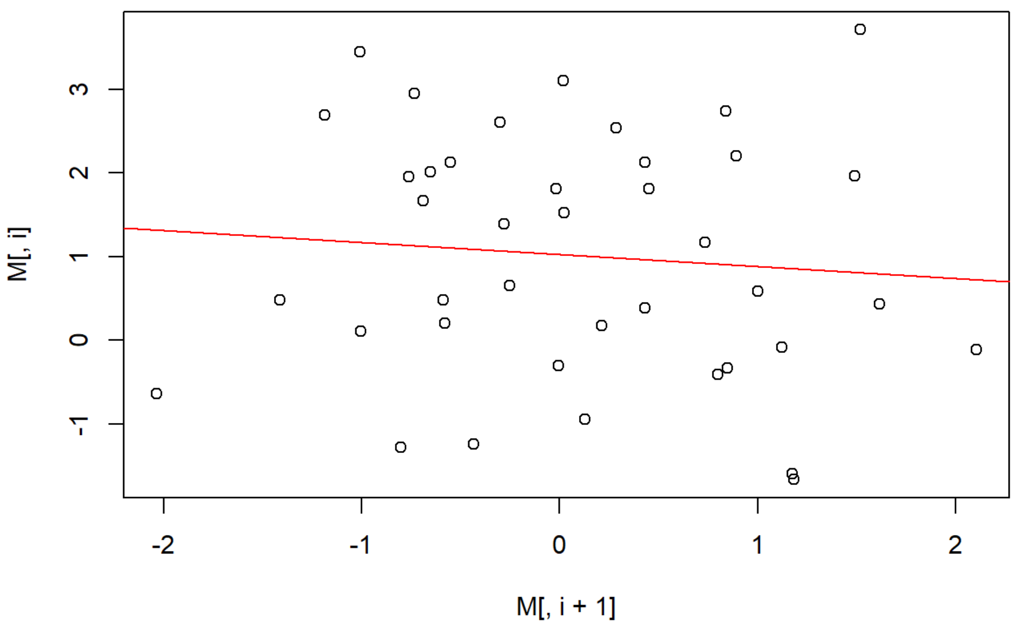

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.9402 -0.8634  0.1130  0.7694  2.5793
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.4640     0.2327   1.994 0.053349 .
## M[, i + 1]    0.5228     0.1394   3.750 0.000589 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.163 on 38 degrees of freedom
## Multiple R-squared:  0.2701, Adjusted R-squared:  0.2509
## F-statistic: 14.06 on 1 and 38 DF,  p-value: 0.0005887
```



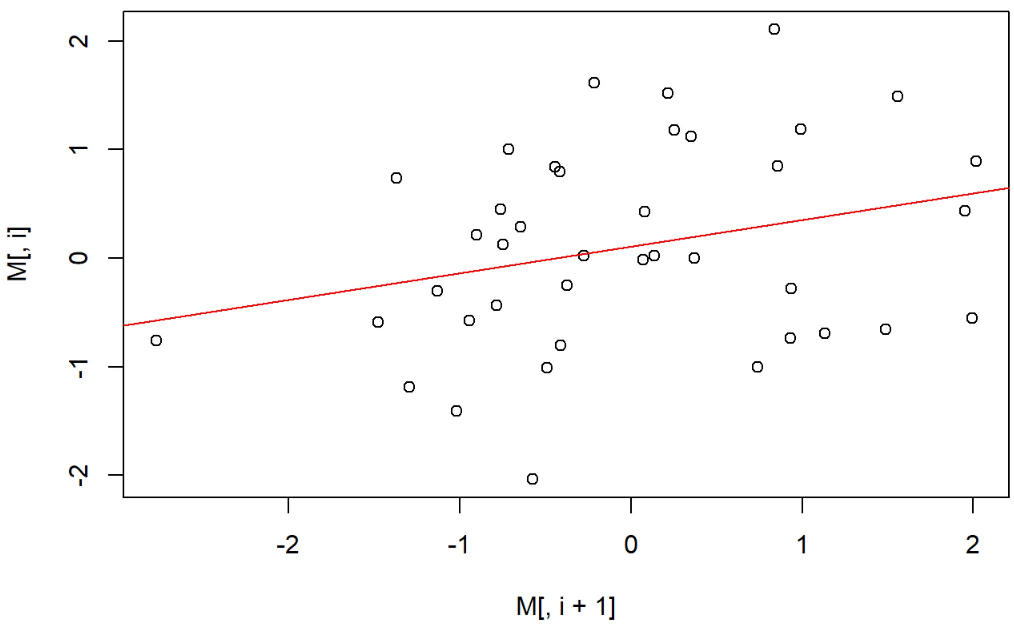

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.2498 -1.0385  0.1551  0.8139  3.0370
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.7962     0.2530   3.147   0.0032 **
## M[, i + 1]    0.2245     0.1433   1.566   0.1256
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.311 on 38 degrees of freedom
## Multiple R-squared:  0.06065,    Adjusted R-squared:  0.03593
## F-statistic: 2.453 on 1 and 38 DF,  p-value: 0.1256
```



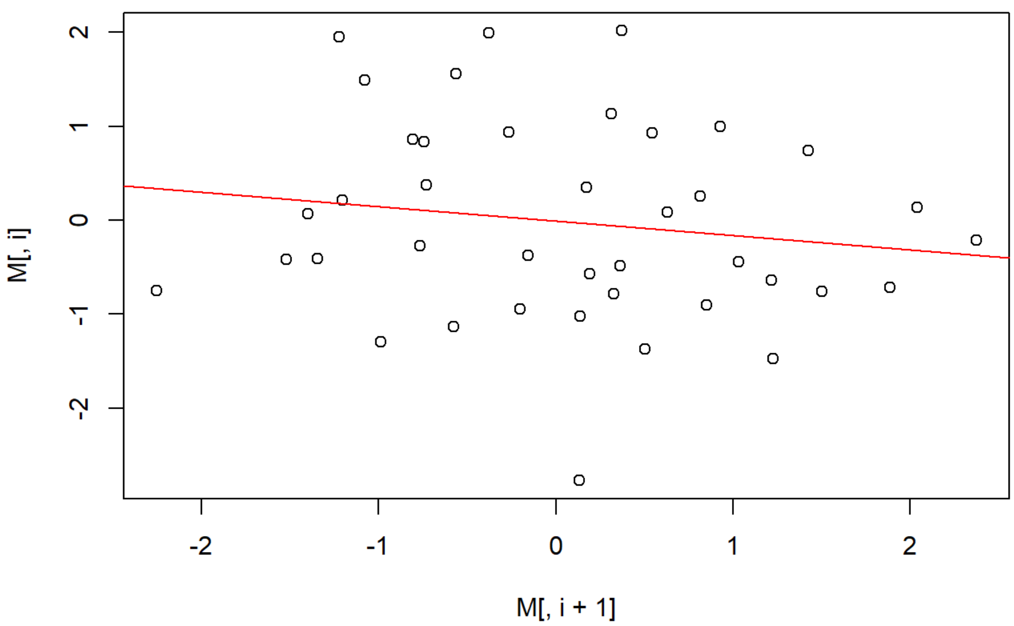

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.52194 -0.97598 -0.02078  1.15499  2.90645
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.0265     0.2350   4.369 9.33e-05 ***
## M[, i + 1]   -0.1441     0.2533  -0.569    0.573
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.477 on 38 degrees of freedom
## Multiple R-squared:  0.008442,   Adjusted R-squared:  -0.01765
## F-statistic: 0.3235 on 1 and 38 DF,  p-value: 0.5729
```



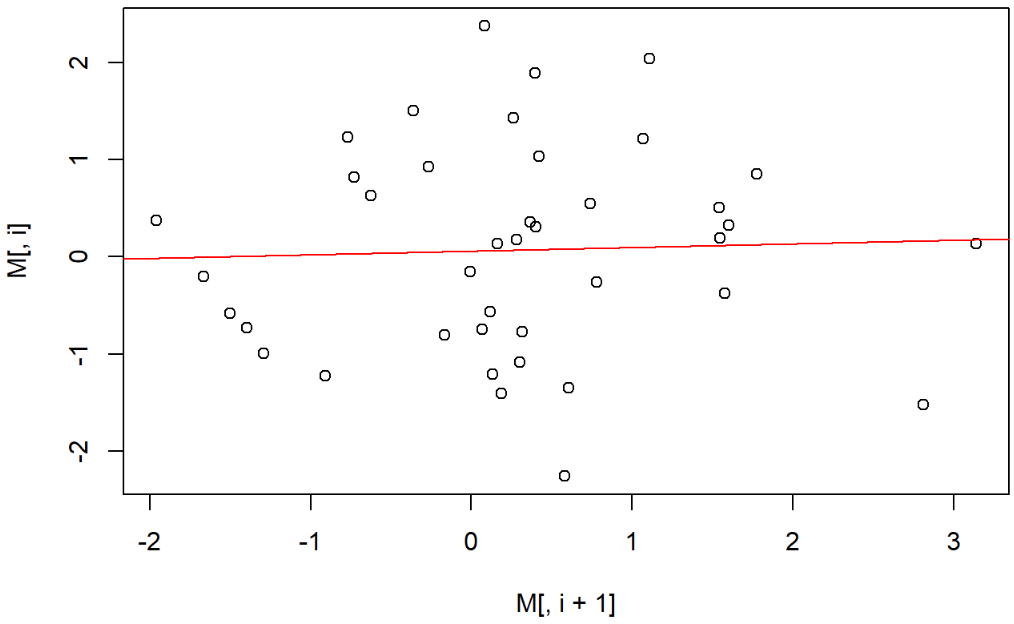

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0014 -0.6631 -0.1229  0.8054  1.7945
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.1055     0.1436   0.735   0.4668
## M[, i + 1]    0.2460     0.1363   1.804   0.0791 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9079 on 38 degrees of freedom
## Multiple R-squared:  0.07893,    Adjusted R-squared:  0.05469
## F-statistic: 3.256 on 1 and 38 DF,  p-value: 0.07909
```



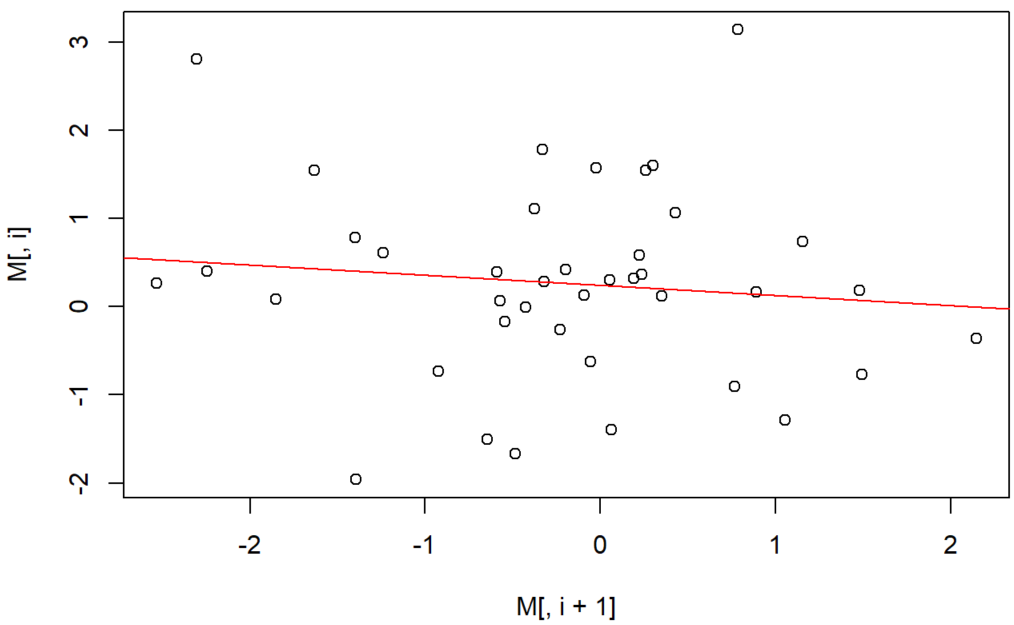

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.7407 -0.6603 -0.2044  0.7848  2.0829
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.009926   0.169119  -0.059    0.954
## M[, i + 1]  -0.153464   0.159488  -0.962    0.342
##
## Residual standard error: 1.067 on 38 degrees of freedom
## Multiple R-squared:  0.02379,    Adjusted R-squared:  -0.001904
## F-statistic: 0.9259 on 1 and 38 DF,  p-value: 0.342
```



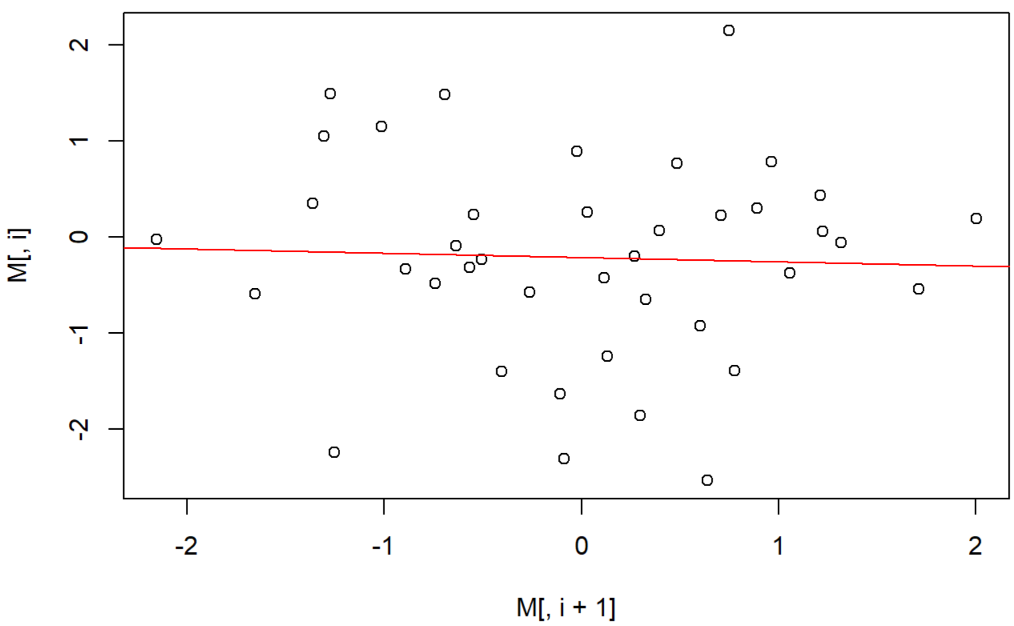
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.33465 -0.81477  0.07198  0.73778  2.31048
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.05882    0.17655   0.333    0.741
## M[, i + 1]   0.03801    0.15628   0.243    0.809
##
## Residual standard error: 1.085 on 38 degrees of freedom
## Multiple R-squared:  0.001554,   Adjusted R-squared:  -0.02472
## F-statistic: 0.05914 on 1 and 38 DF,  p-value: 0.8092
```



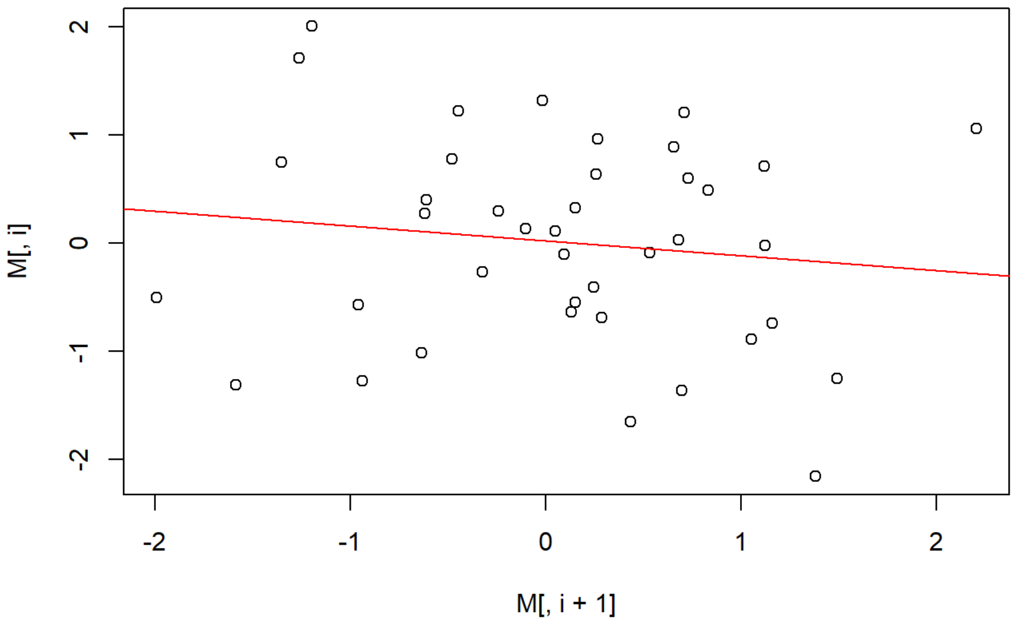

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.36282 -0.48847  0.01191  0.44042  2.98523
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.2434     0.1806   1.348    0.186
## M[, i + 1]   -0.1150     0.1693  -0.679    0.501
##
## Residual standard error: 1.119 on 38 degrees of freedom
## Multiple R-squared:  0.012,  Adjusted R-squared:  -0.014
## F-statistic: 0.4614 on 1 and 38 DF,  p-value: 0.5011
```



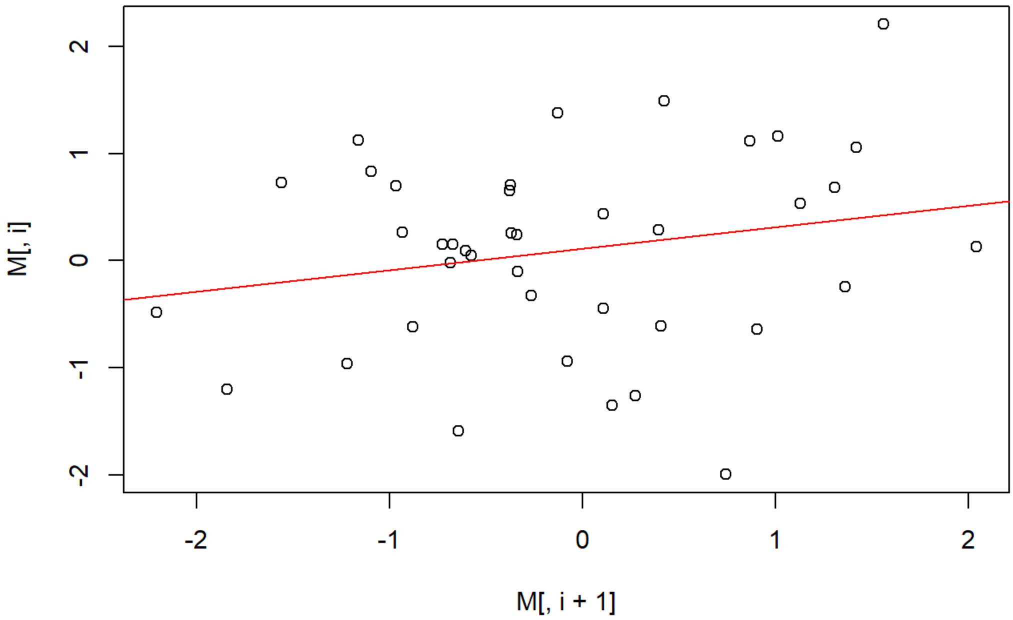

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.29319 -0.42747  0.06047  0.51572  2.39245
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.21181    0.16945  -1.250    0.219
## M[, i + 1]  -0.04384    0.17828  -0.246    0.807
##
## Residual standard error: 1.072 on 38 degrees of freedom
## Multiple R-squared:  0.001589,   Adjusted R-squared:  -0.02468
## F-statistic: 0.06048 on 1 and 38 DF,  p-value: 0.8071
```



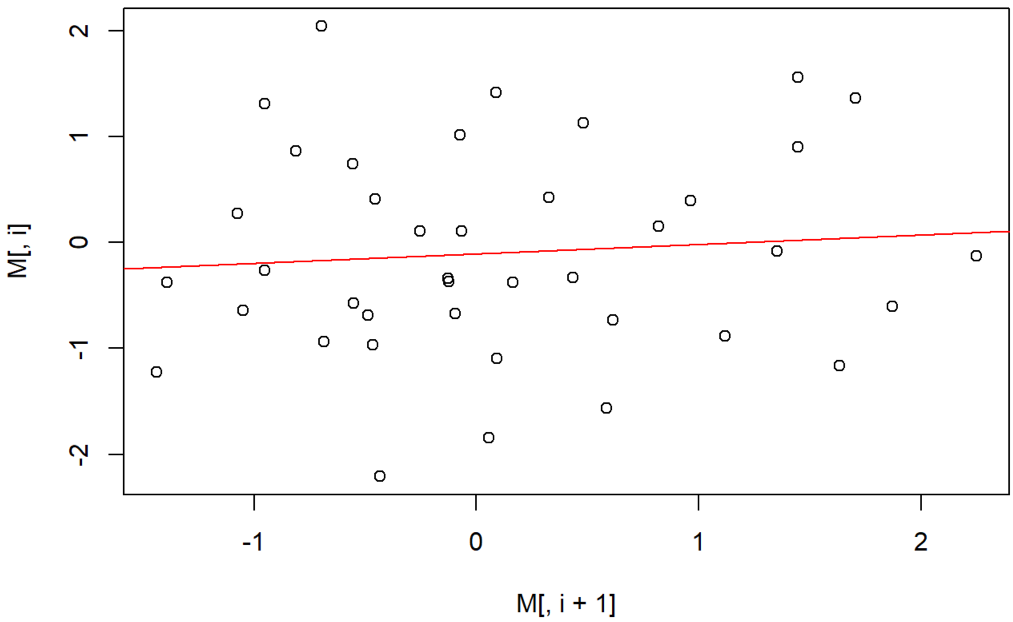
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.98913 -0.68731  0.09899  0.68115  1.81587
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.02269    0.15367   0.148    0.883
## M[, i + 1]  -0.13708    0.16986  -0.807    0.425
##
## Residual standard error: 0.9668 on 38 degrees of freedom
## Multiple R-squared:  0.01685,    Adjusted R-squared:  -0.009022
## F-statistic: 0.6513 on 1 and 38 DF,  p-value: 0.4247
```



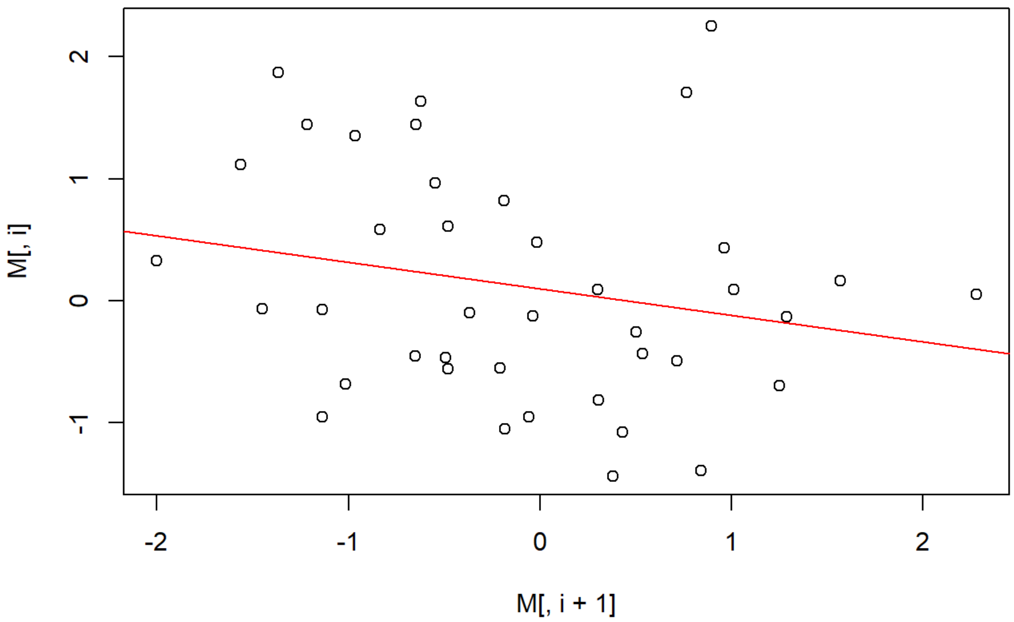

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.2510 -0.5917  0.1410  0.6621  1.7789
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.1111     0.1433   0.775    0.443
## M[, i + 1]    0.2004     0.1473   1.361    0.182
##
## Residual standard error: 0.9016 on 38 degrees of freedom
## Multiple R-squared:  0.04647,    Adjusted R-squared:  0.02137
## F-statistic: 1.852 on 1 and 38 DF,  p-value: 0.1816
```



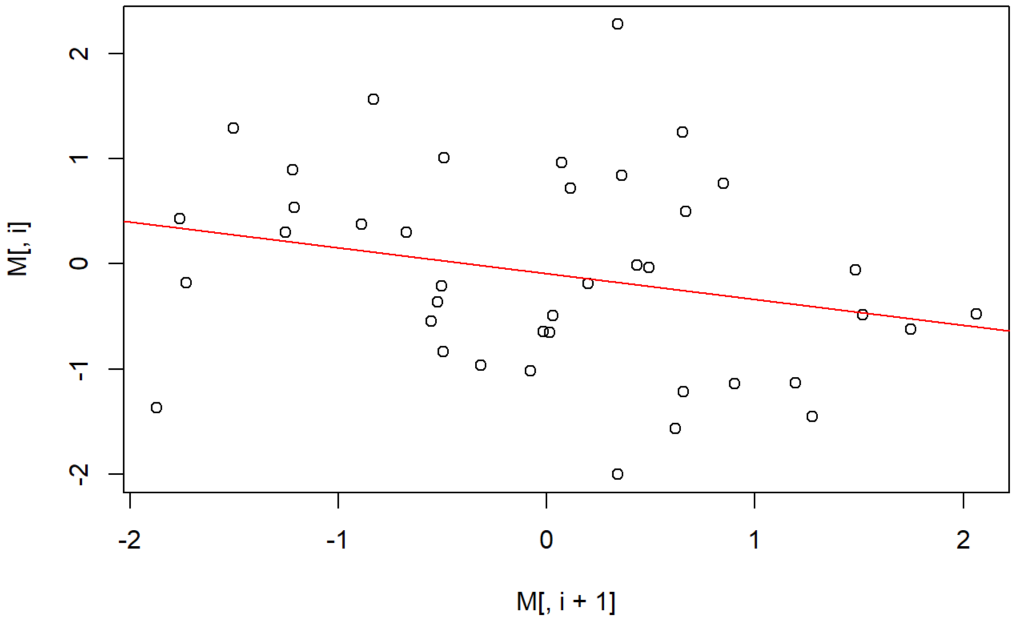

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0625 -0.6705 -0.1828  0.6356  2.2107
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.10659    0.15766  -0.676    0.503
## M[, i + 1]   0.09037    0.16713   0.541    0.592
##
## Residual standard error: 0.9894 on 38 degrees of freedom
## Multiple R-squared:  0.007634,   Adjusted R-squared:  -0.01848
## F-statistic: 0.2923 on 1 and 38 DF,  p-value: 0.5919
```



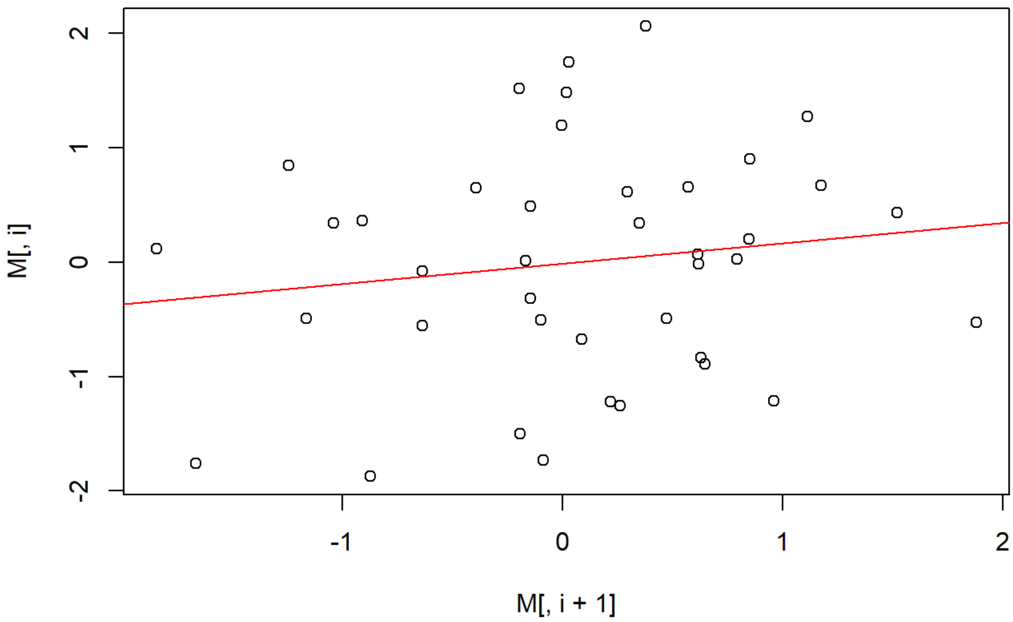
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.4546 -0.6955 -0.2185  0.5800  2.3481
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.09749    0.14879   0.655    0.516
## M[, i + 1]  -0.21789    0.15659  -1.391    0.172
##
## Residual standard error: 0.9368 on 38 degrees of freedom
## Multiple R-squared:  0.04848,    Adjusted R-squared:  0.02344
## F-statistic: 1.936 on 1 and 38 DF,  p-value: 0.1722
```



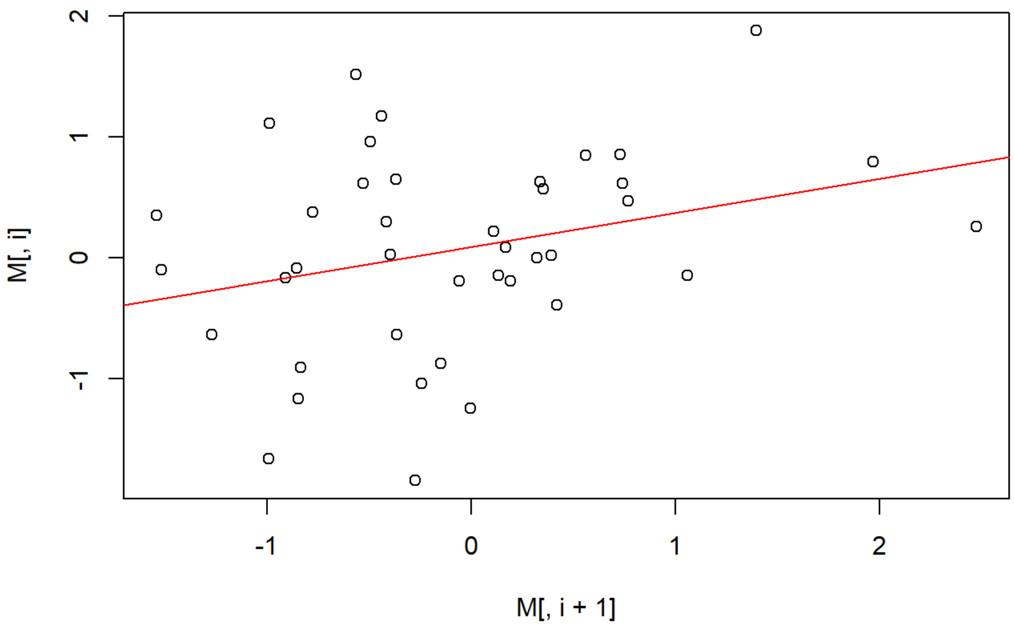

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.82811 -0.63228  0.03353  0.70454  2.45192
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.08981    0.14834  -0.605    0.548
## M[, i + 1]  -0.24592    0.15089  -1.630    0.111
##
## Residual standard error: 0.9382 on 38 degrees of freedom
## Multiple R-squared:  0.06533,    Adjusted R-squared:  0.04074
## F-statistic: 2.656 on 1 and 38 DF,  p-value: 0.1114
```



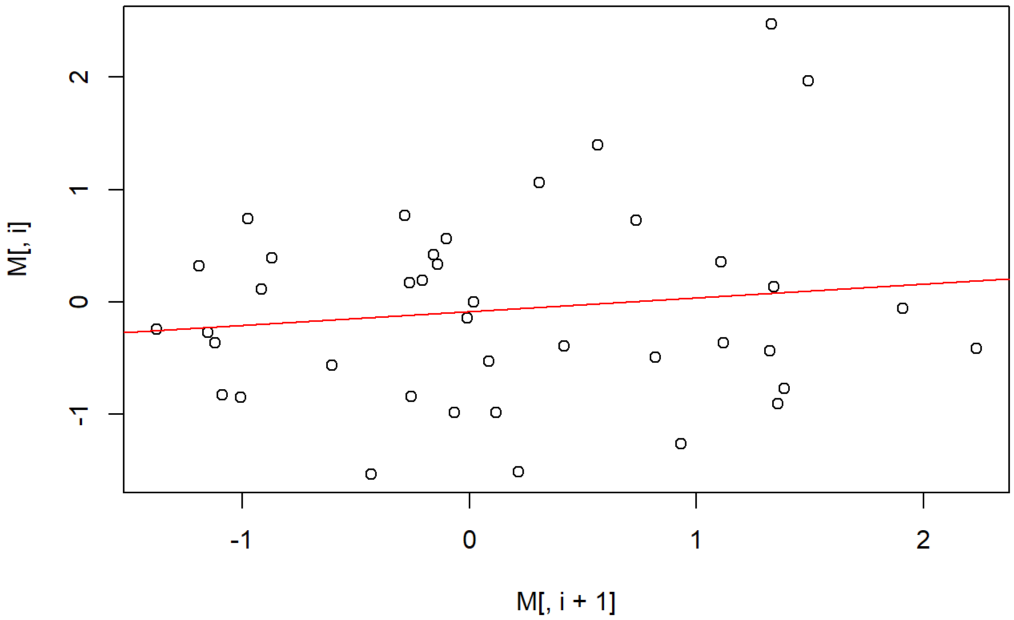

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.70641 -0.72060  0.05097  0.56851  2.00536
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.01045    0.15834  -0.066    0.948
## M[, i + 1]   0.17773    0.19293   0.921    0.363
##
## Residual standard error: 0.9976 on 38 degrees of freedom
## Multiple R-squared:  0.02185,    Adjusted R-squared:  -0.003896
## F-statistic: 0.8487 on 1 and 38 DF,  p-value: 0.3627
```



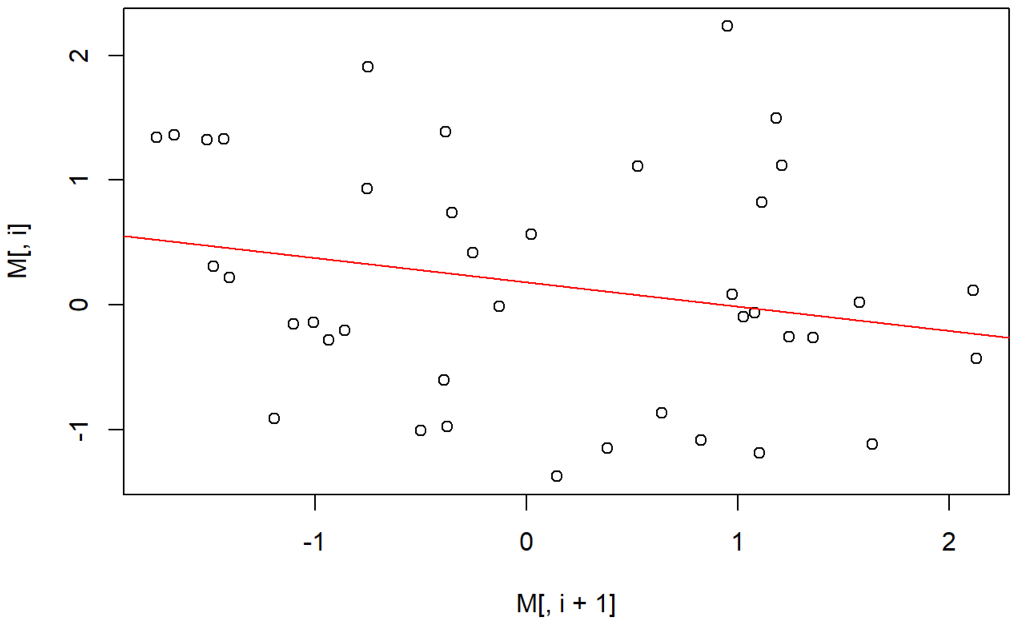
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.85838 -0.53030  0.05489  0.51810  1.58693
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.09097    0.12710   0.716   0.4785
## M[, i + 1]   0.28283    0.14830   1.907   0.0641 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8013 on 38 degrees of freedom
## Multiple R-squared:  0.08736,    Adjusted R-squared:  0.06334
## F-statistic: 3.637 on 1 and 38 DF,  p-value: 0.06407
```



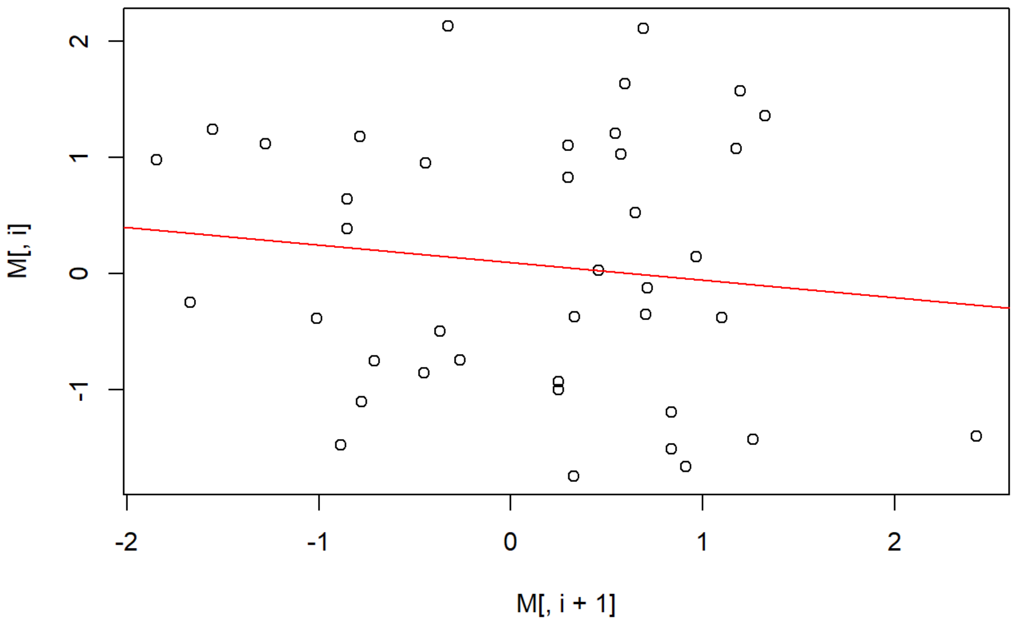

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.45535 -0.60667 -0.05161  0.53380  2.39441
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.08804    0.13938  -0.632    0.531
## M[, i + 1]   0.12424    0.14558   0.853    0.399
##
## Residual standard error: 0.8683 on 38 degrees of freedom
## Multiple R-squared:  0.01881,    Adjusted R-squared:  -0.007016
## F-statistic: 0.7283 on 1 and 38 DF,  p-value: 0.3988
```



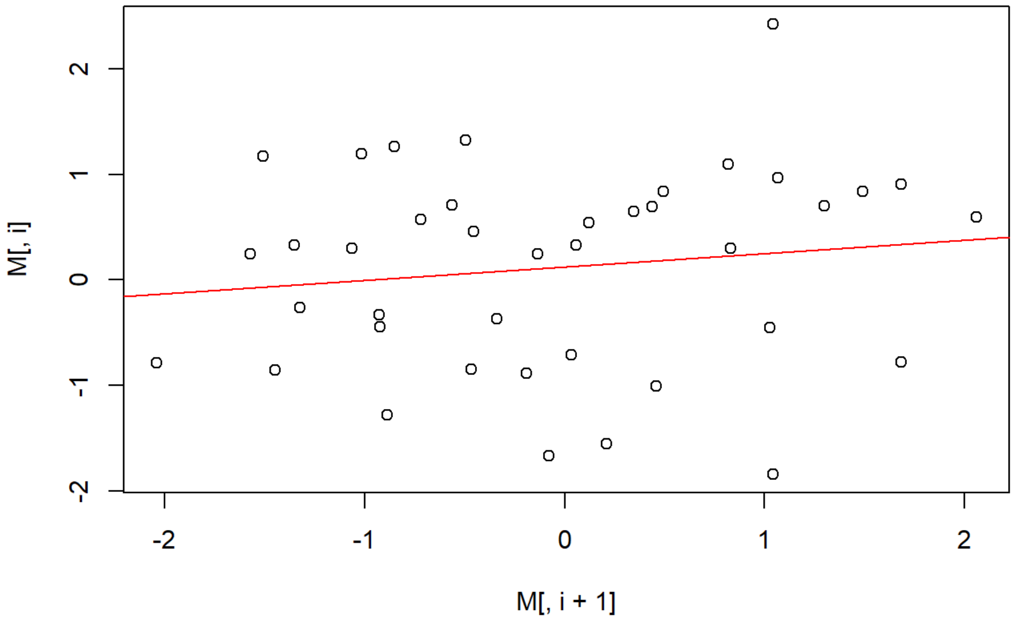

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -1.5281 -0.7011 -0.1199  0.8249  2.2381
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.1798     0.1492   1.205    0.236
## M[, i + 1]   -0.1957     0.1334  -1.467    0.151
##
## Residual standard error: 0.9413 on 38 degrees of freedom
## Multiple R-squared:  0.05359,    Adjusted R-squared:  0.02868
## F-statistic: 2.152 on 1 and 38 DF,  p-value: 0.1506
```



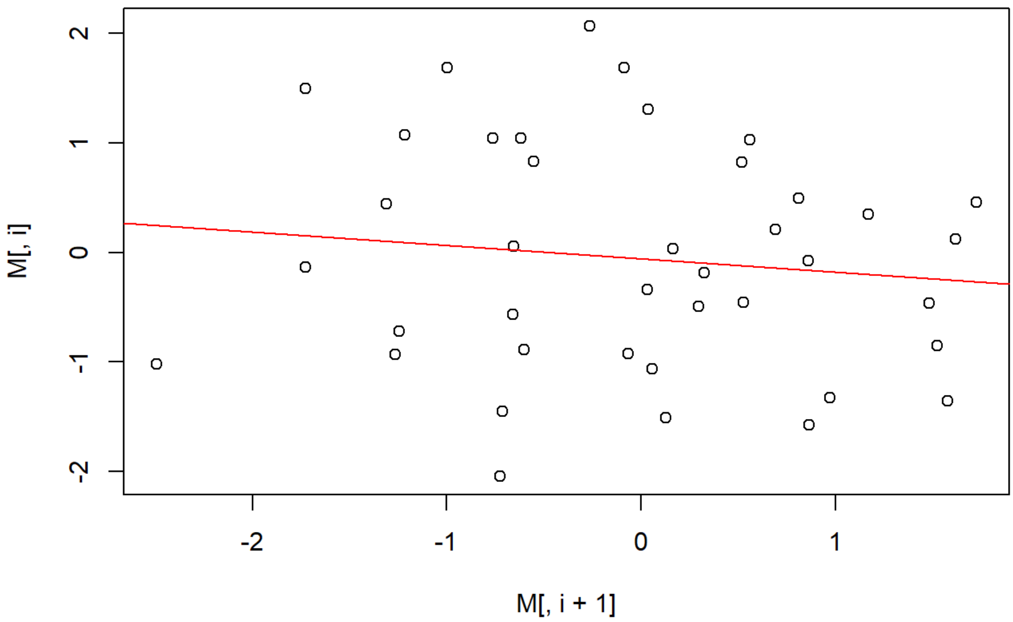
```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.79203 -0.99784 -0.05654  0.92751  2.12366
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.09214    0.18088   0.509    0.613
## M[, i + 1]  -0.15168    0.19082  -0.795    0.432
##
## Residual standard error: 1.135 on 38 degrees of freedom
## Multiple R-squared:  0.01636,    Adjusted R-squared:  -0.009529
## F-statistic: 0.6319 on 1 and 38 DF,  p-value: 0.4316
```



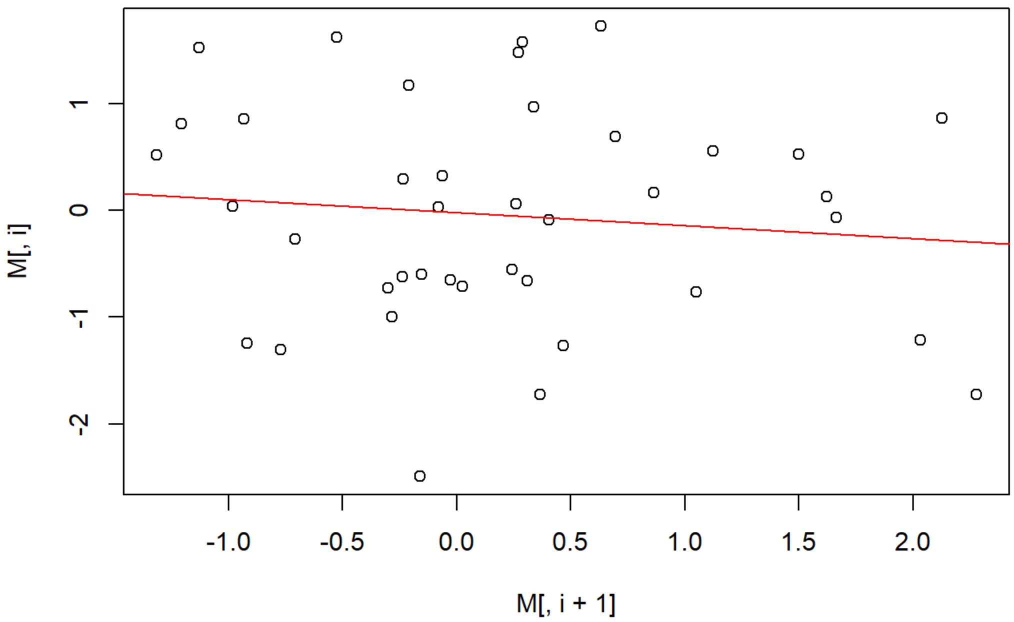

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.1011 -0.7262  0.2596  0.5503  2.1698
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.1231     0.1514   0.813    0.421
## M[, i + 1]    0.1272     0.1476   0.862    0.394
##
## Residual standard error: 0.9559 on 38 degrees of freedom
## Multiple R-squared:  0.01916,    Adjusted R-squared:  -0.00665
## F-statistic: 0.7423 on 1 and 38 DF,  p-value: 0.3943
```



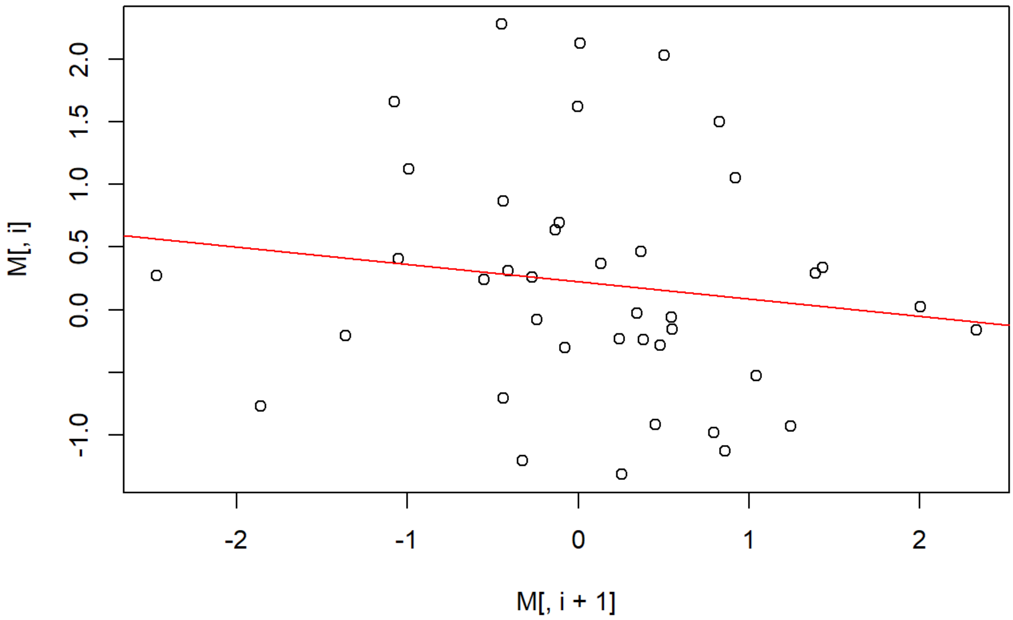

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.07146 -0.88056 -0.02714  0.85287  2.08703
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.05922    0.16504  -0.359    0.722
## M[, i + 1]  -0.12211    0.16152  -0.756    0.454
##
## Residual standard error: 1.043 on 38 degrees of freedom
## Multiple R-squared:  0.01482,    Adjusted R-squared:  -0.01111
## F-statistic: 0.5715 on 1 and 38 DF,  p-value: 0.4543
```



```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.49409 -0.65355  0.07465  0.73556  1.82037
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.0185     0.1688  -0.110    0.913
## M[, i + 1]   -0.1217     0.1795  -0.678    0.502
##
## Residual standard error: 1.041 on 38 degrees of freedom
## Multiple R-squared:  0.01195,    Adjusted R-squared:  -0.01405
## F-statistic: 0.4597 on 1 and 38 DF,  p-value: 0.5019
```



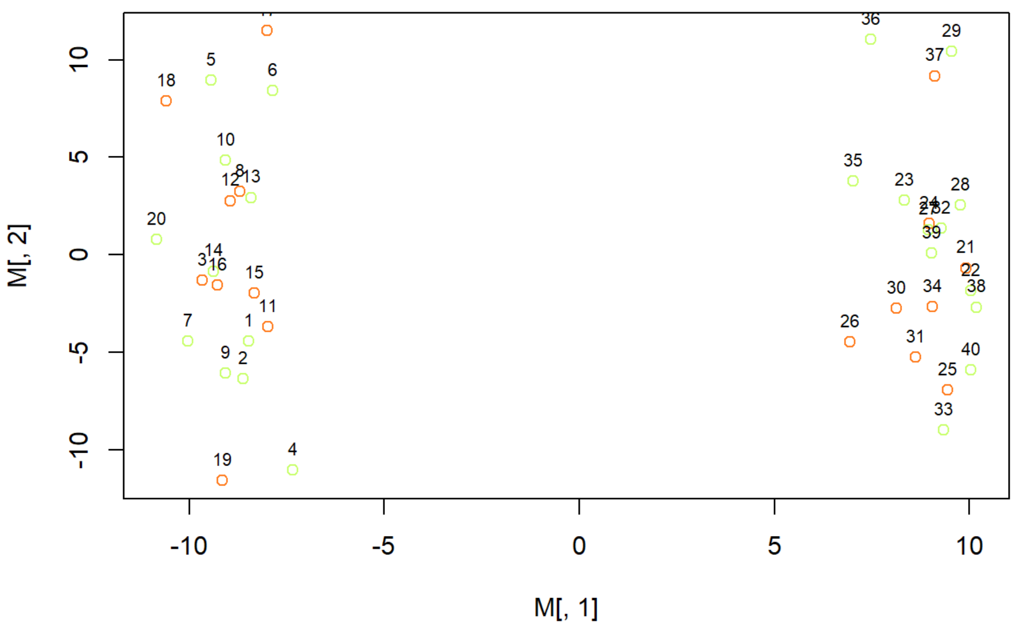

```
##
## Call:
## lm(formula = M[, i] ~ M[, i + 1])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.50347 -0.55382 -0.06092  0.40663  1.98959
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.2249     0.1484   1.516    0.138
## M[, i + 1]   -0.1390     0.1547  -0.899    0.374
##
## Residual standard error: 0.931 on 38 degrees of freedom
## Multiple R-squared:  0.02082,    Adjusted R-squared:  -0.004951
## F-statistic: 0.8079 on 1 and 38 DF,  p-value: 0.3744
```



Dans notre cas, nous avons des nuages de point. On ne peut pas réellement déduire d’une quelconque dépendance des variables.

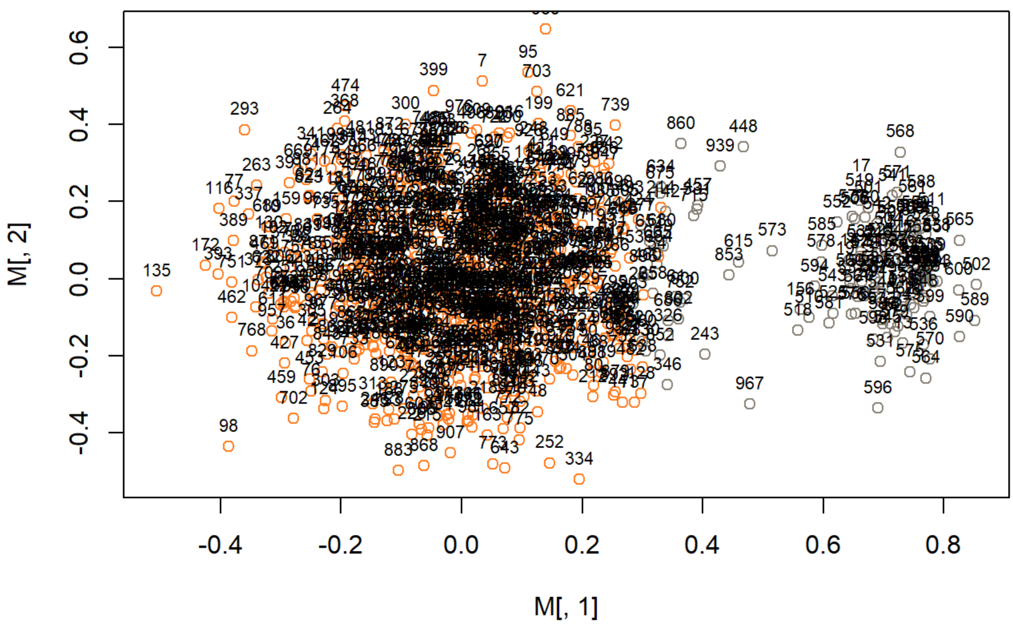
L’analyse Bivariée ne nous fait pas plus avancer.

```
res <- pcafunction(data)$PCA_component$Fi
explainKmeans(res, kmeansfunction(res, k=2))
```



Nous remarquons bien la clusterisation des individus malades et sains grâce à la projection des individus et kmeans.

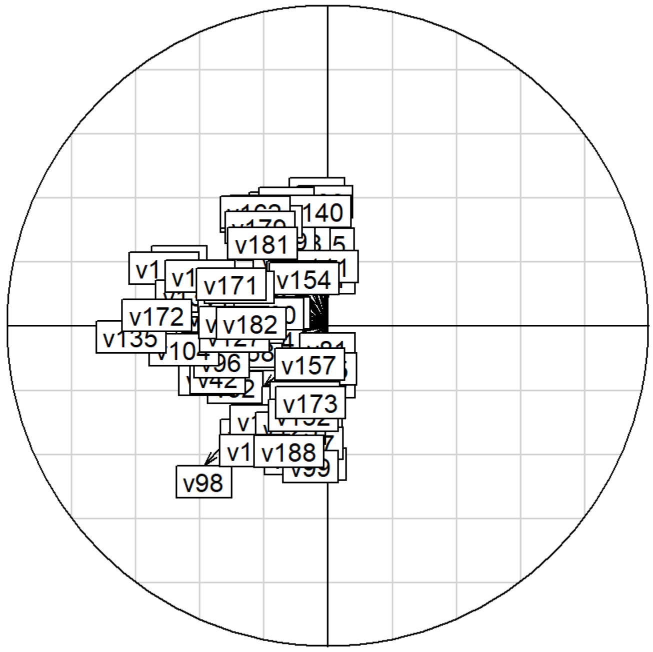
```
res <- pcafunction(data)$PCA_component$Gi
explainKmeans(res, kmeansfunction(res, k=2))
```



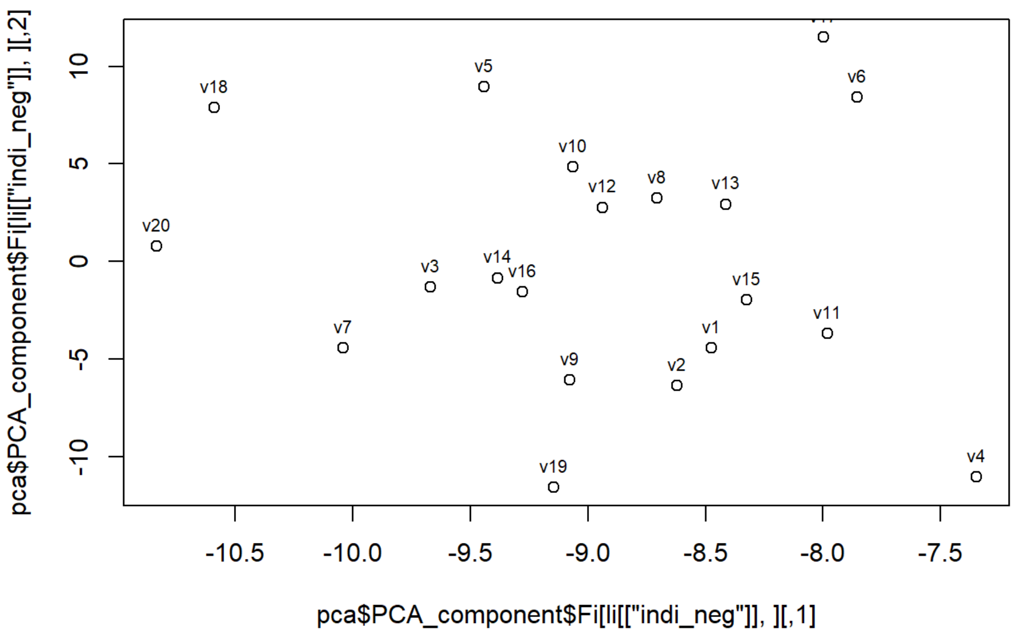
Nous avons la segmentation des gènes par k-means, en revanche on ne pas interpréter car nous ne savons pas quel cluster contient les gène responsables de la maladie ou non.

```
explainPCA(pcafunction(data, axisNumber = 2))
```

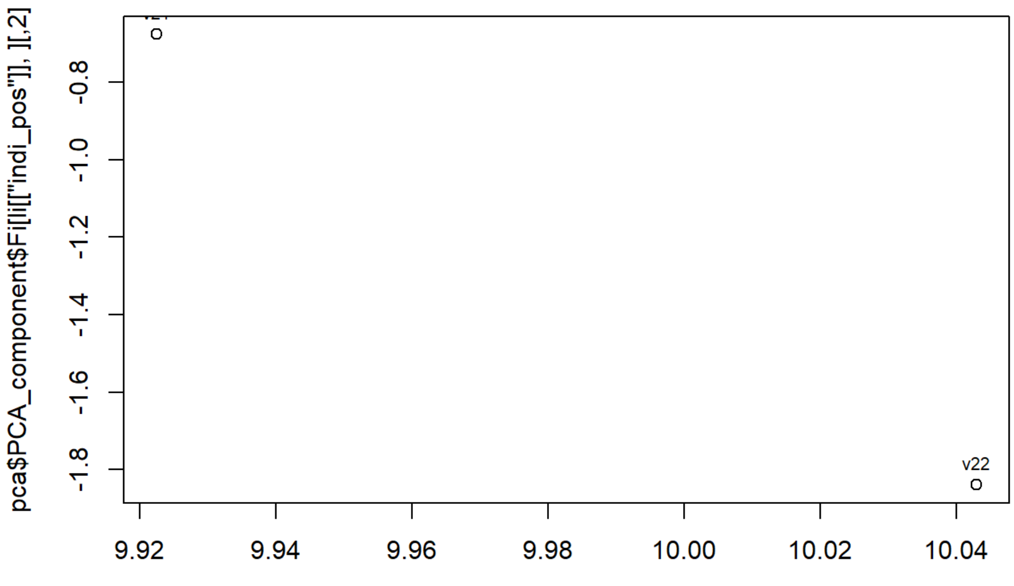
```
##
##
##  The  individuals  which have  negatively  contributed on axis  1  are :
##  i1,i2,i3,i4,i5,i6,i7,i8,i9,i10,i11,i12,i13,i14,i15,i16,i17,i18,i19,i20,
##  -------------
##
##  The  variables  which have  negatively  contributed on axis  1  are :
##  v1,v2,v8,v9,v10,v22,v24,v27,v28,v31,v32,v33,v34,v36,v37,v38,v40,v42,v44,v47,v53,v55,v56,v57,v58,v59,v65,
v66,v67,v71,v72,v74,v75,v76,v77,v78,v81,v83,v84,v85,v88,v89,v91,v96,v97,v98,v99,v102,v104,v105,v106,v108,v10
9,v110,v111,v112,v115,v116,v117,v123,v124,v127,v130,v131,v134,v135,v137,v140,v141,v144,v149,v151,v152,v154,v
157,v159,v160,v162,v165,v169,v171,v172,v173,v179,v181,v182,v188,
##  -------------
##
##  The  individuals  which have  positively  contributed on axis  1  are :
##  i21,i22,
##  -------------
##
##  The  variables  which have  positively  contributed on axis  1  are :
##  v3,v4,v5,v6,v7,v11,v12,v13,v14,v15,v16,v17,v18,v19,v20,v21,v23,v25,v26,v29,v30,v35,v39,v41,v43,v45,v46,v
48,v49,v50,v51,v52,v54,v60,v61,v62,v63,v64,v68,v69,v70,v73,v79,v80,v82,v86,v87,v90,v92,v93,v94,v95,v100,v101
,v103,v107,v113,v114,v118,v119,v120,v121,v122,v125,v126,v128,v129,v132,v133,v136,v138,v139,v142,v143,v145,v1
46,v147,v148,v150,v153,v155,v156,v158,v161,v163,v164,v166,v167,v168,v170,v174,v175,v176,v177,v178,v180,v183,
v184,v185,v186,v187,v189,
##  -------------NULL
```



Axis 1 : variable negative contribution

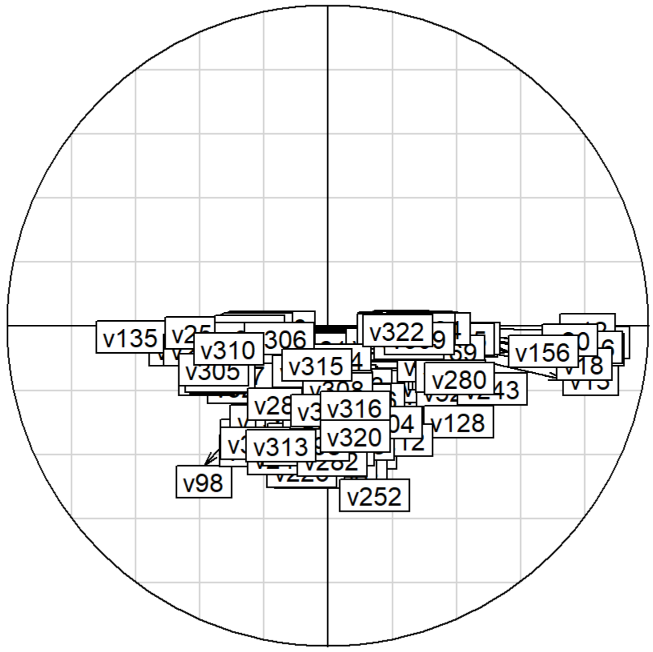


Axis 1 : individual negative contribution

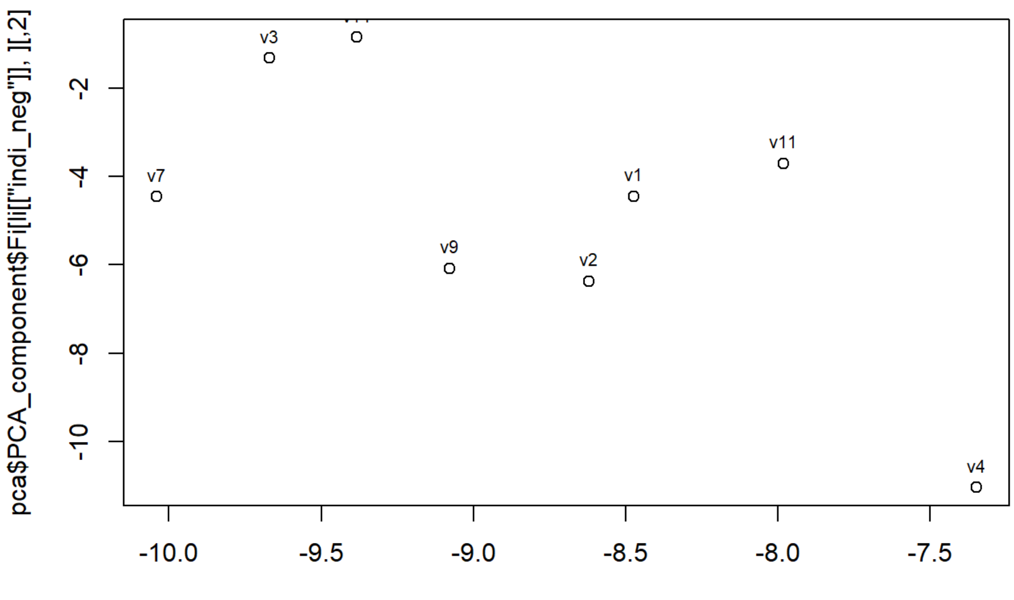


Axis 1 : individual positive contribution

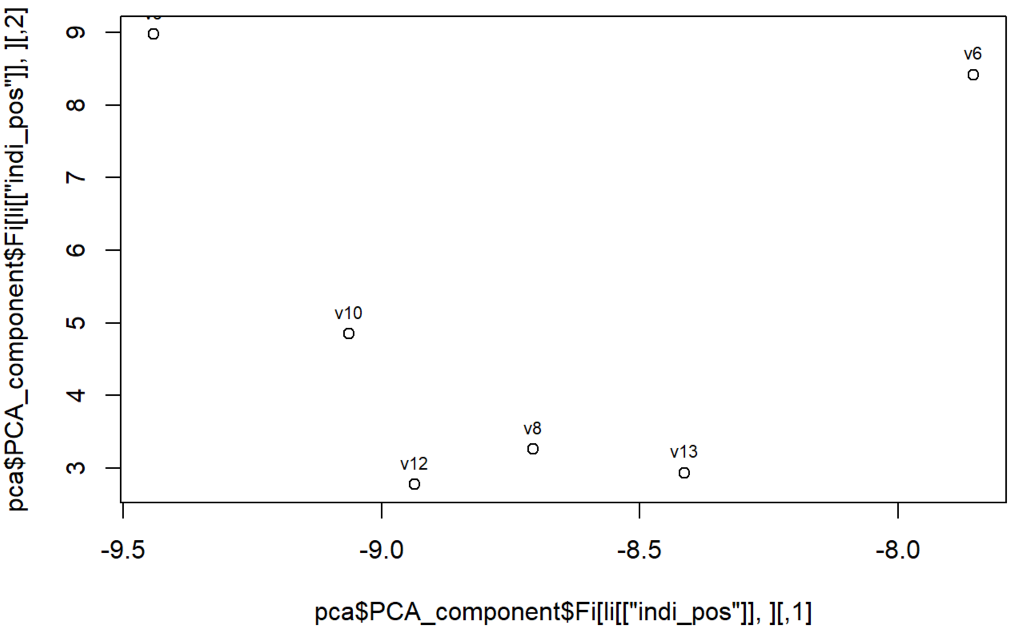
```
##
##
##  The  individuals  which have  negatively  contributed on axis  2  are :
##  i1,i2,i3,i4,i7,i9,i11,i14,
##  -------------
##
##  The  variables  which have  negatively  contributed on axis  2  are :
##  v4,v5,v11,v12,v13,v15,v16,v18,v20,v22,v24,v25,v26,v28,v30,v32,v33,v34,v36,v37,v41,v42,v43,v44,v45,v46,v4
7,v48,v50,v52,v58,v60,v61,v64,v67,v68,v70,v73,v76,v80,v81,v82,v84,v85,v90,v92,v93,v94,v96,v97,v98,v99,v104,v
106,v113,v115,v118,v120,v123,v124,v126,v127,v128,v133,v135,v136,v138,v143,v146,v148,v151,v152,v156,v157,v158
,v161,v163,v164,v166,v167,v168,v170,v173,v174,v175,v176,v183,v184,v185,v186,v188,v193,v194,v196,v205,v206,v2
08,v210,v212,v213,v215,v216,v217,v218,v219,v220,v221,v222,v224,v225,v226,v228,v236,v238,v242,v243,v246,v247,
v249,v251,v252,v254,v256,v258,v260,v265,v268,v269,v273,v274,v275,v280,v281,v282,v283,v284,v285,v287,v288,v28
9,v292,v294,v295,v296,v298,v301,v302,v303,v304,v305,v306,v308,v309,v310,v311,v313,v315,v316,v320,v322,
##  -------------
##
##  The  individuals  which have  positively  contributed on axis  2  are :
##  i5,i6,i8,i10,i12,i13,
##  -------------
##
##  The  variables  which have  positively  contributed on axis  2  are :
##  v1,v2,v3,v6,v7,v8,v9,v10,v14,v17,v19,v21,v23,v27,v29,v31,v35,v38,v39,v40,v49,v51,v53,v54,v55,v56,v57,v59
,v62,v63,v65,v66,v69,v71,v72,v74,v75,v77,v78,v79,v83,v86,v87,v88,v89,v91,v95,v100,v101,v102,v103,v105,v107,v
108,v109,v110,v111,v112,v114,v116,v117,v119,v121,v122,v125,v129,v130,v131,v132,v134,v137,v139,v140,v141,v142
,v144,v145,v147,v149,v150,v153,v154,v155,v159,v160,v162,v165,v169,v171,v172,v177,v178,v179,v180,v181,v182,v1
87,v189,v190,v191,v192,v195,v197,v198,v199,v200,v201,v202,v203,v204,v207,v209,v211,v214,v223,v227,v229,v230,
v231,v232,v233,v234,v235,v237,v239,v240,v241,v244,v245,v248,v250,v253,v255,v257,v259,v261,v262,v263,v264,v26
6,v267,v270,v271,v272,v276,v277,v278,v279,v286,v290,v291,v293,v297,v299,v300,v307,v312,v314,v317,v318,v319,v
321,
##  -------------NULL
```



Axis 2 : variable negative contribution



Axis 2 : individual negative contribution



Axis 2 : individual positive contribution

Interprétation :

Comme nous le voyons sur les cercles de corrélations, l'axe 1 est interprétable malgré le fait que de nombreuses variables soient mal représentées (à prendre avec des pincettes). Ceci est dû à la conservation d'uniquement deux axes, ce qui représente un faible pourcentage d'information captée (voir fichier test_pca.R pour les comparaisons de l'inertie)

La plupart des individus ayant participé positivement à l'axe sont les individus sains et inversement avec une contribution négative, les individus malade. On en déduit donc que les variables ayant le plus négativement contribué représentent les gènes potentiellement pathogènes, contrairement à ceux qui ont contribué positivement qui peuvent signifier soit des gènes immunisant ou neutres.

L'axe 2 est quant à lui difficilement interprétable au vu de la mauvaise représentation des variables que ce soit positivement ou négativement.De plus, il mélange les individus malades et sains, ce qui ne nous aide pas.

L'ACP réalisé sur ce jeu de données est difficilement interprétable dans le sens où il faudrait conserver beaucoup d'axes et donc peu réduire la dimension initiale de la matrice.