semmcci: Internal Tests

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Tests

```
#> test-semmcci-mc-latent-med-defined-none
#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-std-defined-none

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-latent-med-std-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-moment

#> Test passed

#> test-semmcci-mc-simple-med-defined-equality

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-defined-inequality

#> Test passed
#> Test passed
#> Test passed
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#> test-semmcci-mc-simple-med-defined-none-mi-adj-mice

#> Test passed

#> test-semmcci-mc-simple-med-defined-none-mi-mice

#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-defined-none

#> Test passed
#> Test passed
#> Test passed
#> Monte Carlo Confidence Intervals
#>          est     se    R    0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> cp   -0.0199 0.0325 2000 -0.1196 -0.1036 -0.0836 0.0438 0.0638 0.0855
#> b     0.0817 0.0333 2000 -0.0206  0.0016  0.0174 0.1479 0.1661 0.1924
#> a     0.1098 0.0314 2000  0.0129  0.0287  0.0494 0.1714 0.1926 0.2007
#> y~~y  1.0476 0.0475 2000  0.9066  0.9258  0.9555 1.1408 1.1675 1.1847
#> m~~m  0.9615 0.0432 2000  0.8337  0.8472  0.8765 1.0465 1.0712 1.0968
#> x~~x  1.0040 0.0443 2000  0.8709  0.8895  0.9171 1.0919 1.1170 1.1396
#> y~1  -0.0038 0.0326 2000 -0.1104 -0.0867 -0.0666 0.0608 0.0810 0.0990
#> m~1  -0.0050 0.0306 2000 -0.1108 -0.0798 -0.0633 0.0548 0.0743 0.0963
#> x~1  -0.0258 0.0327 2000 -0.1428 -0.1101 -0.0892 0.0370 0.0593 0.0724
#> Standardized Monte Carlo Confidence Intervals
#>          est     se    R    0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> cp   -0.0194 0.0316 2000 -0.1118 -0.1024 -0.0799 0.0431 0.0605 0.0879
#> b     0.0785 0.0320 2000 -0.0187  0.0015  0.0165 0.1417 0.1612 0.1810
#> a     0.1115 0.0317 2000  0.0127  0.0293  0.0511 0.1715 0.1919 0.2065
#> y~~y  0.9938 0.0054 2000  0.9656  0.9736  0.9787 0.9993 0.9997 1.0000
#> m~~m  0.9876 0.0072 2000  0.9573  0.9632  0.9706 0.9974 0.9991 0.9998
#> x~~x  1.0000 0.0000 2000  1.0000  1.0000  1.0000 1.0000 1.0000 1.0000

#> test-semmcci-mc-simple-med-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-std-defined-none-random-x

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-simple-med-std-defined-none

#> Test passed
#> Test passed
#> Test passed
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#> test-semmcci-mc-simple-med-std-defined

#> Test passed
#> Test passed
#> Test passed

#> test-semmcci-mc-methods

#> Monte Carlo Confidence Intervals
#>                      est     se   R  0.05%    0.5%    2.5%   97.5%   99.5%  99.95%
#> visual=~x2        0.5535 0.1062 100 0.2590 0.2867 0.3504 0.7405 0.7917 0.8095
#> visual=~x3        0.7294 0.1089 100 0.4433 0.4443 0.4891 0.9091 0.9518 0.9535
#> textual=~x5       1.1131 0.0718 100 0.9446 0.9459 0.9742 1.2382 1.2707 1.2796
#> textual=~x6       0.9261 0.0570 100 0.7542 0.7556 0.7915 1.0341 1.0496 1.0499
#> speed=~x8         1.1800 0.1621 100 0.8194 0.8197 0.8780 1.4679 1.4842 1.4915
#> speed=~x9         1.0815 0.1654 100 0.5967 0.6152 0.7648 1.3517 1.4139 1.4329
#> x1~~x1            0.5491 0.1086 100 0.2835 0.2846 0.3230 0.7364 0.7603 0.7735
#> x2~~x2            1.1338 0.1036 100 0.9355 0.9389 0.9576 1.3140 1.3996 1.4293
#> x3~~x3            0.8443 0.0782 100 0.6534 0.6588 0.6794 0.9840 1.0219 1.0241
#> x4~~x4            0.3712 0.0469 100 0.2543 0.2550 0.2640 0.4508 0.4706 0.4752
#> x5~~x5            0.4463 0.0594 100 0.3178 0.3196 0.3383 0.5521 0.5574 0.5581
#> x6~~x6            0.3562 0.0437 100 0.2581 0.2603 0.2707 0.4317 0.4494 0.4567
#> x7~~x7            0.7994 0.0853 100 0.6020 0.6122 0.6367 0.9625 0.9794 0.9883
#> x8~~x8            0.4877 0.0664 100 0.3388 0.3442 0.3563 0.6219 0.6677 0.6715
#> x9~~x9            0.5661 0.0680 100 0.4235 0.4300 0.4526 0.7162 0.7474 0.7542
#> visual~~visual    0.8093 0.1495 100 0.4298 0.4381 0.5486 1.1164 1.1816 1.1870
#> textual~~textual  0.9795 0.1210 100 0.6784 0.7011 0.7415 1.1803 1.1920 1.1940
#> speed~~speed      0.3837 0.0818 100 0.1566 0.1793 0.2167 0.5407 0.5644 0.5789
#> visual~~textual   0.4082 0.0712 100 0.2402 0.2421 0.2849 0.5293 0.6021 0.6235
#> visual~~speed     0.2622 0.0573 100 0.1453 0.1458 0.1584 0.3750 0.3948 0.3970
#> textual~~speed    0.1735 0.0486 100 0.0569 0.0615 0.0789 0.2623 0.2736 0.2777
#> Standardized Monte Carlo Confidence Intervals
#>                      est     se   R  0.05%    0.5%    2.5%   97.5%   99.5%  99.95%
#> visual=~x2        0.4236 0.0645 100 0.2107 0.2388 0.2946 0.5315 0.5835 0.5936
#> visual=~x3        0.5811 0.0565 100 0.4350 0.4455 0.4670 0.6712 0.6902 0.6940
#> textual=~x5       0.8551 0.0216 100 0.7894 0.7974 0.8121 0.8932 0.9048 0.9113
#> textual=~x6       0.8380 0.0267 100 0.7629 0.7679 0.7777 0.8834 0.8851 0.8853
#> speed=~x8         0.7230 0.0466 100 0.5829 0.5880 0.6240 0.8011 0.8203 0.8282
#> speed=~x9         0.6650 0.0582 100 0.4768 0.4814 0.5132 0.7468 0.7490 0.7491
#> x1~~x1            0.4042 0.0867 100 0.2154 0.2163 0.2370 0.5750 0.6152 0.6329
#> x2~~x2            0.8206 0.0536 100 0.6477 0.6594 0.7175 0.9130 0.9420 0.9554
#> x3~~x3            0.6623 0.0642 100 0.5183 0.5237 0.5495 0.7819 0.8014 0.8107
#> x4~~x4            0.2748 0.0413 100 0.1785 0.1812 0.1942 0.3651 0.3833 0.3887
#> x5~~x5            0.2689 0.0369 100 0.1695 0.1813 0.2021 0.3405 0.3640 0.3768
#> x6~~x6            0.2977 0.0444 100 0.2162 0.2166 0.2196 0.3952 0.4102 0.4179
#> x7~~x7            0.6757 0.0631 100 0.5266 0.5305 0.5453 0.8021 0.8423 0.8604
#> x8~~x8            0.4772 0.0665 100 0.3140 0.3271 0.3581 0.6106 0.6542 0.6602
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#> x9~~x9          0.5578 0.0736 100 0.4389 0.4390 0.4422 0.7366 0.7682 0.7726
#> visual~~visual  1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> textual~~textual 1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> speed~~speed    1.0000 0.0000 100 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
#> visual~~textual 0.4585 0.0649 100 0.3204 0.3245 0.3312 0.5904 0.6410 0.6456
#> visual~~speed   0.4705 0.0825 100 0.2831 0.2914 0.3223 0.6545 0.6739 0.6818
#> textual~~speed  0.2830 0.0697 100 0.1068 0.1200 0.1392 0.3964 0.4232 0.4389
#> Monte Carlo Confidence Intervals
#> Standardized Monte Carlo Confidence Intervals

#> test-semmcci-npd

#> Test passed
#> Test passed
#> Test passed
#> Test passed
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#>
#>
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#>
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#>
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#>
#>
#> [[1]][[3]]$visible
#> [1] TRUE
#>
#>
```

```
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#> [[1]][[4]]$value[[1]]
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#>
#>
#> [[1]][[4]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[5]]
#> [[1]][[5]]$value
#> [[1]][[5]]$value[[1]]
#> Monte Carlo Confidence Intervals
#>                                est      se     R    0.05%     0.5%     2.5%
#> ses=~sei                    5.2195  0.4193 20000   3.8401   4.1365   4.3938
#> alien67=~powerless67        0.9787  0.0613 20000   0.7821   0.8197   0.8598
#> alien71=~powerless71        0.9221  0.0591 20000   0.7241   0.7724   0.8052
#> alien71~alien67             0.6070  0.0515 20000   0.4344   0.4769   0.5069
#> alien71~ses                -0.2268  0.0522 20000  -0.3911  -0.3601  -0.3298
#> alien67~ses                -0.5750  0.0569 20000  -0.7713  -0.7232  -0.6874
#> anomia67~~anomia71          1.6229  0.3094 20000   0.6397   0.8237   1.0141
#> powerless67~~powerless71    0.3387  0.2598 20000  -0.4836  -0.3233  -0.1660
#> education~~education        2.8013  0.5017 20000   1.0315   1.5127   1.8211
#> sei~~sei                  264.5971 18.1205 20000 206.3884 217.8885 229.0100
#> anomia67~~anomia67          4.7307  0.4518 20000   3.2021   3.5441   3.8538
#> powerless67~~powerless67    2.5634  0.4018 20000   1.3037   1.5370   1.7685
#> anomia71~~anomia71          4.3992  0.5133 20000   2.7376   3.0593   3.3741
#> powerless71~~powerless71    3.0699  0.4312 20000   1.6621   1.9775   2.2251
#> ses~~ses                    6.7983  0.6461 20000   4.6227   5.1180   5.5307
#> alien67~~alien67            4.8415  0.4614 20000   3.3283   3.6710   3.9347
#> alien71~~alien71            4.0832  0.4032 20000   2.7543   3.0390   3.2760
#>                             97.5%    99.5%   99.95%
#> ses=~sei                   6.0451   6.2990   6.6086
#> alien67=~powerless67       1.0996   1.1370   1.1734
#> alien71=~powerless71       1.0381   1.0745   1.1205
#> alien71~alien67            0.7086   0.7394   0.7745
#> alien71~ses               -0.1241  -0.0893  -0.0605
#> alien67~ses               -0.4633  -0.4297  -0.3975
#> anomia67~~anomia71         2.2236   2.4077   2.6159
#> powerless67~~powerless71   0.8502   1.0068   1.1695
#> education~~education       3.7885   4.1077   4.4690
#> sei~~sei                 300.0243 311.6564 323.2718
#> anomia67~~anomia67         5.6224   5.9001   6.2360
#> powerless67~~powerless67   3.3408   3.6200   3.8951
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```
#> anomia71~~anomia71          5.3991    5.6836    6.0265
#> powerless71~~powerless71    3.9257    4.1783    4.5290
#> ses~~ses                    8.0673    8.4340    8.8802
#> alien67~~alien67            5.7423    6.0648    6.3662
#> alien71~~alien71            4.8713    5.1175    5.3726
#>
#>
#> [[1]][[5]]$visible
#> [1] TRUE
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#>
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#>
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#>
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#>
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#>
#>
#> [[1]][[9]]
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#> [[1]][[9]]$value[[1]]
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#>
```

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#> [[1]][[10]]
#> [[1]][[10]]$value
#> [[1]][[10]]$value[[1]]
#>          est     se    R    0.05%     0.5%     2.5%   97.5%   99.5%  99.95%
#> cp   -0.0194 0.0316 2000 -0.1118 -0.1024 -0.0799  0.0431  0.0605  0.0879
#> b     0.0785 0.0320 2000 -0.0187  0.0015  0.0165  0.1417  0.1612  0.1810
#> a     0.1115 0.0317 2000  0.0127  0.0293  0.0511  0.1715  0.1919  0.2065
#> y~~y  0.9938 0.0054 2000  0.9656  0.9736  0.9787  0.9993  0.9997  1.0000
#> m~~m  0.9876 0.0072 2000  0.9573  0.9632  0.9706  0.9974  0.9991  0.9998
#> x~~x  1.0000 0.0000 2000  1.0000  1.0000  1.0000  1.0000  1.0000  1.0000
#>
#>
#> [[1]][[10]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[11]]
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#> [[1]][[11]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[11]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[12]]
#> [[1]][[12]]$value
#> [[1]][[12]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[12]]$visible
#> [1] TRUE
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#>
#> [[1]][[13]]
#> [[1]][[13]]$value
#> [[1]][[13]]$value[[1]]
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#>
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#>
#> [[1]][[14]]
#> [[1]][[14]]$value
#> [[1]][[14]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[14]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[15]]
#> [[1]][[15]]$value
#> [[1]][[15]]$value[[1]]
#>                            2.5%      97.5%
#> visual=~x2          0.2945886 0.5315253
#> visual=~x3          0.4670263 0.6712214
#> textual=~x5         0.8120985 0.8932290
#> textual=~x6         0.7776578 0.8833793
#> speed=~x8           0.6240141 0.8011342
#> speed=~x9           0.5131862 0.7468423
#> x1~~x1              0.2370127 0.5749533
#> x2~~x2              0.7174806 0.9129677
#> x3~~x3              0.5494612 0.7818814
#> x4~~x4              0.1941693 0.3650691
#> x5~~x5              0.2021340 0.3404698
#> x6~~x6              0.2196400 0.3952468
#> x7~~x7              0.5453048 0.8020841
#> x8~~x8              0.3581429 0.6105916
#> x9~~x9              0.4422236 0.7366318
#> visual~~visual      1.0000000 1.0000000
#> textual~~textual    1.0000000 1.0000000
#> speed~~speed        1.0000000 1.0000000
#> visual~~textual     0.3311979 0.5903908
#> visual~~speed       0.3223023 0.6544508
#> textual~~speed      0.1392158 0.3963529
#>
#>
#> [[1]][[15]]$visible
#> [1] TRUE
#>
#>
```

```
#> [[1]][[16]]
#> [[1]][[16]]$value
#> [[1]][[16]]$value[[1]]
#> [[1]][[16]]$value[[1]]$thetahatstar
#>                  y1           y2           y3
#>   [1,]   0.4019584315   0.398230205   0.7222350562
#>   [2,]   0.9087417578   1.614480124   2.0291513111
#>   [3,]   0.1096125701  -0.794145067  -0.3040326236
#>   [4,]  -1.6162914412  -1.926731406  -3.0847377230
#>   [5,]   1.6072765537   3.000500882   3.6693934450
#>   [6,]   0.4309569117  -0.020779704   0.5258626135
#>   [7,]  -0.4184667557  -0.678453126  -0.8983325885
#>   [8,]   2.1600120755   3.643386995   4.7154182429
#>   [9,]  -1.5237912361  -1.836834107  -2.9195026170
#>  [10,]  -0.6485874326  -0.202804433  -0.9213232691
#>  [11,]  -1.0396905806  -1.644167706  -2.2089171873
#>  [12,]  -0.6217727736  -0.825616733  -1.2335206870
#>  [13,]   0.2975119021   0.695790663   0.7571259606
#>  [14,]   0.5058884918   0.179775125   0.7306002988
#>  [15,]   1.6424091644   2.042415994   3.1815060939
#>  [16,]  -0.9142149464  -3.318947154  -2.9818841048
#>  [17,]   0.2601989558   1.802344040   1.3246882728
#>  [18,]   0.5419118452   1.791613015   1.6700232302
#>  [19,]   0.2079669470  -0.232311833   0.1304072002
#>  [20,]  -1.0227563117  -1.183450488  -1.9321217326
#>  [21,]   1.4701596203   2.902962663   3.4442817976
#>  [22,]  -1.7098208689  -3.461454564  -4.0530741087
#>  [23,]  -0.4981177472   0.307161149  -0.4506810938
#>  [24,]   0.7733697278   1.266212759   1.6670713440
#>  [25,]  -0.4414064738   0.274476771  -0.3981017539
#>  [26,]   0.7990332211   1.947614479   2.0772226230
#>  [27,]  -0.9992959831  -1.583490441  -2.1248726062
#>  [28,]  -1.6468492265  -3.310187788  -3.8906030275
#>  [29,]  -0.8590502438   0.211150136  -0.9540386478
#>  [30,]  -0.4044553557  -0.027669259  -0.5197028596
#>  [31,]   1.3463587711   2.085632319   2.8363205430
#>  [32,]  -1.2450313140  -3.388052237  -3.4327557952
#>  [33,]  -0.0533720764   0.372869004   0.1403727953
#>  [34,]   2.1756759324   3.630149568   4.7276045356
#>  [35,]   0.7056079288   1.374375307   1.6425994485
#>  [36,]  -0.3720158607  -1.153676096  -1.1041381218
#>  [37,]  -0.9453404487  -2.680397842  -2.6663288377
#>  [38,]  -0.6862794589  -0.625171934  -1.2027207366
#>  [39,]  -0.0589414774  -1.006357545  -0.6319851233
#>  [40,]  -0.9832403834  -2.205927365  -2.4502780339
```

```
#>    [41,] -0.4972473755 -0.212703492 -0.7380988680
#>    [42,] -0.1367276033  0.190635489 -0.0647018179
#>    [43,] -1.6327636674 -1.421224547 -2.8247431107
#>    [44,] -0.2750412344 -1.649160292 -1.2581857247
#>    [45,]  2.7581887240  4.613514644  5.9997125513
#>    [46,]  0.8426357037  0.626905666  1.3986559331
#>    [47,] -1.3115937066 -0.799351695 -2.0791373243
#>    [48,] -3.1912846957 -6.022660025 -7.3217910831
#>    [49,] -0.9912529756 -2.191305625 -2.4521551193
#>    [50,]  0.3136712025  0.317210317  0.5671800370
#>    [51,]  0.8042699747  0.678429468  1.3794082046
#>    [52,] -2.7280120768 -3.555761151 -5.3750739848
#>    [53,] -0.3432911502 -0.673172071 -0.8016593778
#>    [54,]  0.4209393302  0.619291538  0.8685836342
#>    [55,] -0.5601302768 -1.080103014 -1.2978829814
#>    [56,]  0.3086363886  1.216447410  1.0599406641
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#>   [577,]   1.4415397514   3.356380730   3.6602214485
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#>   [584,]  1.2072781895  3.406137769  3.3957151321
#>   [585,]  1.5249262906  3.182606241  3.6677651962
#>   [586,]  2.0152748981  1.386295087  3.2823424259
#>   [587,]  0.1988534016 -1.082919712 -0.3530089644
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#> [1084,]  -0.5064951565  -0.592378248  -0.9603342556
#> [1085,]   1.4182467644   1.645068045   2.6814686778
#> [1086,]   0.4571761777   0.162030239   0.6600093674
#> [1087,]  -0.0928239535   0.046021672  -0.0902094757
#> [1088,]   0.0168481524  -0.280427680  -0.1346163193
#> [1089,]  -0.6365781481  -1.508919612  -1.6311871762
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#> [1118,]  -0.2883931256   0.390609874  -0.1428482196
#> [1119,]  -0.4695694276  -2.311978568  -1.8685948063
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#> [1343,] -0.4141288499 -1.139279090 -1.1486624247
#> [1344,] -0.3580394968 -1.700710887 -1.3902912872
#> [1345,] -0.6031628483 -1.263658592 -1.4534093816
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#> [1350,]   1.9226497672   1.981484804   3.4971461503
#> [1351,]  -2.4341354425  -5.071715030  -5.8499067489
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#> [1353,]  -2.8524944651  -5.114370279  -6.3952637943
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#> [1355,]  -2.7152073046  -3.261952479  -5.1960551833
#> [1356,]  -0.6868761470  -2.578931448  -2.2877195248
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#> [1358,]   0.7192455367   1.220629200   1.5742826152
#> [1359,]   0.2041179411   1.021140227   0.8212209823
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#> [1365,]   0.4079212035   1.538443412   1.3624411027
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#> [1386,]  -1.0848892318  -1.152050763  -1.9921746842
#> [1387,]  -0.6861145292  -0.625068866  -1.2024578741
#> [1388,]   0.0239404212   0.989308228   0.5788778629
#> [1389,]  -0.7954356642  -0.690367194  -1.3750169376
#> [1390,]   0.4471323896   1.570492319   1.4291224538
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#> [1400,]  -1.8649391640  -4.251517988  -4.6849555808
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#> [1608,] -1.4977431946 -2.747008207 -3.3921297589
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#> [1855,]  -0.2907737818  -1.123047969  -0.9858335786
#> [1856,]  -0.3747447085   0.218702658  -0.3459281894
#> [1857,]   0.8699112389   1.705262981   2.0311111307
#> [1858,]   1.8187338079   2.221949915   3.5010131376
#> [1859,]  -2.2067197888  -4.282243077  -5.1282001869
#> [1860,]   1.8461333439   4.026402623   4.5365755042
#> [1861,]  -2.2438817250  -4.024602289  -5.0315605130
#> [1862,]  -0.3909903268  -0.873049336  -0.9720627913
#> [1863,]  -2.4019090946  -3.750737610  -5.0766339887
#> [1864,]  -1.2210314903  -2.650373447  -2.9934476611
#> [1865,]   0.3471712558  -1.064911848  -0.1580660148
#> [1866,]   2.3179863092   2.740559425   4.4113773885
#> [1867,]   1.0511056676   1.833209024   2.3280615847
#> [1868,]   1.0729989229   1.018340449   1.9031440852
#> [1869,]   1.2828851412   1.700716297   2.5435579442
#> [1870,]   2.2362271639   3.439893757   4.6975266766
#> [1871,]  -0.1991775872  -0.742775398  -0.6605796361
#> [1872,]  -0.1226721095  -0.825020090  -0.6108212264
#> [1873,]  -0.2577770676  -0.341616115  -0.5110253866
#> [1874,]   1.4942941593   1.087253342   2.4667344225
#> [1875,]   0.3277168130   0.470996868   0.6700397236
#> [1876,]  -1.7906053828  -3.632129009  -4.2485279209
#> [1877,]  -0.2657166141  -1.381290418  -1.0979015482
#> [1878,]  -1.0047269529  -2.305154232  -2.5321381043
#> [1879,]  -0.5617609841  -0.778310188  -1.1324340574
#> [1880,]   1.7527497868   2.363687249   3.4973906949
#> [1881,]   0.4405532288   0.340883559   0.7385369938
#> [1882,]   0.9557178383   0.154347754   1.2774171923
#> [1883,]  -0.8790925081  -2.831516955  -2.6675837878
#> [1884,]   1.0668677901   2.611302780   2.7795260874
#> [1885,]  -0.2588563833   0.255248501  -0.1811363991
```

```
#> [1886,]  -0.2284690237 -1.121161666 -0.9070939967
#> [1887,]  -1.7846364841 -2.682747839 -3.7142180256
#> [1888,]  -0.2322438253 -0.697905988 -0.6769119165
#> [1889,]   0.4189974333 -0.516881184  0.2356338369
#> [1890,]  -0.9640508864 -1.294008999 -1.9202726094
#> [1891,]  -0.3978175413 -0.781246084 -0.9296292277
#> [1892,]   0.6446583957  1.066508981  1.3957437030
#> [1893,]   1.4948570678  3.948665083  4.0554000726
#> [1894,]  -0.3277577494  0.291552340 -0.2469078863
#> [1895,]   0.0427954420  1.290482019  0.7695285343
#> [1896,]   0.9700314606  0.935878263  1.7289826987
#> [1897,]   1.8714136591  3.321902025  4.1771312055
#> [1898,]   0.2576365496  1.066798745  0.9132961613
#> [1899,]  -0.5136433610  0.298859054 -0.4746485326
#> [1900,]   0.5085764891  0.561465757  0.9457744967
#> [1901,]  -1.3280612411 -2.464692897 -3.0238666462
#> [1902,]  -1.9365419753 -2.806794960 -3.9724820330
#> [1903,]   1.0849507357  2.191765152  2.5692493331
#> [1904,]  -0.9036453394 -2.183405737 -2.3385260767
#> [1905,]   0.4525907202  1.229993802  1.2469664597
#> [1906,]  -0.2014295392 -1.257454193 -0.9490129573
#> [1907,]  -1.0869815189 -2.859177357 -2.9421675089
#> [1908,]   0.3393479349  1.921123768  1.4893032115
#> [1909,]  -0.3384156508 -1.486291665 -1.2468270602
#> [1910,]  -0.6742254942 -0.866806680 -1.3217868558
#> [1911,]  -0.9442174676 -1.973171092 -2.2724472670
#> [1912,]  -1.2458833426 -2.719944182 -3.0630462594
#> [1913,]   0.5540316982  2.040030404  1.8229976897
#> [1914,]   0.8946452685  0.850944865  1.5878431751
#> [1915,]   0.6786875162  0.563454739  1.1590032797
#> [1916,]   0.3202638370  0.134699238  0.4741149100
#> [1917,]  -0.2458033854 -1.063349158 -0.8966260705
#> [1918,]   2.1798504766  3.885751155  4.8746582862
#> [1919,]  -0.2810972562  0.790593877  0.0882239562
#> [1920,]  -1.1015719780 -1.341135118 -2.1179116286
#> [1921,]   0.4042532427  0.781853360  0.9379914288
#> [1922,]  -0.6534386939 -1.785171789 -1.8055203251
#> [1923,]   0.0965918419  0.409026687  0.3474407432
#> [1924,]  -0.1380346477 -1.031320407 -0.7444660371
#> [1925,]  -0.1014444724  0.388444623  0.0890713143
#> [1926,]   1.0257380583  1.579661492  2.1557204282
#> [1927,]   0.6229468384  1.438029788  1.5748483265
#> [1928,]   1.6660382111  3.073466527  3.7831609113
#> [1929,]  -0.9627494698 -1.184757210 -1.8580196004
#> [1930,]   1.0052319784  2.150569923  2.4469800413
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#> [1931,]  -0.2915444752 -1.131537433 -0.9915059145
#> [1932,]  -0.6030046049 -0.331106274 -0.9356845627
#> [1933,]  -1.0983155123 -2.717616056 -2.8777401724
#> [1934,]  -0.3158407724 -0.056587059 -0.4252504500
#> [1935,]   0.2384141862  1.114693493  0.9159058463
#> [1936,]   0.8037113854  1.980488744  2.1013000389
#> [1937,]   2.0715933285  3.521979285  4.5377856729
#> [1938,]  -0.5195798898 -0.088904982 -0.6972440679
#> [1939,]  -0.1503403160 -1.350730167 -0.9370699979
#> [1940,]   2.3895877442  4.199026156  5.3100508903
#> [1941,]  -0.0372416161 -0.253917663 -0.1873532074
#> [1942,]  -0.2169981352 -1.736207179 -1.2341145415
#> [1943,]  -0.1283448551 -0.366578581 -0.3634791810
#> [1944,]  -1.9524915691 -2.619213786 -3.8882711533
#> [1945,]   1.5346041529  2.146048785  3.1045873034
#> [1946,]  -1.1646969162 -2.606748426 -2.8989895361
#> [1947,]  -0.9583835151 -2.494496421 -2.5794257701
#> [1948,]  -0.1281911063 -0.840946817 -0.6265419696
#> [1949,]   0.4771352720  0.526372215  0.8870924935
#> [1950,]   1.2047557068  0.918966702  2.0122938382
#> [1951,]  -0.3529059626 -2.082141901 -1.5955681175
#> [1952,]  -0.7096153384 -2.011283013 -2.0010537174
#> [1953,]  -0.5883052313 -1.713331257 -1.6844317384
#> [1954,]   0.4362902875  2.827821022  2.1133673622
#> [1955,]   2.7434122506  3.571026144  5.4027491197
#> [1956,]  -1.7884541174 -4.120932643 -4.5171108884
#> [1957,]  -1.3437354794 -2.094824863 -2.8381508289
#> [1958,]  -0.2661467331 -1.171314468 -0.9819100371
#> [1959,]   2.1103587614  3.583846162  4.6204589035
#> [1960,]   1.7606104421  2.764513412  3.7296345106
#> [1961,]  -1.8057779810 -3.024300576 -3.9301285099
#> [1962,]   0.2932016639  0.790665018  0.8044024761
#> [1963,]   2.1831363576  4.248732675  5.0801952589
#> [1964,]  -0.2617072168  0.566641031 -0.0118815133
#> [1965,]   0.5454604937  0.725045266  1.0825478767
#> [1966,]   0.4696745293  0.032247694  0.6035706782
#> [1967,]  -0.0334873933 -0.519986838 -0.3303290205
#> [1968,]   0.1646375333  0.425605097  0.4414926558
#> [1969,]  -0.2929283805 -0.114182147 -0.4286420268
#> [1970,]  -1.8658218079 -2.364520275 -3.6388514935
#> [1971,]  -0.5600425186 -0.177445096 -0.7968361970
#> [1972,]   1.7778135420  3.162397084  3.9718952049
#> [1973,]  -1.6225221209 -1.530960519 -2.8728709812
#> [1974,]  -0.1163674717 -0.028580924 -0.1609690798
#> [1975,]  -0.2597719254  1.203165159  0.3437759969
```

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#> [1976,]  0.1183041942  1.016625974  0.7117077690
#> [1977,]  1.6395480994  2.642668843  3.5110536041
#> [1978,] -0.2441611999 -0.504877541 -0.5846499333
#> [1979,] -1.5697382080 -2.554871821 -3.3752784222
#> [1980,]  2.1419805618  5.457090457  5.6994627989
#> [1981,] -0.8682107071 -1.121414864 -1.7049793417
#> [1982,] -0.4579588686 -1.541007752 -1.4262601522
#> [1983,]  0.6350584099 -0.062208445  0.7573818018
#> [1984,] -1.7731916072 -4.011242598 -4.4372054673
#> [1985,] -0.8398616762 -3.119863299 -2.7786838891
#> [1986,] -0.6765944488 -0.687099589 -1.2250109822
#> [1987,]  1.8465948158  3.123583842  4.0361243262
#> [1988,]  0.0828385623  0.575918110  0.4229084360
#> [1989,]  0.5355936469  1.976442182  1.7647170150
#> [1990,] -2.1253383449 -2.927337899 -4.2748035395
#> [1991,] -1.4701722088 -2.855395225 -3.4178995590
#> [1992,]  0.5645279508  0.874215461  1.1891078197
#> [1993,]  1.7493592312  2.834878054  3.7546539104
#> [1994,]  0.1804263943 -0.705528743 -0.1665508796
#> [1995,] -0.4314495403 -0.457781000 -0.7920580653
#> [1996,]  0.4762071544  1.168719136  1.2424107976
#> [1997,] -0.4094672233 -0.460794282 -0.7663188098
#> [1998,]  0.3231508885 -0.617688235  0.0601714576
#> [1999,] -0.0866453646  0.255902360  0.0339700933
#> [2000,] -0.2089621619 -1.079762973 -0.8597947962
#>
#> [[1]][[16]]$value[[1]]$decomposition
#> [1] "eigen"
#>
#>
#>
#> [[1]][[16]]$visible
#> [1] TRUE
```

Environment

```
ls()

#> [1] "i"         "root"      "tex_file"
```

Class

```
#> [[1]]
#> [1] "character"
#>
#> [[2]]
#> [1] "root_criterion"
#>
#> [[3]]
#> [1] "character"
```

References

R Core Team. (2023). *R: A language and environment for statistical computing.* R Foundation for
        Statistical Computing. Vienna, Austria. https://www.R-project.org/