survBootOutliers: An R package for outlier detection in survival analysis

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Contents

1 Introduction

This package provides three new outlier detection methods to perform outlier detection in a survival analysis context. The first method OSD, for One Step Deletion, is a sequential procedure that maximizes the c-index of a fitted Cox regression using a a greedy one-step-ahead search, in each step the observation that when removed maximizes the concordance increase is permanently deleted from the dataset, the algorithm ends until k observations are removed, these are considered the most outlying ones. The second and third methods are based on bootstrap methods. The second method BHT, for Bootstrap Hypothesis Testing, is based on creating B bootstrap samples for each observation that is removed from the dataset, then an hypothesis test is made for the B concordance variations to be larger than zero, the observations with the lowest p-values are considered the most outlying. The last method DBHT, for Dual Bootstrap Hypothesis Testing, draws 2B bootstrap samples for each observation, B samples with each observation absent, just like with BHT, the other B bootstrap samples are drawn with the observation under test being deliberately inserted in each of the bootstrap samples. The hypothesis test is different, the two histograms are tested for inequality, for non-outlying observations the histograms are expected to be similar but for outlying observtions the histograms drawn when the observation is absent is expected to have higher concordance on average.

The package still provides three other methods considered more traditional based on Martingale-based residuals, Deviancre resiudals and Cox likelihood displacement.

These methods are based on the Master Thesis at Instituto Superior Técnico, named "Outlier detection in survival analysis" evaluated in May 2015. The link for the full text is left here for more detail: .

2 Example data

The well-known Worcester Heart Attack Study data is given as example and provided within the package;

```
> library(survBootOutliers)
> whas100_data <-  get.whas100.dataset()
> summary(whas100_data)
```

```
       X                los              age             gender
 Min.   :  1.00   Min.   : 1.00   Min.   :32.00   Min.   :0.00
 1st Qu.: 25.75   1st Qu.: 4.00   1st Qu.:59.75   1st Qu.:0.00
 Median : 50.50   Median : 5.00   Median :71.00   Median :0.00
 Mean   : 50.50   Mean   : 6.84   Mean   :68.25   Mean   :0.35
 3rd Qu.: 75.25   3rd Qu.: 7.00   3rd Qu.:80.25   3rd Qu.:1.00
 Max.   :100.00   Max.   :56.00   Max.   :92.00   Max.   :1.00
      bmi             times          status
 Min.   :14.92   Min.   :   6   Min.   :0.00
 1st Qu.:23.54   1st Qu.: 715   1st Qu.:0.00
 Median :27.19   Median :1878   Median :1.00
 Mean   :27.04   Mean   :1505   Mean   :0.51
 3rd Qu.:30.35   3rd Qu.:2076   3rd Qu.:1.00
 Max.   :39.94   Max.   :2719   Max.   :1.00
```

3 Examples

3.1 OSD

```
> whass <- get.whas100.dataset()
> outliers_osd <- survBootOutliers(
+     surv.object=survival::Surv(time = whass$times,event = whass$status ),
+     covariate.data = whass[,2:5] , sod.method = "osd",
+     max.outliers = 10)

[1] "BiocParallel detected"

> print(outliers_osd)
```

```
   removed_indexes
1                1
2               67
3               97
4               51
5               23
6               31
7               93
8               52
9               56
10              57
```

3.2 BHT

```
> whas <- get.whas100.dataset()
> outliers_bht <- survBootOutliers(
+     surv.object=survival::Surv(time = whas$times,event = whas$status ),
+     covariate.data = whas[,2:5],
+     sod.method = "bht",
+     B = 10,
+     B.N = 100)

[1] "BiocParallel detected"

> print(outliers_bht)

$outlier_set
       obs_id     avg_delta  max_delta pvalue
  [1,]      1  2.929752e-02 0.07352557    0.2
  [2,]     26  3.270317e-02 0.05770102    0.2
  [3,]     46  2.592482e-02 0.05316654    0.2
  [4,]     73  2.384595e-02 0.06939688    0.2
  [5,]      9  1.479961e-02 0.07797189    0.3
  [6,]     13  2.641754e-02 0.07178510    0.3
  [7,]     15  2.290921e-02 0.10194935    0.3
  [8,]     17  1.983177e-02 0.06900853    0.3
  [9,]     19  1.887399e-02 0.04742255    0.3
 [10,]     23  2.314372e-02 0.06459758    0.3
 [11,]     49  1.942962e-02 0.06382829    0.3
 [12,]     50  2.842312e-02 0.11397492    0.3
 [13,]     53  2.644270e-02 0.07405195    0.3
 [14,]     71  1.689723e-02 0.04999248    0.3
 [15,]     75  1.374859e-02 0.05136097    0.3
 [16,]     76  1.180123e-02 0.06357746    0.3
 [17,]     80  1.698724e-02 0.05302541    0.3
 [18,]     82  1.928161e-02 0.07635903    0.3
 [19,]    100  1.723384e-02 0.07987488    0.3
```

```
[20,]      4  1.883611e-02 0.07258761    0.4
[21,]      5  1.463430e-02 0.06416854    0.4
[22,]     11  2.520652e-02 0.07604165    0.4
[23,]     16  1.195177e-02 0.05959859    0.4
[24,]     22  7.204062e-03 0.04475839    0.4
[25,]     24  1.568984e-02 0.05718032    0.4
[26,]     27  2.644429e-02 0.13700590    0.4
[27,]     33  1.799276e-02 0.09779518    0.4
[28,]     40  3.481245e-02 0.07537908    0.4
[29,]     42  1.663836e-02 0.08540441    0.4
[30,]     44  1.333300e-02 0.05248911    0.4
[31,]     47  2.026251e-02 0.09960401    0.4
[32,]     52  1.450133e-02 0.04960437    0.4
[33,]     60  1.441709e-02 0.04320810    0.4
[34,]     64  1.145015e-02 0.06719109    0.4
[35,]     66  2.649699e-02 0.09189566    0.4
[36,]     67  1.882639e-02 0.07747228    0.4
[37,]     69  7.197787e-03 0.02980042    0.4
[38,]     74  1.894931e-02 0.06574037    0.4
[39,]     77  2.324956e-02 0.05340468    0.4
[40,]     78  1.686225e-02 0.07151131    0.4
[41,]     83  9.279061e-03 0.04511851    0.4
[42,]     85  2.205591e-02 0.09055347    0.4
[43,]     96  1.460935e-02 0.05770387    0.4
[44,]     97  8.349898e-03 0.06796374    0.4
[45,]     99  1.009175e-02 0.06256735    0.4
[46,]      2  1.216956e-02 0.07088630    0.5
[47,]      6  1.232932e-02 0.10345577    0.5
[48,]      8  7.224928e-03 0.06776469    0.5
[49,]     10  2.175498e-02 0.10625720    0.5
[50,]     28  2.328801e-02 0.08701897    0.5
[51,]     30  5.641406e-03 0.04749354    0.5
[52,]     31  1.746146e-02 0.09931686    0.5
[53,]     35  1.051382e-02 0.11052619    0.5
[54,]     38  7.297716e-03 0.07644223    0.5
[55,]     41  8.929313e-03 0.03484839    0.5
[56,]     43  1.282997e-02 0.07321105    0.5
[57,]     48  1.504616e-02 0.06369496    0.5
[58,]     51  1.252108e-02 0.05674324    0.5
[59,]     56 -4.296300e-04 0.03492625    0.5
[60,]     68  1.305440e-02 0.08209598    0.5
[61,]     79  1.524449e-02 0.05409801    0.5
[62,]     81  1.840501e-02 0.09790197    0.5
[63,]     86  7.112923e-03 0.06456698    0.5
[64,]     87  1.108106e-02 0.07148473    0.5
[65,]     88  9.520876e-03 0.06264555    0.5
```

```
 [66,]     90  1.089842e-02 0.05026503    0.5
 [67,]     93  1.058809e-02 0.06797906    0.5
 [68,]     94  1.477600e-02 0.08094387    0.5
 [69,]      3  4.705619e-03 0.03626683    0.6
 [70,]      7  6.960224e-03 0.05099474    0.6
 [71,]     18 -8.143646e-03 0.02914562    0.6
 [72,]     20  3.297765e-03 0.08877977    0.6
 [73,]     21 -4.783867e-04 0.06732309    0.6
 [74,]     25  2.312916e-03 0.07590528    0.6
 [75,]     29 -4.392350e-03 0.03114390    0.6
 [76,]     32  3.701762e-04 0.03659860    0.6
 [77,]     34  3.698778e-03 0.05825566    0.6
 [78,]     36  1.307487e-02 0.07856572    0.6
 [79,]     37 -1.086815e-03 0.03749528    0.6
 [80,]     39  5.044338e-03 0.07626340    0.6
 [81,]     54  3.447833e-03 0.07547826    0.6
 [82,]     55  6.263924e-03 0.10563800    0.6
 [83,]     57  9.772619e-03 0.07643649    0.6
 [84,]     61 -5.115808e-03 0.04272597    0.6
 [85,]     63  9.545626e-03 0.06942311    0.6
 [86,]     65  1.628122e-02 0.10125239    0.6
 [87,]     84  3.330388e-04 0.05747410    0.6
 [88,]     92 -1.007615e-03 0.05171901    0.6
 [89,]     98  9.091346e-05 0.04760270    0.6
 [90,]     14 -6.802307e-03 0.02278150    0.7
 [91,]     58 -1.268575e-02 0.01854475    0.7
 [92,]     62 -8.028923e-04 0.04596566    0.7
 [93,]     72  1.261493e-02 0.07528802    0.7
 [94,]     89  6.086796e-03 0.08828403    0.7
 [95,]     91 -6.251249e-03 0.02662325    0.7
 [96,]     95  5.343574e-03 0.08102257    0.7
 [97,]     12 -1.641186e-03 0.08130891    0.8
 [98,]     45 -1.014978e-02 0.03305399    0.8
 [99,]     59 -4.481014e-03 0.08913683    0.8
[100,]     70 -1.347407e-02 0.01797722    0.8

$histograms
$histograms$histogram
 [1]  0.01392034  0.02553297  0.03432088  0.07352557  0.05619260 -0.04599178
 [7]  0.05741531  0.02255201  0.03197161  0.02353573

$histograms$histogram
 [1]  0.070886305  0.005044603  0.063073791  0.014059385  0.058461959
 [6] -0.042935161 -0.024965132  0.018421481 -0.028928224 -0.011423441

$histograms$histogram
```

```
 [1]  0.024166353  0.027774739  0.036266829  0.013953114 -0.006308055
 [6] -0.005477228 -0.026962190 -0.022598928 -0.016816586  0.023058141

$histograms$histogram
 [1]  0.039280525  0.043943442 -0.027249014  0.002564708  0.072587608
 [6]  0.049228703 -0.032940493  0.049936561 -0.019514147  0.010523188

$histograms$histogram
 [1]  0.018442137  0.011583368  0.064168538  0.025155675 -0.012099313
 [6] -0.011690853 -0.012740733  0.056889173  0.004480261  0.002154749

$histograms$histogram
 [1]  0.038032417  0.103455765  0.018487003 -0.006370478  0.011235543
 [6] -0.011838013  0.010935359 -0.033090356  0.016071318 -0.023625315

$histograms$histogram
 [1] -0.006346428  0.050994744 -0.040455960  0.003558114 -0.026437920
 [6]  0.035319781  0.039658580 -0.001957046  0.043108715 -0.027840341

$histograms$histogram
 [1] -0.058337707  0.065088151  0.067764686  0.007253502 -0.007081663
 [6] -0.011190568 -0.098300858  0.030161431  0.047059003  0.029833301

$histograms$histogram
 [1]  0.077971889  0.030769493  0.040171681  0.001355640 -0.027340684
 [6]  0.032467401  0.010487719  0.010040429 -0.030554057  0.002626636

$histograms$histogram
 [1]  0.028265534  0.046807583  0.106257200  0.017214150 -0.007221849
 [6]  0.051360048 -0.019819016 -0.011693004  0.024739234 -0.018360037

$histograms$histogram
 [1]  0.035512289 -0.017723831  0.047570770 -0.050724315 -0.009979187
 [6]  0.040690920  0.076041655  0.039138778  0.042206076  0.049332063

$histograms$histogram
 [1]  0.037444926 -0.005292024 -0.003403599  0.028989842 -0.026725027
 [6] -0.041333223  0.081308907 -0.026785446 -0.016269173 -0.044347048

$histograms$histogram
 [1]  0.024023736  0.047538190  0.031639893  0.035478242 -0.016990374
 [6]  0.005133562  0.050849299 -0.008954766  0.023672562  0.071785105

$histograms$histogram
 [1] -0.0253358115 -0.0288882260  0.0226011876  0.0227815036  0.0004010434
 [6] -0.0113600828  0.0119328564 -0.0024404778 -0.0421227002 -0.0155923610
```

```
$histograms$histogram
 [1]  0.101949345  0.012249924  0.034425385  0.009391700  0.011438006
 [6] -0.024769889  0.081443875  0.003136598 -0.040548357  0.040375505

$histograms$histogram
 [1]  0.042334780 -0.049327201  0.018010558 -0.001180499  0.037777129
 [6]  0.013620327  0.059598591 -0.010718101  0.007573530  0.001828631

$histograms$histogram
 [1]  0.014638831  0.008568552  0.040527285  0.039166419  0.069008532
 [6]  0.030626077  0.060549059 -0.012654217  0.011991171 -0.064104026

$histograms$histogram
 [1] -0.032550079  0.017746705  0.020762595 -0.037314065 -0.032294312
 [6]  0.014987498  0.003542751 -0.057483610  0.029145624 -0.007979568

$histograms$histogram
 [1]  0.02676079  0.04722881  0.02128903  0.02956968  0.04742255  0.02221121
 [7]  0.02815346 -0.03000155  0.01496452 -0.01885865

$histograms$histogram
 [1] -0.008467066 -0.036397486  0.088779767  0.025760488  0.023402798
 [6] -0.063176283  0.006253224 -0.003165898 -0.005058604  0.005046715

$histograms$histogram
 [1]  0.018910459 -0.052022486  0.026132768 -0.042420224  0.006249071
 [6]  0.026516771 -0.034024035 -0.018573638  0.067323095 -0.002875647

$histograms$histogram
 [1]  0.004749302  0.042268993  0.020359988 -0.001018982  0.025088836
 [6] -0.024079358 -0.048323536  0.000902745  0.007334239  0.044758394

$histograms$histogram
 [1]  0.01882257  0.04363601  0.05228072  0.06459758  0.05302364 -0.02765033
 [7]  0.06313135  0.01329934 -0.05982204  0.01011838

$histograms$histogram
 [1]  0.047727857  0.057180322 -0.032964849 -0.044477691  0.054823048
 [6]  0.028720598  0.025095687  0.020797037  0.002489841 -0.002493432

$histograms$histogram
 [1]  0.042297762  0.004091725 -0.015661836 -0.026570255 -0.019153227
 [6]  0.075905278  0.018071311 -0.013792039 -0.061812994  0.019753433

$histograms$histogram
```

```
 [1]  0.003316794  0.039406804 -0.026809454  0.049464605  0.050166133
 [6]  0.040036922  0.037426584  0.027993175  0.057701019  0.048329116

$histograms$histogram
 [1]  0.039980349  0.021116372  0.056643674 -0.010338388 -0.037503430
 [6]  0.008615104 -0.006952752  0.137005902  0.037761111  0.018114934

$histograms$histogram
 [1] -0.009678444 -0.012616727  0.021912351 -0.002004327  0.037826810
 [6]  0.083565968 -0.015215371  0.030214670  0.087018974  0.011856244

$histograms$histogram
 [1]  0.018408445  0.004819332 -0.033720788  0.030829501 -0.006932643
 [6] -0.045080370  0.031143898  0.030272947 -0.015302185 -0.058361636

$histograms$histogram
 [1]  0.040751991  0.034627993 -0.032824859 -0.037472399  0.047493545
 [6] -0.016364740  0.001317584 -0.015214155  0.002580765  0.031518335

$histograms$histogram
 [1]  0.032502567  0.099316857  0.041024444  0.014589146  0.030592077
 [6]  0.005586960 -0.025799548 -0.010135601 -0.011114422 -0.001947832

$histograms$histogram
 [1]  0.036598599 -0.008361736  0.026161475 -0.005904717 -0.018061437
 [6] -0.046259225 -0.004750020  0.006464596  0.007820060  0.009994167

$histograms$histogram
 [1]  0.026418403  0.097795176 -0.002829128 -0.038458546  0.010336969
 [6] -0.021626730  0.050880711  0.014168126  0.025478596  0.017764049

$histograms$histogram
 [1]  0.016399540  0.046539607  0.016770865 -0.006928620 -0.052267512
 [6]  0.001416786 -0.011817808 -0.012418600  0.058255655 -0.018962135

$histograms$histogram
 [1] -0.029998992  0.110526188 -0.022782720  0.001786781 -0.040649226
 [6]  0.029818861 -0.007648205  0.020192696  0.005704586  0.038188191

$histograms$histogram
 [1]  0.054285014 -0.011197872  0.038236465 -0.001910771  0.078565723
 [6] -0.032828804 -0.040188072  0.026929379 -0.017425743  0.036283353

$histograms$histogram
 [1] -0.021856036 -0.037975529 -0.037928919  0.037495283  0.026479999
 [6]  0.006435485 -0.008262993 -0.018660949  0.035235394  0.008170115
```

```
$histograms$histogram
 [1] -0.074148071  0.076442229  0.032839856  0.007683714  0.030043449
 [6] -0.007319016  0.071596611  0.015548908 -0.006167394 -0.073543121

$histograms$histogram
 [1]  0.03757470 -0.06258147  0.04293020  0.07626340 -0.02222206 -0.01810626
 [7] -0.02466355  0.05071189  0.02199825 -0.05146175

$histograms$histogram
 [1]  0.04788638  0.01122539  0.06958696  0.07312766  0.07537908 -0.01831823
 [7] -0.01688168  0.07403242  0.04906056 -0.01697400

$histograms$histogram
 [1]  0.0219489525  0.0348483913 -0.0034380819 -0.0007213943 -0.0564036995
 [6]  0.0087793741  0.0336711697 -0.0064161503  0.0249473799  0.0320771858

$histograms$histogram
 [1] -0.0172549463  0.0036538187  0.0002079371  0.0277570840  0.0854044141
 [6]  0.0331840977 -0.0170451361  0.0575441553 -0.0308770133  0.0238092089

$histograms$histogram
 [1]  0.054858610 -0.013585485  0.007911537 -0.074785933 -0.001957757
 [6]  0.061783082  0.044815728 -0.028969966  0.005018839  0.073211052

$histograms$histogram
 [1]  0.0350640043  0.0027901241 -0.0007315726  0.0374790767 -0.0100299076
 [6]  0.0274635928  0.0283001113 -0.0539878612  0.0144933414  0.0524891086

$histograms$histogram
 [1] -0.020760822  0.006434870 -0.015583776 -0.018856194 -0.012417056
 [6]  0.001586707 -0.010171208 -0.035023189  0.033053987 -0.029761142

$histograms$histogram
 [1]  0.04132602  0.02469981  0.03058567  0.03446683  0.01275109  0.05100264
 [7]  0.05316654  0.02467976 -0.02761146  0.01418126

$histograms$histogram
 [1]  0.017537549  0.012484081 -0.013097048 -0.008975680 -0.002589421
 [6]  0.099604008  0.001594539  0.051938014  0.023135966  0.020993118

$histograms$histogram
 [1] -0.019446916  0.062343617  0.032423130 -0.035775589 -0.003580260
 [6]  0.008106828  0.063694961  0.046231026 -0.007348449  0.003813211

$histograms$histogram
```

```
 [1]  0.050661610  0.021670151  0.052860126 -0.081746661 -0.043015463
 [6]  0.051635064  0.005999948  0.063828290  0.013988790  0.058414376

$histograms$histogram
 [1]  0.02839305 -0.03983099  0.01635231  0.02380189 -0.02368474  0.02477140
 [7]  0.02530474  0.05410551  0.06104315  0.11397492

$histograms$histogram
 [1]  0.056743244  0.006488696  0.052955147 -0.036251965 -0.003021883
 [6] -0.002736755 -0.005537187  0.019144683  0.014108380  0.023318425

$histograms$histogram
 [1]  0.023704173 -0.005695262  0.043839872 -0.028339513  0.014618223
 [6]  0.005751835  0.025250510 -0.010943268  0.049604370  0.027222332

$histograms$histogram
 [1]  0.0263766363 -0.0345981083  0.0589835761  0.0311671260  0.0225722885
 [6]  0.0421688480  0.0193409220  0.0740519514 -0.0009319222  0.0252956921

$histograms$histogram
 [1] -0.008996908 -0.027300164 -0.008549834  0.075478259  0.010588048
 [6]  0.005728653 -0.034737162  0.002680180 -0.011148330  0.030735588

$histograms$histogram
 [1] -0.029059441 -0.008888471  0.014901463 -0.063726846  0.048937178
 [6]  0.028475642  0.045950373 -0.028879523 -0.050709139  0.105638000

$histograms$histogram
 [1] -0.024331560  0.009290121  0.012508699 -0.043323482  0.033955671
 [6]  0.032698682 -0.048241400  0.016150926  0.034926252 -0.027930208

$histograms$histogram
 [1]  0.07643649 -0.02645345  0.01368237  0.07634499  0.03676363 -0.03880194
 [7] -0.05259947 -0.01309297  0.03309083 -0.00764430

$histograms$histogram
 [1]  0.005445951 -0.031488196 -0.061428532  0.002722004  0.018544750
 [6]  0.005599206 -0.014767773 -0.010164775 -0.038247150 -0.003072952

$histograms$histogram
 [1] -0.076176181 -0.008209928  0.089136829 -0.067445827  0.041619348
 [6] -0.016287068 -0.037045700  0.043862591 -0.006023460 -0.008240741

$histograms$histogram
 [1]  0.0204089772  0.0337954281  0.0087150356  0.0078863766  0.0380434261
 [6]  0.0390421874 -0.0001643223  0.0432081050 -0.0157301712 -0.0310341518
```

```
$histograms$histogram
 [1]  0.01285149 -0.01533285 -0.07045632  0.02817044 -0.06572270  0.03200337
 [7]  0.04272597 -0.03500494  0.03385061 -0.01424315

$histograms$histogram
 [1] -0.021630745 -0.003820197  0.042830860  0.002164560 -0.031613870
 [6] -0.025800488  0.019553242  0.045965658 -0.004185324 -0.031492618

$histograms$histogram
 [1]  0.03427670 -0.02193619 -0.05834612  0.05379655 -0.04812906 -0.01487336
 [7] -0.01925977  0.06917470  0.06942311  0.03132970

$histograms$histogram
 [1]  0.067191086  0.010602655 -0.021269648  0.007806170  0.008509639
 [6] -0.011108157  0.009442983 -0.035168124  0.044887783  0.033607158

$histograms$histogram
 [1] -0.01738001  0.06748219  0.03267815  0.02091875 -0.02369038 -0.01283407
 [7]  0.06641751 -0.05757148  0.10125239 -0.01446087

$histograms$histogram
 [1]  0.040726556 -0.010824144 -0.001158893  0.055542704  0.091895659
 [6]  0.028806261  0.008333123  0.071089891  0.015875551 -0.035316801

$histograms$histogram
 [1]  0.05804917  0.03621068 -0.01952610  0.07747228 -0.01209296  0.01110197
 [7]  0.01429330 -0.03218818  0.02549025  0.02945345

$histograms$histogram
 [1] -0.017734599  0.015399226  0.000120583 -0.014444039  0.017073070
 [6]  0.075191202 -0.009949121  0.082095976 -0.086312758  0.069104496

$histograms$histogram
 [1]  0.013036862 -0.010860246  0.009024349  0.029800423 -0.005662765
 [6]  0.013361516  0.025241061  0.007042979  0.005657904 -0.014664212

$histograms$histogram
 [1]  0.0179772206 -0.0261175856  0.0101315617  0.0001529222 -0.0136739975
 [6] -0.0322943123 -0.0190876872 -0.0208060232 -0.0303847104 -0.0206381222

$histograms$histogram
 [1]  0.028532918  0.003689204  0.021791422 -0.017159688  0.002766124
 [6]  0.028550240  0.022451434  0.046009256  0.049992483 -0.017651141

$histograms$histogram
```

```
 [1] -0.0034119716 -0.0007329851  0.0359807165  0.0246077684 -0.0119303599
 [6]  0.0431547570 -0.0138949895  0.0752880249 -0.0218677457 -0.0010438839

$histograms$histogram
 [1]  0.001777849  0.014672707 -0.013418356  0.015003435  0.026047689
 [6]  0.069396881  0.034717701  0.050567813  0.026770213  0.012923587

$histograms$histogram
 [1]  0.06574037  0.03910564  0.03674358  0.04754782  0.01743751  0.02977429
 [7] -0.02689002 -0.01083717 -0.02852201  0.01939313

$histograms$histogram
 [1] -0.0229675483  0.0161944912 -0.0004709788  0.0260681948  0.0419158370
 [6]  0.0030360656  0.0065387210  0.0144100061  0.0014001199  0.0513609722

$histograms$histogram
 [1] -0.056550495  0.022267606  0.004481300 -0.015123055  0.039052207
 [6]  0.007299304  0.018891675  0.018168279  0.015947972  0.063577460

$histograms$histogram
 [1] -0.026412698  0.053404682  0.037142612 -0.003297733  0.041291851
 [6]  0.023720669 -0.027412497  0.050060237  0.034792913  0.049205584

$histograms$histogram
 [1]  0.030910218  0.002606204 -0.003307640  0.026156048  0.071511310
 [6] -0.037551029  0.049220659  0.003223154 -0.015997016  0.041850627

$histograms$histogram
 [1]  0.018814153  0.004287644 -0.006289221  0.054098008 -0.006774357
 [6]  0.032405955 -0.011840918 -0.002549207  0.046876722  0.023416110

$histograms$histogram
 [1] -0.012287316  0.006233879  0.031362045  0.053025409  0.046909462
 [6]  0.006898834 -0.010263807  0.031282550  0.014193800  0.002517566

$histograms$histogram
 [1] -0.029514547  0.018358485  0.050029759  0.023894948  0.051661982
 [6]  0.010406579 -0.024149065 -0.011551446  0.097901973 -0.002988563

$histograms$histogram
 [1]  0.014800415 -0.004255874  0.026401185  0.013464583 -0.034895058
 [6]  0.076359031  0.047261794  0.001354507  0.010653634  0.041671894

$histograms$histogram
 [1]  0.045118514  0.027052973 -0.030366095  0.014804662 -0.009744485
 [6]  0.030722162 -0.048486684  0.015073445  0.017733019  0.030883096
```

```
$histograms$histogram
 [1] -0.01254527  0.04852299  0.02413952 -0.01699089 -0.04972042  0.01280082
 [7]  0.02198806 -0.03485963 -0.04747890  0.05747410

$histograms$histogram
 [1]  0.023710993 -0.015636204  0.009253597 -0.012720897  0.090553466
 [6]  0.024913040  0.031073530 -0.024298530  0.032836720  0.060873390

$histograms$histogram
 [1] -0.0247357290  0.0645669789  0.0035367206  0.0422544680 -0.0344070777
 [6] -0.0249632717  0.0001213188 -0.0211588105  0.0540266363  0.0118879999

$histograms$histogram
 [1] -0.027377320  0.001400839 -0.032552231  0.014950660  0.037451198
 [6] -0.019641078  0.071484729 -0.008134380  0.026788515  0.046439712

$histograms$histogram
 [1]  0.0101431926  0.0004760404 -0.0183266232 -0.0195481135  0.0214137218
 [6] -0.0577201764 -0.0038990473  0.0626455482  0.0580225818  0.0420016363

$histograms$histogram
 [1] -0.017117141  0.041747759  0.088284032  0.012424764 -0.003794683
 [6] -0.002041037 -0.041021226 -0.011489179 -0.011947695  0.005822372

$histograms$histogram
 [1]  0.0347216084  0.0208097175  0.0498251182 -0.0048017715 -0.0531661788
 [6]  0.0169541851 -0.0322426447  0.0502650344  0.0268064962 -0.0001873466

$histograms$histogram
 [1]  0.0266232541  0.0238345874 -0.0145013010 -0.0708064368 -0.0241947175
 [6]  0.0058046136  0.0145485803 -0.0213169652 -0.0019563518 -0.0005477506

$histograms$histogram
 [1] -0.084328737 -0.004820916  0.036832558  0.017011096  0.015255013
 [6]  0.037790267 -0.020301795 -0.036950276 -0.022282375  0.051719010

$histograms$histogram
 [1] -0.001679124  0.028933454  0.055245684 -0.005970507  0.018686939
 [6]  0.067979059  0.042920754 -0.010842948  0.027687892 -0.117080307

$histograms$histogram
 [1] -0.035071637  0.058305615  0.065734342 -0.046534032 -0.009683582
 [6] -0.038814236  0.016525999  0.011022109  0.045331554  0.080943871

$histograms$histogram
```

```
 [1] -0.018435027 -0.014796123  0.009538571 -0.010497572 -0.004734342
 [6]  0.027464945 -0.047994665 -0.018606548  0.081022567  0.050473930

$histograms$histogram
 [1]  0.002629508  0.057703868  0.047326290 -0.008983709 -0.057711689
 [6]  0.026228035  0.029352827  0.037691996  0.026059147 -0.014202769

$histograms$histogram
 [1]  0.0292332845 -0.0664858705 -0.0348713998  0.0009822104  0.0354318151
 [6] -0.0021642094  0.0007349345  0.0679637446  0.0246271499  0.0280473199

$histograms$histogram
 [1] -0.028850394 -0.009244617  0.047602699  0.019352509 -0.020986775
 [6]  0.021283024 -0.007344730 -0.041473963  0.011148340  0.009423043

$histograms$histogram
 [1] -0.0177440391  0.0004175427 -0.0145755298  0.0087830575  0.0625673478
 [6]  0.0050547755  0.0435052974 -0.0140271829  0.0180324953  0.0089037046

$histograms$histogram
 [1] -0.028968276  0.013736672  0.079874880  0.006815755  0.028275698
 [6]  0.038199694  0.028583684 -0.045408935  0.007736587  0.043492625
```

3.3 DBHT

```
> whas <- get.whas100.dataset()
> outliers_dbht <- survBootOutliers(
+     surv.object=Surv(time = whas$times,event = whas$status ),
+     covariate.data = whas[,2:5],
+     sod.method = "dbht",
+     B = 10,
+     B.N = 100
+ )

[1] "BiocParallel detected"

> print(outliers_dbht)

$outlier_set
       obs_id     pvalue
  [1,]     90 0.01337125
  [2,]     11 0.01922664
  [3,]     82 0.02142727
  [4,]     23 0.02175118
  [5,]     81 0.02455476
  [6,]     33 0.02807892
  [7,]     72 0.04024019
```

```
 [8,]      1 0.04074274
 [9,]     97 0.05140702
[10,]     63 0.06091260
[11,]      7 0.06540761
[12,]     91 0.08265804
[13,]     17 0.09132606
[14,]     60 0.09370487
[15,]      8 0.09966572
[16,]     46 0.10410695
[17,]     93 0.11115916
[18,]     89 0.11187009
[19,]      6 0.12271987
[20,]     25 0.12682236
[21,]     88 0.12894274
[22,]    100 0.13276537
[23,]     67 0.15774274
[24,]     57 0.16120943
[25,]     52 0.18587212
[26,]     32 0.18853422
[27,]     56 0.19166396
[28,]     45 0.21243687
[29,]     69 0.21520929
[30,]     43 0.21553065
[31,]     26 0.24698106
[32,]     79 0.25033681
[33,]     42 0.25663127
[34,]     77 0.28981783
[35,]     47 0.29243586
[36,]     18 0.29687734
[37,]     53 0.31140880
[38,]     62 0.32083568
[39,]     30 0.32694969
[40,]     87 0.33593441
[41,]     15 0.33622083
[42,]     21 0.35092374
[43,]     34 0.35676625
[44,]     68 0.41683566
[45,]     39 0.41888222
[46,]     80 0.42284916
[47,]     29 0.42781978
[48,]      4 0.43808688
[49,]     48 0.45241250
[50,]     78 0.45644065
[51,]     12 0.48721309
[52,]     74 0.48854693
[53,]     49 0.48914780
```

```
[54,]     61 0.51292343
[55,]     13 0.51936315
[56,]     10 0.52268573
[57,]     75 0.53867934
[58,]     84 0.56396187
[59,]     50 0.59828608
[60,]     44 0.60141947
[61,]      9 0.64332999
[62,]     58 0.64363428
[63,]      2 0.64626373
[64,]     38 0.64689014
[65,]      5 0.65466324
[66,]     85 0.66528965
[67,]     16 0.66687262
[68,]     71 0.69008759
[69,]     86 0.70188631
[70,]     76 0.70267847
[71,]     51 0.70864914
[72,]     36 0.71922875
[73,]     73 0.72117983
[74,]     94 0.72945362
[75,]     92 0.74331919
[76,]     40 0.77921701
[77,]     59 0.78976542
[78,]     14 0.79227154
[79,]     28 0.79714380
[80,]     22 0.79744152
[81,]     27 0.82368973
[82,]     96 0.82385562
[83,]     41 0.83014776
[84,]     35 0.83104740
[85,]      3 0.83522105
[86,]     83 0.84905594
[87,]     20 0.85326636
[88,]     54 0.85848949
[89,]     37 0.85853739
[90,]     95 0.87288793
[91,]     64 0.88747563
[92,]     24 0.89738091
[93,]     55 0.89765039
[94,]     99 0.90267984
[95,]     19 0.92484526
[96,]     70 0.93213688
[97,]     65 0.96123305
[98,]     98 0.96336091
[99,]     31 0.96942824
```

```
[100,]     66 0.97803347

$histograms
$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0007468963  0.1081033132 -0.0167206963 -0.0435605531  0.0080914823
 [6]  0.0403480186  0.0037196873  0.0791002376  0.1125279730  0.0863902310

$histograms$histograms$poison
 [1]  0.049126906 -0.029521523  0.019433990  0.009442847 -0.024486040
 [6]  0.024820584 -0.054703987 -0.000473511 -0.029230109  0.032639857


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.100656291  0.048497613 -0.003246701 -0.020617638 -0.022011006
 [6] -0.040656863 -0.002127886  0.058997751 -0.077195032  0.044527417

$histograms$histograms$poison
 [1]  0.043110507  0.033982592  0.002589063  0.022862093  0.021991125
 [6] -0.022987689  0.029240469  0.058163693 -0.023667070 -0.005550774


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.024265923  0.019902851 -0.002117817 -0.028886031 -0.037699416
 [6] -0.014292949  0.015643971  0.054648183  0.002301921  0.040112596

$histograms$histograms$poison
 [1]  0.031259741  0.042401821  0.004160318 -0.004425481 -0.065358355
 [6]  0.078453320  0.042948457 -0.031807164  0.044626937  0.051361720


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.024428022  0.014257936 -0.008717327  0.002835887  0.043223024
 [6] -0.006712583  0.029556732  0.030514404  0.048135443 -0.023102530

$histograms$histograms$poison
 [1]  0.037416227  0.003291719  0.077058380 -0.019992938  0.103865953
 [6] -0.021069912 -0.045485946 -0.024316153  0.011476847  0.005572222


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.029640104  0.023447532 -0.012900887 -0.021310524 -0.039721967
```

```
 [6]  0.025232835  0.015681226 -0.001875626  0.082781218  0.048398216

$histograms$histograms$poison
 [1]  0.01828790  0.05471388  0.06680432  0.02054046 -0.03840511  0.04826540
 [7] -0.04087636  0.04162590  0.01718002 -0.02819246


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.001904113  0.120919688  0.084748891  0.048749202 -0.036158358
 [6]  0.058249387 -0.007193957 -0.001327034 -0.012800600  0.046183448

$histograms$histograms$poison
 [1] -0.004891687  0.083147607  0.011977224 -0.010161691  0.011971909
 [6] -0.013198342  0.027592311  0.002466025 -0.030760265 -0.002688794


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.034328207  0.005841428  0.023105478  0.023928878 -0.031620840
 [6]  0.050152567  0.071061382  0.006078820 -0.021290414 -0.043645666

$histograms$histograms$poison
 [1]  0.0181365866 -0.0332486242 -0.1051931226 -0.0255219224  0.0651324100
 [6] -0.0233931181 -0.0577800074  0.0164302481  0.0008660729 -0.0340544944


$histograms$histograms
$histograms$histograms$antidote
 [1] 0.0052356377 0.0582952842 0.0764092183 0.0145971457 0.0144124503
 [6] 0.0769918081 0.0004205680 0.0007064039 0.0141483754 0.0328217311

$histograms$histograms$poison
 [1]  0.02492869  0.06712384 -0.01489896 -0.04219669  0.02074557  0.03174445
 [7] -0.02396820 -0.05222082  0.00261069  0.06373892


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.100887630  0.005294749  0.018779053  0.006524274 -0.034530503
 [6] -0.037987399  0.036949945  0.044894764  0.015794272  0.099834429

$histograms$histograms$poison
 [1]  6.414574e-02  6.596219e-02  2.089678e-02  7.138616e-02  4.317284e-03
 [6]  1.879444e-02 -8.840951e-05 -4.768953e-03  4.830052e-02  3.320437e-02
```

```
$histograms$histograms
$histograms$histograms$antidote
 [1] -0.037059212 -0.027420725 -0.045375703 -0.036062684  0.019209948
 [6]  0.012903342  0.018881940 -0.006234224 -0.039026010  0.013883878

$histograms$histograms$poison
 [1]  0.0294290433 -0.0379660689 -0.0231425945  0.0010276515 -0.0774033038
 [6] -0.0105924295  0.0024243242  0.0021779184 -0.0003338518 -0.0046986496


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0001859168 -0.0037345641  0.0244291606  0.0320298193 -0.0051637013
 [6]  0.0525590687 -0.0275838759  0.0129227639  0.0333884092  0.0163672919

$histograms$histograms$poison
 [1] -0.004294487 -0.036675129  0.020171638 -0.039732621 -0.021771578
 [6] -0.007203296 -0.043677202 -0.009054898  0.013781320  0.023562655


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.003030662  0.009484221 -0.021946954  0.017066998 -0.022636165
 [6] -0.009910254  0.022082672  0.003896124  0.003957177  0.045147668

$histograms$histograms$poison
 [1]  0.040394998  0.006140437 -0.011111465 -0.009453921  0.034439003
 [6] -0.012591943 -0.010698301 -0.044083420  0.052024977  0.001420866


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.014804217 -0.007420386 -0.007296090 -0.009224192  0.002523188
 [6]  0.062879334  0.057700058  0.005307968 -0.070823942  0.031186279

$histograms$histograms$poison
 [1]  0.066136131  0.014032841 -0.002351553 -0.029225273  0.019340698
 [6]  0.030514844 -0.010802367 -0.016750638  0.008308926  0.007708358


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.010583254 -0.056882500 -0.019974646 -0.005173590 -0.035975259
 [6] -0.004084041  0.048100924  0.006452140 -0.009838317  0.036971366
```

```
$histograms$histograms$poison
 [1]  0.003278810  0.022944555  0.039220043 -0.013918878 -0.017292648
 [6]  0.001470621 -0.028650760  0.072719284  0.015876708 -0.010468602


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.018747571  0.045710526  0.079063569 -0.026831946  0.026939465
 [6] -0.037927636  0.033319035  0.013491825  0.082979311  0.009351734

$histograms$histograms$poison
 [1]  0.0306286415  0.0003232655  0.0146637852 -0.0359200014  0.0015633929
 [6] -0.0385368228  0.0756899817  0.0283521631  0.0227694935  0.0348114154


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.069175872  0.101889169  0.013176966  0.007754514 -0.005244651
 [6]  0.026674255  0.009899364  0.031553017  0.038684871 -0.054897160

$histograms$histograms$poison
 [1]  0.04292075 -0.03049047 -0.02000099  0.03912827 -0.01317802  0.07676206
 [7]  0.05784626  0.01886858  0.02837592 -0.01601736


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.007598649  0.038857868  0.021912351  0.004886202  0.039643146
 [6] -0.028025090  0.036827738  0.038213889  0.080483779 -0.025201493

$histograms$histograms$poison
 [1]  0.008409109  0.014256128 -0.002174028 -0.022877607 -0.043312650
 [6]  0.028717024  0.027537719 -0.021380136  0.016568775  0.027757084


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.001476170 -0.021706325  0.042123281  0.088686026 -0.058267403
 [6]  0.046982815  0.098130326  0.005623555  0.053446034  0.015386519

$histograms$histograms$poison
 [1]  0.04950599 -0.05566450  0.05871961 -0.01843910 -0.02241350  0.03518524
 [7] -0.01731482  0.05762664  0.01744806  0.05744402


$histograms$histograms
```

```
$histograms$histograms$antidote
 [1] -0.007106906  0.006291788 -0.018310395  0.030578831  0.026229923
 [6]  0.037403383  0.005089837 -0.050449684 -0.081454589  0.012540169

$histograms$histograms$poison
 [1]  0.066473668 -0.004686573  0.060170825 -0.017323062  0.046393616
 [6] -0.011749390  0.017635191  0.004036626  0.036361557 -0.005055155


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.034737067  0.005042585  0.038596057 -0.069266741  0.018076140
 [6] -0.059256481 -0.017703179  0.004514727 -0.001092478 -0.037778111

$histograms$histograms$poison
 [1]  0.0628364168  0.0386634035  0.0371551723  0.0081488295 -0.0165132556
 [6] -0.0079401996  0.0003711158 -0.0182097427 -0.0374834507  0.0139781031


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.028612092 -0.004775248  0.055231427  0.027388135  0.038023112
 [6] -0.027918661 -0.010039490 -0.021050927  0.010623189  0.029302295

$histograms$histograms$poison
 [1] -0.014230432  0.007862208  0.023987039  0.016884893  0.026577074
 [6] -0.015369422  0.009796825 -0.023800215  0.042824898  0.008288490


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.015313757 -0.001242820 -0.070539303  0.050249587  0.006650346
 [6]  0.009969892  0.011584855  0.042865915 -0.002828784  0.026190993

$histograms$histograms$poison
 [1]  0.061887032  0.003702339 -0.016566451 -0.003061255  0.020371242
 [6] -0.004746589 -0.004943196  0.041352704  0.070998729  0.041072677


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.006053959  0.040676096  0.001783751  0.036781645  0.000288949
 [6]  0.004655239  0.072953126  0.002486170  0.006658237  0.049638471

$histograms$histograms$poison
 [1]  0.031631061 -0.038306926 -0.011676225 -0.016576551 -0.024097687
```

```
 [6]  0.015096647 -0.006143115  0.038828531 -0.012632957 -0.017401049


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.031478703  0.057188296  0.008612715 -0.000442528  0.065329718
 [6]  0.033563236 -0.026718191  0.087089259 -0.036677161  0.008936940

$histograms$histograms$poison
 [1]  0.0393523334  0.0599682341  0.0065017445  0.0073152862  0.0431350304
 [6] -0.0003073778  0.0806852734  0.0148012748  0.0562817469  0.0770310958


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.020027692  0.086418978  0.032244906  0.079531667  0.078995643
 [6]  0.049450619  0.009852713  0.008981494  0.081624615 -0.014495718

$histograms$histograms$poison
 [1] 0.011155394 0.031851017 0.019365877 0.010266128 0.013250538 0.005686711
 [7] 0.076137275 0.007388824 0.037870249 0.055489884


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.030588340  0.034552382  0.010966518 -0.010323534  0.055528228
 [6]  0.107956126  0.068209565  0.051779517  0.004043134  0.058476714

$histograms$histograms$poison
 [1]  0.04003902 -0.02742351 -0.02888681  0.05629826  0.05492433 -0.03229634
 [7]  0.05428618  0.06743056  0.05365388 -0.01892082


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.060150432 -0.037379454 -0.045765694  0.004901518 -0.020850549
 [6]  0.030983369 -0.072183737 -0.008981896  0.038395867  0.000327147

$histograms$histograms$poison
 [1] -0.042499308  0.057249562 -0.011269738  0.003584457  0.053092751
 [6]  0.045271542 -0.033963225  0.064558790 -0.037768989  0.028700462


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.064583361  0.025841478  0.006723022 -0.010354610  0.037826250
```

```
 [6] -0.017891849  0.033088530 -0.009278504  0.016480520  0.004184345

$histograms$histograms$poison
 [1]  0.034493093  0.007175678 -0.041656954  0.026037157 -0.010612357
 [6] -0.018234950  0.035751636  0.072172091  0.005234837  0.031264077


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.008293468  0.037121112  0.072739418  0.018035226 -0.046999640
 [6]  0.071294556 -0.013543361 -0.023713829  0.018552653  0.037646129

$histograms$histograms$poison
 [1]  0.017123843  0.047209970  0.029625488  0.041722618  0.016129840
 [6] -0.001222409  0.017804753  0.004699055  0.027010022 -0.048340442


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.061154106 -0.030363691  0.028478996 -0.009145334  0.027071883
 [6] -0.020575513  0.087042492  0.018610867 -0.023546021  0.029904359

$histograms$histograms$poison
 [1]  0.064077234 -0.013398439  0.038696429  0.013916307  0.036545708
 [6] -0.065231672 -0.018486123  0.026644340  0.017109395 -0.007782441


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.027664191 -0.025275337 -0.018116213  0.012671147 -0.022401692
 [6] -0.044386421 -0.017203757 -0.027862450  0.034851491  0.007251889

$histograms$histograms$poison
 [1]  0.028248609  0.037687986 -0.015034228 -0.075996471  0.055520350
 [6]  0.003065435  0.084146303  0.006021766  0.021949895  0.049333469


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.109110211  0.048627761 -0.042998024  0.008739514  0.032066221
 [6]  0.025839695 -0.006165491  0.089791186  0.055861930  0.050932806

$histograms$histograms$poison
 [1]  0.023994923  0.005984458  0.022753729 -0.003622688 -0.014935560
 [6]  0.030194510  0.043858520  0.037831915  0.058691070  0.023164019
```

```
$histograms$histograms
$histograms$histograms$antidote
 [1]  0.002652814  0.028533437  0.064002111  0.033454021  0.045532157
 [6] -0.041828586  0.008111105  0.083579715 -0.040331004  0.027113357

$histograms$histograms$poison
 [1] -0.033438375 -0.011125186 -0.025341900  0.048664778 -0.027245632
 [6] -0.059389070 -0.009519321 -0.013302212 -0.045902597  0.042031781


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.064874878 -0.002706470  0.002475121  0.062830389 -0.016427827
 [6] -0.020365515  0.041211761  0.042782427  0.045671828  0.001189377

$histograms$histograms$poison
 [1] -0.016452528 -0.006313456  0.064529207  0.020533421 -0.011985243
 [6]  0.005692762 -0.012383356  0.026319921 -0.008543919 -0.025515401


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.043878039  0.012544669  0.019738983 -0.069253063 -0.003471859
 [6]  0.072206789  0.059245898 -0.011213943 -0.023020932  0.015836914

$histograms$histograms$poison
 [1]  0.013975843  0.060247181 -0.005075987  0.016752636 -0.028631501
 [6]  0.033706461  0.025005220  0.112272592  0.077465493 -0.004170306


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.04393007 -0.00608781 -0.04030794  0.05216883  0.01962189  0.03412236
 [7]  0.02363605  0.06545898 -0.02640824 -0.08988482

$histograms$histograms$poison
 [1]  0.031567072 -0.002744295  0.015018206  0.038235477 -0.011626237
 [6]  0.056309460 -0.027842205  0.014409349  0.082455638 -0.009035184


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.010097295 -0.038632073 -0.013377683  0.009119174 -0.058187630
 [6]  0.043073622  0.006111918 -0.018847986 -0.007188179  0.008393146
```

```
$histograms$histograms$poison
 [1]  0.024005189 -0.020747434  0.010975919 -0.021651127  0.031796956
 [6] -0.019516663  0.068109118 -0.007379669  0.011610353 -0.015573364


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.003628937 -0.002634608 -0.048587037  0.054282813 -0.050615122
 [6] -0.021435523 -0.019580270 -0.052095586  0.049187533  0.023406933

$histograms$histograms$poison
 [1]  0.015501564 -0.024151789 -0.005283025 -0.061609427 -0.018694980
 [6]  0.022044381  0.007757441  0.019062159  0.027742318  0.011526875


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.04342127 -0.04833724  0.08792967  0.01248680  0.02654556 -0.06390216
 [7] -0.02008082  0.03170871 -0.06519779  0.04049602

$histograms$histograms$poison
 [1] -0.030809668  0.023736941  0.049492146 -0.049056532 -0.018593767
 [6]  0.031066771  0.008148981  0.010301533  0.012288086 -0.031390705


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.003467898 -0.058305658  0.010693418 -0.021205770  0.012774842
 [6]  0.023834945  0.010821778  0.023655005  0.023365715 -0.038152132

$histograms$histograms$poison
 [1]  0.05267107 -0.06353642  0.02970945  0.06121653  0.01287445  0.03057036
 [7]  0.02660681  0.04813808 -0.01318617 -0.06147318


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0524923551 -0.0548383497 -0.0000195406 -0.0184363123  0.0294442885
 [6]  0.0374077971 -0.0118730794  0.0151060082  0.0047875196  0.0264290985

$histograms$histograms$poison
 [1]  0.03124473  0.01527322  0.03242304 -0.06372536  0.01371088  0.02253220
 [7]  0.01798357  0.05929431  0.03155946  0.06613449


$histograms$histograms
```

```
$histograms$histograms$antidote
 [1]  0.039662136  0.023338824  0.043737747 -0.002862508 -0.084368822
 [6]  0.096698092  0.006074530  0.073559429  0.064367551  0.016646463

$histograms$histograms$poison
 [1]  0.015723937  0.017618048  0.023605230  0.018898004  0.014655579
 [6]  0.030772957  0.026675557 -0.013877601  0.029686320  0.001624493


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.059039066 -0.032288309 -0.018585360  0.051483673  0.019722969
 [6] -0.014838313  0.003436103  0.021343721  0.020919688  0.007850350

$histograms$histograms$poison
 [1]  0.017738996 -0.115241457 -0.006796441  0.043092753  0.020109105
 [6] -0.028770951 -0.020319141 -0.064785227  0.053987822  0.058582238


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.060758320 -0.002155972 -0.047935748  0.065401756 -0.021542633
 [6]  0.008090315 -0.043628822 -0.077009852  0.075809861  0.001640533

$histograms$histograms$poison
 [1] -0.021690633 -0.008711392  0.032148475 -0.042744580  0.088487540
 [6]  0.050324459 -0.014748084 -0.008219188  0.018699301 -0.020031667


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.01404489 -0.01767457  0.01611010  0.05543294 -0.03178837  0.01994086
 [7]  0.01485522 -0.02608962  0.02309118  0.04665862

$histograms$histograms$poison
 [1]  0.0277277031 -0.0432557166  0.0677269428 -0.0379383056  0.0529068281
 [6]  0.0210094338 -0.0283733637 -0.0629035733 -0.0007184839 -0.0521467348


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.004098492 -0.011398564  0.094835596 -0.002167028  0.060988394
 [6]  0.048730931  0.040233510 -0.009694253  0.019343933 -0.014238590

$histograms$histograms$poison
 [1] -0.0653007077  0.0097667712  0.0041894720 -0.0097717377 -0.0106657171
```

```
 [6] -0.0284812856  0.0324536924 -0.0008930354  0.0692643256  0.0181235654


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.05479123  0.01298378  0.01210242  0.04905363  0.02447553  0.03275171
 [7] -0.06310125 -0.03007528 -0.01817082  0.02045462

$histograms$histograms$poison
 [1]  0.020110873  0.004844792  0.034754972  0.015568120 -0.136284073
 [6]  0.064414290 -0.036913303  0.005640977  0.034842026 -0.029548305


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.024326722  0.039658328  0.009568657 -0.048502022  0.088805405
 [6]  0.024132698  0.017023703 -0.004266904  0.014356074  0.011724561

$histograms$histograms$poison
 [1]  0.0395853992  0.0497115784  0.0597725591  0.0004156709 -0.0091880300
 [6] -0.0157617494 -0.0590043224 -0.0112447229  0.0120901794  0.0891121046


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.015733232 -0.019525682  0.047468623  0.052705849 -0.016657813
 [6]  0.007931669  0.029359879  0.007577927  0.016327401 -0.012867759

$histograms$histograms$poison
 [1] -0.014033912 -0.036106108  0.060877508  0.005561446 -0.039557947
 [6]  0.001968405  0.056202946  0.062052127  0.008566234 -0.013023870


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.009391518 -0.003202421 -0.030484113 -0.023734310 -0.010336860
 [6] -0.086530206 -0.032115193 -0.028816512  0.060720000  0.046911200

$histograms$histograms$poison
 [1]  0.043516455 -0.068413792  0.045493535  0.009891104 -0.034812113
 [6]  0.033442660 -0.051096410 -0.049601204 -0.021252805  0.043922452


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.042238593  0.025596016  0.075863718 -0.004043327  0.045198891
```

```
 [6]  0.009563207 -0.051635593 -0.030561641 -0.026996687  0.015430629

$histograms$histograms$poison
 [1] -0.028979254  0.054163160 -0.010286497  0.014222778  0.007954147
 [6] -0.005593331  0.005253951  0.007293606  0.081057293 -0.015998921


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.022207510 -0.009363101 -0.001657183 -0.029207755  0.004372695
 [6] -0.010056291 -0.039850725 -0.037789142  0.048946081 -0.003931153

$histograms$histograms$poison
 [1] -0.013398439 -0.009833681  0.015292142 -0.023540185  0.001927154
 [6]  0.012664632 -0.002926997 -0.052048600 -0.023491538 -0.074564748


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.025436354  0.054274283 -0.055344359  0.021989780  0.006298134
 [6]  0.049766663  0.036622393 -0.011993617  0.016292711  0.060505873

$histograms$histograms$poison
 [1] -0.019908741  0.013557218 -0.019785225 -0.004079603  0.027235013
 [6] -0.010531258  0.031263000 -0.025059268  0.087401917 -0.007736405


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.006595462 -0.031928675  0.014265854 -0.011077964  0.004086300
 [6]  0.002783331  0.023116320  0.014235832 -0.029284358  0.015808925

$histograms$histograms$poison
 [1]  0.043035197  0.050400436 -0.005034124 -0.022919483  0.016046595
 [6]  0.022146735  0.006793092  0.068286456  0.060329339 -0.075216229


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.003153793  0.018685598 -0.003344943 -0.070854376  0.021869152
 [6] -0.060103195 -0.039361903  0.039534531 -0.103226077 -0.039575239

$histograms$histograms$poison
 [1] -0.0142216543 -0.0584294599 -0.0100204225  0.0732204842 -0.0306559670
 [6]  0.0219123506 -0.0072142536  0.0259951984  0.0104782241 -0.0006045371
```

```
$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0188531126 -0.0068689839  0.0242742988 -0.0005651719  0.0530597536
 [6]  0.0429370576  0.0129636446  0.0687522908  0.0776572174 -0.0447568956

$histograms$histograms$poison
 [1]  0.068448121  0.034469474 -0.001058071  0.007008398  0.005670299
 [6] -0.002807920  0.022797925  0.024971390  0.006193817 -0.059299121


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.0169190509 -0.0303931064  0.0004279756  0.0058564762  0.0396060413
 [6]  0.0143488255  0.0804846007  0.0338776398  0.0112954980  0.1140329302

$histograms$histograms$poison
 [1]  0.060198065 -0.001192749 -0.034141996  0.028001971  0.004909058
 [6]  0.021435100  0.063226109 -0.037918743 -0.024341696 -0.010751276


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.025790766  0.037020104  0.048322182 -0.011130903  0.019923620
 [6]  0.007599111 -0.047147899  0.017123843  0.025031502  0.007899116

$histograms$histograms$poison
 [1]  0.056849141  0.019813107 -0.022837124 -0.047897037  0.037005691
 [6]  0.029587051 -0.009949121  0.010461778  0.083209538 -0.019047534


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.014553923 -0.034399167  0.049954372 -0.045066340  0.026734028
 [6]  0.027800802  0.025872747  0.004157707 -0.030773134  0.041140150

$histograms$histograms$poison
 [1]  0.146692178 -0.015679668 -0.019486134 -0.017539808  0.031611055
 [6]  0.002345151 -0.035358438  0.059986611  0.041364711  0.023241641


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.012995947  0.050674145  0.006909988  0.036132118  0.029981687
 [6]  0.026514302  0.025788320  0.056764796 -0.001987073 -0.010820532
```

```
$histograms$histograms$poison
 [1]  0.01388712  0.05267086  0.06932052  0.02980522 -0.06384151  0.01864912
 [7] -0.07619436 -0.02798167  0.03158353 -0.06853389


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.02534160 -0.01388637  0.09728796  0.03902167  0.07738806  0.01853742
 [7] -0.00853010  0.01126665 -0.01022053  0.03212533

$histograms$histograms$poison
 [1] -0.044225216  0.021469612  0.039495350  0.014569828  0.045947157
 [6]  0.030284930  0.022694340  0.007677997  0.058864941  0.025982801


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.019240225  0.033287940 -0.028677582  0.059805602 -0.011037614
 [6]  0.025640104  0.079938464  0.003487785  0.036144359  0.009024349

$histograms$histograms$poison
 [1] -0.024139452  0.035270018  0.043497455  0.032736541  0.010491220
 [6] -0.036104971  0.024751602  0.034686150  0.003910028 -0.002688302


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.029520127  0.023222967  0.079939933  0.049731899 -0.009109187
 [6]  0.014330547 -0.077188083  0.016872725  0.048464333  0.026652593

$histograms$histograms$poison
 [1] -0.078962768 -0.008924464 -0.021104112 -0.004578552 -0.016133944
 [6] -0.101569431  0.051368224 -0.009881679  0.005086954  0.055936903


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0059346375 -0.0541910965 -0.0191984910  0.0294944597  0.0007190292
 [6]  0.0446296944  0.0698530616 -0.0548662167 -0.0032024212  0.0320698883

$histograms$histograms$poison
 [1]  0.018794437  0.036181278 -0.010066423  0.096754060  0.067581768
 [6]  0.055141027 -0.008426383  0.021397764  0.004915793 -0.013042488


$histograms$histograms
```

```
$histograms$histograms$antidote
 [1] -5.309796e-02  3.970423e-02  3.408404e-02  1.569604e-02  3.009707e-02
 [6]  1.568476e-02 -3.927752e-02 -2.042251e-05 -6.128421e-04 -2.550751e-02

$histograms$histograms$poison
 [1]  0.03164097  0.04714379  0.02055439  0.02385728 -0.01506151  0.05852798
 [7]  0.09522675  0.01095355 -0.01265597  0.02727982


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.02479835  0.02363698 -0.02466176  0.04013692  0.02873844 -0.00731848
 [7] -0.02005219 -0.02978231 -0.04644035 -0.04197966

$histograms$histograms$poison
 [1] -0.008049039  0.072904414  0.049770295 -0.003270800  0.035272488
 [6]  0.018001671  0.006935073  0.072256861  0.005171931  0.001578816


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.026160523  0.038428324 -0.005727141  0.126031975  0.086159245
 [6] -0.037001680  0.011498385  0.063081439  0.045097423  0.001780482

$histograms$histograms$poison
 [1]  0.035567813  0.022444407  0.026513099 -0.019108877  0.052240404
 [6]  0.098139306 -0.032150751  0.011255157  0.008782877 -0.062301101


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.020370947  0.002959027 -0.031817808  0.023028073 -0.031971034
 [6] -0.004103412 -0.023436034  0.008696155 -0.043283428  0.028283271

$histograms$histograms$poison
 [1]  0.012520931  0.007319631 -0.004890866 -0.074979478 -0.016365807
 [6] -0.022450928  0.018333466 -0.057113248 -0.009625272  0.027601150


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.004645197  0.016904364  0.066420606  0.055624501 -0.007696659
 [6]  0.077610323  0.039515381 -0.004267637  0.040959970 -0.048285066

$histograms$histograms$poison
 [1] -0.015165076  0.016283972 -0.035347443  0.029235246 -0.004816871
```

```
 [6]  0.018269981 -0.011213943 -0.004406559  0.055156123  0.056789498


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0063895918  0.0090976487  0.0082072280  0.0095910316  0.0304074464
 [6] -0.0517330501 -0.0151168316 -0.0239097518 -0.0006564136  0.0009155992

$histograms$histograms$poison
 [1]  0.0033494300  0.0557769766 -0.0002030749 -0.0305052686  0.0228452621
 [6]  0.0770665493 -0.0071669417  0.0236956934  0.0066832401  0.0120162111


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.054350336  0.015150576  0.068659359  0.038504823  0.044482788
 [6]  0.045463637  0.009158752  0.018189819 -0.005363285 -0.050077291

$histograms$histograms$poison
 [1]  0.083259929  0.002946833  0.035146332 -0.039590958  0.007867891
 [6]  0.091015745  0.015959970 -0.003142594 -0.019380663  0.049210477


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.039594579 -0.022659925  0.052657116  0.036682394  0.042223793
 [6] -0.017082290  0.001498343  0.050483779  0.063418913  0.010977301

$histograms$histograms$poison
 [1] -0.029804218 -0.035963107  0.034044687 -0.004346813  0.058778710
 [6]  0.028607394 -0.040617837  0.015445566  0.002780063 -0.049614364


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.074810672  0.021877069 -0.070124343 -0.021377693  0.007685391
 [6]  0.072366858  0.017413294 -0.020375532  0.027514591  0.038571964

$histograms$histograms$poison
 [1]  0.016451011 -0.004238846  0.059163072  0.036218386  0.061711143
 [6]  0.064908190 -0.002097253 -0.033717033  0.040360240  0.013659647


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.046731466 -0.031119164  0.012427734  0.027433400  0.004163696
```

```
 [6] -0.008967880 -0.004098570  0.047221687  0.049525763  0.034829109

$histograms$histograms$poison
 [1]  0.017240394  0.099592203  0.055764567 -0.002718191  0.038689467
 [6] -0.047730507 -0.027176421  0.045740846 -0.016838195  0.010793752


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.002296044  0.001545168  0.017951120  0.038812762 -0.077667481
 [6]  0.004646051  0.067031976  0.032282456  0.044240609 -0.005189302

$histograms$histograms$poison
 [1]  0.058636894 -0.035796277  0.006551367 -0.022923766  0.017294310
 [6]  0.032863728  0.066687234  0.009455420  0.059383077 -0.052954653


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0805462414  0.0212556250 -0.0451511415  0.0005176316 -0.0342734503
 [6]  0.0049950574 -0.0306633265  0.0389484754  0.0223834376 -0.0104919276

$histograms$histograms$poison
 [1]  0.010655157 -0.014122243  0.026198065  0.035415453 -0.004574702
 [6]  0.053716022  0.002129490 -0.020262051  0.022528823  0.012682816


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.028260584 -0.003875393  0.009817502 -0.084202264  0.053179847
 [6]  0.007680632 -0.018095509 -0.007386769  0.040141319  0.070358811

$histograms$histograms$poison
 [1]  0.040746543  0.002120951  0.002527241  0.008719847 -0.022231458
 [6] -0.007630717  0.032502567 -0.028001117 -0.016651316 -0.070028753


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.03640317 -0.03294864  0.02975473 -0.01286018 -0.01475813  0.05204854
 [7]  0.07300904 -0.01273161 -0.02771533  0.01397802

$histograms$histograms$poison
 [1]  0.007933228  0.003842853  0.041645536  0.045941925 -0.028972003
 [6] -0.040396695  0.044373077 -0.013151769 -0.005524728  0.031710570
```

```
$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0149307532  0.0507155786  0.0157455614  0.0260853063 -0.0001768319
 [6]  0.0219527171 -0.0160785430 -0.0143604842  0.0541301328 -0.0654644643

$histograms$histograms$poison
 [1] -0.038206697  0.040616327 -0.035647672  0.015302194 -0.015730171
 [6]  0.034974703 -0.006000322  0.010889826 -0.046540030  0.025017941


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.028153459  0.053394131  0.036279388  0.010390957  0.093106986
 [6]  0.004092961  0.036025339 -0.050469906  0.011050740  0.006005988

$histograms$histograms$poison
 [1] -0.020653408  0.019210561 -0.006232904 -0.020996180 -0.012829677
 [6]  0.043541189  0.036769162  0.041429040  0.040056077  0.076483084


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.052604315 -0.034478627  0.031400017  0.060884930  0.009950502
 [6]  0.065393408 -0.034493545  0.062763623  0.044798101  0.050437709

$histograms$histograms$poison
 [1]  0.032031728  0.011260553  0.026691172  0.022975217 -0.045152100
 [6] -0.031119164 -0.031968739  0.003227112 -0.003705491  0.010366837


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.040139395  0.072609379  0.003796108  0.043813643  0.058522694
 [6]  0.050568199  0.111376258  0.034025732 -0.016608269  0.010999366

$histograms$histograms$poison
 [1] -0.085535757 -0.064406387 -0.021281028  0.057189828  0.056206182
 [6]  0.039958792  0.008669855 -0.047946159  0.026019045  0.007394925


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.04248378  0.00427676 -0.01226362  0.03191719 -0.01929100  0.02518168
 [7]  0.04831704  0.02386986 -0.04003986 -0.01866504
```

```
$histograms$histograms$poison
 [1]  0.044005103 -0.009263779  0.008963069  0.019943088  0.035467854
 [6]  0.076658058 -0.039952482 -0.001030829  0.061401317  0.045573989


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.041053999  0.024949963  0.030826197 -0.021675951  0.090689281
 [6] -0.009134727 -0.021202193  0.050534967 -0.043056273 -0.001276589

$histograms$histograms$poison
 [1]  0.022073908  0.093539777  0.031676551  0.071192528  0.013524978
 [6] -0.046760331 -0.004688899 -0.039180154 -0.013417039  0.045191901


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.001899290 -0.004655943 -0.020149036  0.015120339  0.050885063
 [6] -0.012339475  0.015118939 -0.013103136  0.017261364 -0.002785937

$histograms$histograms$poison
 [1]  0.009284095  0.001532075  0.011379631 -0.036368874  0.056024072
 [6]  0.004287644 -0.022363334  0.004929883  0.057781819  0.010159935


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.009607687 -0.011653858  0.014117963  0.036032187 -0.018897359
 [6] -0.015474713 -0.041176490  0.023430832  0.064122105  0.084607204

$histograms$histograms$poison
 [1]  0.0303634155  0.0839129898 -0.0187434125  0.0116287153  0.0242549447
 [6] -0.0177680653  0.0525322967  0.0610258947  0.0063587201 -0.0004007439


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0009311719 -0.0008178081  0.0411595704 -0.0139912158  0.0500058185
 [6]  0.0276038702  0.0078319751  0.0516867867  0.0125063155  0.0263589510

$histograms$histograms$poison
 [1]  0.020516731  0.036179093  0.013602479 -0.011133300 -0.018668409
 [6]  0.046694530 -0.050659233 -0.009798447  0.044324721  0.072780370


$histograms$histograms
```

```
$histograms$histograms$antidote
 [1]  0.0790361665  0.0313934525 -0.0840553853  0.0454797437  0.0928072092
 [6] -0.0366935520 -0.0065727595  0.0402186405  0.0342711206 -0.0001094274

$histograms$histograms$poison
 [1] -0.003624078  0.044512107 -0.034509514  0.007891888 -0.023177613
 [6] -0.031263700 -0.002762639  0.008167827 -0.010743122  0.022382697


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.0098590723  0.0538846548  0.0319286668 -0.0321566454  0.0009154307
 [6]  0.0358588263  0.0176588252  0.0671938044  0.0542215049 -0.0516496417

$histograms$histograms$poison
 [1]  0.0261196053  0.0026976472 -0.0436297809  0.0324897881 -0.0018827519
 [6] -0.0051733637 -0.0298564489 -0.0003089589 -0.0106407837  0.0335311226


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.051836359  0.025670816  0.047499321  0.067917871  0.038204180
 [6]  0.042853909  0.041703069  0.008268691  0.016782830 -0.018847224

$histograms$histograms$poison
 [1] -0.051801935  0.042845145 -0.038222586 -0.003368987 -0.016172799
 [6]  0.030740601 -0.022310433 -0.056085506  0.009488184  0.060724825


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.120778432  0.013849010 -0.003072952  0.015599442 -0.005759637
 [6]  0.026282905  0.040121635  0.033378002 -0.023359279  0.094190087

$histograms$histograms$poison
 [1]  0.016888381  0.017888206 -0.049703207  0.053676958 -0.012504475
 [6]  0.026182422  0.015470309 -0.004011709  0.020146363 -0.017202791


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.044977828  0.011555801 -0.001505525 -0.001770527 -0.003819147
 [6]  0.055905595  0.023838975  0.021039309  0.063281481  0.020729269

$histograms$histograms$poison
 [1]  0.036651243 -0.033647454  0.009215806  0.044453991  0.053195876
```

```
 [6]  0.050097441  0.001151816  0.031859092  0.032837265  0.005478946


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.003032552 -0.013449836 -0.022653536  0.023462985 -0.001807326
 [6]  0.053575551  0.070402478  0.024438231 -0.049061262  0.032031569

$histograms$histograms$poison
 [1] -0.017535797 -0.047358749 -0.018197075 -0.007286308  0.003267182
 [6] -0.018539239 -0.004512092  0.061909428 -0.021159555  0.005856476


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.008729946  0.035360571  0.004450762 -0.021521106 -0.024275698
 [6]  0.026584508 -0.045204143  0.040719513  0.002270479  0.010636140

$histograms$histograms$poison
 [1] -0.036469029  0.108363511  0.064272293 -0.045525440  0.030075616
 [6] -0.075603678  0.042904717  0.055691985  0.006052261  0.012075789


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.013606581 -0.009481659 -0.048031562  0.032132776  0.024635011
 [6] -0.034145516  0.034309045 -0.003136226  0.088634988  0.061782367

$histograms$histograms$poison
 [1]  0.081618291  0.000429445  0.041464726  0.031926997 -0.016353693
 [6]  0.066927113  0.030364455  0.034041731  0.043539168  0.012691759


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.018140235 -0.013736723 -0.091619522  0.014810631  0.038458610
 [6] -0.018832924 -0.041866653  0.065971096  0.005875273  0.017959283

$histograms$histograms$poison
 [1]  0.015903891  0.027561188  0.004104537  0.047613504  0.035266859
 [6] -0.026363789  0.024583847 -0.033060323 -0.006602613  0.025279858


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.029111247  0.070534049  0.007196220  0.004155192  0.022781357
```

```
 [6]  0.026209712  0.032661798 -0.050250552 -0.035731104  0.026413794

$histograms$histograms$poison
 [1] -0.0321474422  0.0271759664  0.0397805780 -0.0213458358 -0.0472560696
 [6]  0.0094865925 -0.0435561035 -0.0142566921  0.0004897299 -0.0353533064


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.028428966  0.045828884 -0.002758428 -0.046807917  0.046088175
 [6] -0.046750194 -0.010962389 -0.022837551  0.037326609 -0.043511964

$histograms$histograms$poison
 [1]  0.038522651 -0.005565108  0.024378193 -0.021206536  0.038932440
 [6]  0.015358157  0.034460064  0.041863362  0.058602905  0.034339923


$histograms$histograms
$histograms$histograms$antidote
 [1]  0.004874343  0.019765037 -0.056872009 -0.047306230  0.041846772
 [6] -0.027443873 -0.005267863 -0.001437691  0.042124945 -0.046345966

$histograms$histograms$poison
 [1] -0.004286065  0.035281105  0.010312260 -0.019545867  0.012644657
 [6]  0.045187316 -0.043763862  0.028154772  0.036094295  0.018367937


$histograms$histograms
$histograms$histograms$antidote
 [1] -0.01537879  0.03883452  0.05437253  0.01192926 -0.03511846  0.04889790
 [7] -0.03244166  0.05755247  0.06470761  0.04474607

$histograms$histograms$poison
 [1] -0.017459490  0.052724676  0.008469333  0.047266533 -0.032334700
 [6]  0.056654456 -0.022364517 -0.007653828  0.005590437 -0.046401663
```