```
R version 4.4.0 (2024-04-24) -- "Puppy Cup"
Copyright (C) 2024 The R Foundation for Statistical Computing
Platform: aarch64-apple-darwin20

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  Natural language support but running in an English locale

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.80 (8376) aarch64-apple-darwin20]

[History restored from /Users/alperkaragol/.Rapp.history]

> rm(list = ls())
> x0 <-
c(-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3
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455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.
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> x1 <-
c(-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3
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455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.6,-3455.
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515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6)
> x2 <-
c(-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-515.6,-5
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-515.6,-515.6)
> x3 <-
c(-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1
290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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> x4 <-
c(-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1
290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.2,-1290.
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56.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4
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6.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,
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> x5 <-
c(-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-4
56.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4
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6.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,
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> x6 <-
c(-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-456.4,-4
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> x7 <-
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> x8 <-
c(-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482
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> x9 <-
c(-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482
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2,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-482,-177.5,-1
77.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5
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7.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,
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5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-1
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,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-17
7.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5)
> x10 <-
c(-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-1
77.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5
,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-17
7.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,
-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177
.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5,-177.5)
> MFE <- c(x0,x1,x2,x3,x4,x5,x6,x7,x8,x9,x10)
> y0 <-
c(509,509,409,396,393,312,309,302,933,931,931,931,926,904,904,429,429,435,435,431,429,429,424,386,49.8,377,373,322,4
1.8,1094,1083,1079,1032,1021,445,418,428,409,397,389,357,335,336,320,305,307,294,272,262,266,257,204,199,188,177,128
,127,85.3,57.3,52.7,46.8,1093,1082,1081,1081,1080,1080,1080,1079,1079,1079,1078,1078,1078,1043,1041,1041,1041,1040,1
032,1031,1030,1028,1027,929,868,795,736,724,723,713,673,643,630,494,508,479,454,445,415,427,427,427,427,427,407,418,
404,416,418,417,417,417,416,395,405,389,382,363,315,335,335,335,309,308,306,304,295,291,289,276,271,253,265,229,220,
227,211,221,208,201,208,190,204,195,191,172,189,189,178,163,151,128,39.3,138,130,130,119,128,128,125,1094,1080,1079,
1077,1076,1073,507,456,445,425,430,430,416,416,416,416,416,416,377,353,337,309,289,286,286,220,203,199,184,127,1039,
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1027,989,976,438,429,415,404,383,383,349,379,379,327,308,308,307,273,232,81.1,230,191,157,137,102,86.6,77.4,69,68.6,
53.1,45.6,43.9,1091,1078,1026,1018,428,418,395,389,337,335,297,309,305,289,200,203,179,188,128,129,127,96.6,94.9,83.
6,58.1,51.4,46.8,1047,450,433,413,388,313,297,1058,1048,1048,1048,1046,1046,1044,1009,896,479,450,442,429,412,419,40
7,383,336,332,305,297,221,179,122,51.9,45.6,46,1092,1086,1078,1033,1033,1020,442,418,428,415,395,388,363,343,336,299
)
> y1 <-
c(305,285,261,266,221,199,204,188,177,125,84.1,79.5,56.9,52.7,46.8,1094,1086,1080,1035,1021,442,418,428,415,395,388,
363,343,335,336,300,305,306,293,286,262,266,221,199,204,189,177,126,84.1,79.5,56.9,52.7,46.8,1090,1080,1078,1078,107
7,1038,927,506,454,446,430,417,420,364,335,339,337,306,304,294,221,177,127,57.3,52.3,46.8,1035,996,984,984,984,983,9
82,437,437,429,416,419,417,384,381,350,330,337,313,304,291,284,283,283,115,59,51.9,1056,1045,1008,999,997,883,479,44
9,442,430,420,406,412,382,383,384,362,337,315,305,294,270,221,178,122,53.9,52.3,45.6,1091,1080,1077,1077,1077,1039,9
26,504,455,441,418,420,427,364,335,333,305,309,282,259,220,203,179,184,130,56,51.9,46.8,327,327,256,247,245,189,189,
184,589,588,581,579,579,578,575,274,271,271,270,261,262,261,261,261,230,227,202,709,700,700,697,691,288,263,262,263,
253,252,239,239,232,209,188,188,186,183,161,156,155,141,126,84.5,68.2,58.1,56.9,54.4,52.3,46.8,711,710,710,709,709,7
09,709,708,707,707,699,699,698,698,697,697,697,697,697,697,697,697,697,696,696,696,696,695,695,638,625,490,504,413,4
05,417,391,293,287,263,261,263,263,262,262,262,262,261,253,253,253,253,252,252,240,239,217,206,217,209,206,189,2
02,189,188,188,186,184,167,168,167,165,157,149,145,140,144,143,127,39.3,141,130,130,127)
> y2 <-
c(126,123,107,108,110,95.4,90.8,79.5,85.3,79.5,82,81.6,78.6,77,75.3,708,708,697,696,695,694,502,287,286,263,263,263,
263,262,262,262,262,262,262,219,184,183,180,179,164,157,125,75.3,67.3,57.7,670,669,658,658,276,276,266,261,229,242,2
32,232,220,220,201,191,191,185,185,141,99,97,86.2,77.8,68.6,53.1,43.9,39.3,708,696,695,688,296,263,263,253,231,230,1
89,186,184,164,141,128,125,94.1,82.4,68.2,57.7,57.7,54.4,51,46.8,666,291,264,258,240,189,187,679,679,677,669,669,668
,667,667,666,476,284,265,264,258,255,253,235,206,183,143,120,75.3,68.2,54.8,51.9,45.6,709,703,703,697,690,650,297,28
4,263,263,260,253,233,230,208,189,186,163,160,156,141,124,83.2,79,67.7,58.1,56.9,54.4,52.3,46.8,710,704,704,698,691,
298,284,263,263,261,253,234,230,208,189,188,188,186,184,163,161,156,141,124,83.2,79.5,67.7,56.9,58.1,54.4,52.3,46.8,
708,708,707,698,696,696,695,502,288,263,263,262,253,209,191,188,188,181,141,125,75.3,67.7,57.3,54.4,51.9,46.8,669,65
9,658,658,658,658,275,275,266,266,262,256,256,234,234,234,231,190,183,166,164,164,142,51.4,677,677,667,667,666,6
66,475,284,265,265,266,266,259,256,236,226,208,189,182,158,142,122,74.9,68.2,53.9,53.1,51.9,45.6,707,707,706,697,695
,695,695,502,283,264,262,262,252,210,185,184,183,176,153,141,128,75.3,67.7,57.7,55.6,54.4,51.4,46.8)
> y3 <-
c(383,383,310,304,297,248,243,234,635,635,635,635,635,598,598,343,345,343,345,343,343,327,327,295,49.8,295,291,245,4
1.8,675,675,675,623,623,345,345,345,327,327,306,299,297,268,264,249,253,249,249,243,240,234,200,203,177,128,99.5,41,
36.4,675,675,675,675,675,675,675,675,675,675,675,675,674,672,624,624,624,624,624,624,623,623,623,622,511,456,446
,405,356,345,345,345,345,345,344,344,344,344,344,344,344,313,331,332,331,319,319,327,317,321,309,306,294,299,298,252
,265,264,251,251,252,252,252,251,251,229,220,227,225,222,212,222,221,203,195,189,176,178,163,153,138,120,120,116,113
,110,102,100,100,99,95.8,88.7,89.1,88.3,87,86.2,79.9,86.6,80.3,675,675,675,675,675,655,456,346,346,340,330,330,330,3
30,330,330,325,287,266,267,253,251,251,233,220,203,185,97.5,89.1,41.4,654,654,604,604,349,343,343,331,327,327,327,27
2,289,289,261,261,254,177,80.7,215,191,158,138,102,63.6,63.6,59,49.8,675,675,623,623,345,346,345,306,298,281,265,266
,253,201,202,179,128,99.1,97.9,48.9,43.1,41,36.4,669,348,330,327,299,266,249,665,665,665,665,665,665,665,614,503,452
,345,344,333,332,325,306,296,266,252,249,220,179,85.3,46,41.4,675,675,675,623,623,616,345,344,345,332,332,331,332,32
5,306,263,248,252,249,220,200,203,177,99,41,36.4,675,675,675)
> y4 <-
c(623,623,345,344,345,332,332,331,332,325,306,297,264,264,249,252,249,249,221,200,203,177,99,41,674,674,674,674,674,
622,512,456,346,345,332,332,327,307,297,266,253,249,249,220,177,88.7,41.4,36.4,662,610,610,610,610,609,608,344,343,3
43,333,333,327,327,305,291,291,261,261,259,258,258,251,200,115,59,663,663,615,615,615,499,451,345,343,331,332,319,32
2,322,305,294,294,268,251,247,246,220,178,85.3,41.4,281,248,248,203,189,173,169,157,156,151,134,123,90.3,89.5,406,38
7,387,387,387,386,386,348,347,347,347,347,346,230,230,230,230,226,225,219,219,202,176,49.8,198,167,149,146,131,1
30,125,119,119,118,118,104,103,102,404,402,403,402,403,394,394,394,394,394,244,222,228,229,229,229,217,217,199,202,2
01,201,174,172,163,151,153,151,151,136,127,124,120,120,117,117,117,117,116,112,87.4,84.9,79.9,77.8,73.6,73.2,59.8,55
.6,49.8,49.8,46.8,824,799,492,431,430,430,431,431,402,403,392,404,393,393,402,392,392,402,404,394,394,404,404,404,40
4,404,404,404,404,403,403,394,403,403,402,402,394,394,394,394,396,393,394,394,395,394,394,394,394,394,394,394,394,39
4,394,394,394,394,394,335,318,308,287,263,229,238,234,229,229,229,229,229,229,229,229,228,228,228,228,228,226,20
8,217,218,217,216,212,210,208,190,202,201,201,189,176,177)
> y5 <-
c(175,174,164,802,404,403,404,404,394,394,402,404,394,394,394,394,337,303,230,230,226,217,217,217,217,217,217,216,20
0,176,176,163,163,151,151,138,124,120,120,120,120,120,120,117,117,117,117,114,87,79,79,78.2,58.1,56,411,410,389,389,
368,368,368,368,274,220,227,226,220,219,219,217,201,201,174,174,160,161,161,140,138,85.3,80.7,127,121,119,119,117,10
8,105,102,88.3,88.3,83.2,80.3,81.1,75.3,75.3,61.9,64,50.6,47.2,43.9,41.8,39.7,404,402,402,404,394,394,394,394,348,24
4,225,229,229,229,229,208,199,202,200,176,176,164,141,118,117,116,112,84.1,77.4,78.2,74.4,57.7,50.6,46,402,374,231,2
18,217,202,177,165,154,120,120,117,89.9,82.4,776,402,402,402,403,402,402,402,401,374,374,374,375,375,374,373,374,374
,332,313,233,228,227,224,217,216,216,202,177,162,157,135,119,118,115,115,115,114,94.1,87.4,46,37.6,771,404,404,402,4
02,403,394,393,393,393,393,336,222,228,229,229,229,207,217,217,216,217,215,199,201,174,162,151,151,136,118,117,117,1
17,112,90.8,84.1,78.2,72.4,71.9,59.4,57.3,55.2,51.9,49.3,46.8,404,402,402,403,404,394,394,394,394,394,336,222,228,22
9,229,229,208,217,217,216,217,215,199,201,201,174,174,162,151,151,151,136,118,117,117,117,112,91.2,87.4,84.1,78.2,77
.8,72.4,73.6,71.9,59.8,57.7,55.6,51.9,49.8,46.8,796,404,402,403,403,403,402,392,393,393)
> y6 <-
c(393,393,393,393,337,318,236,230,230,222,218,217,216,201,200,174,164,151,137,120,117,117,117,112,87.4,75.7,74,73.6,
50.2,417,417,417,417,393,395,394,367,367,367,367,367,367,232,227,227,225,219,219,217,217,202,202,174,171,166,161
,161,160,160,134,115,120,120,119,120,119,117,116,116,110,86.2,77,74,59.8,59.4,58.1,774,425,425,420,402,401,374,373,3
73,373,372,372,333,286,228,227,227,222,217,215,216,215,204,199,180,176,161,154,154,135,120,120,120,120,117,116,116,1
04,87.4,83.6,71.5,63.1,46.8,45.6,798,404,404,404,404,402,402,394,394,394,394,394,394,394,337,318,225,229,229,229,217
,216,215,200,200,176,160,151,151,135,120,116,116,114,112,79,78.2,74,71.5,55.6,48.9,46.4,798,404,404,404,404,402,402,
394,394,394,394,394,394,394,337,318,225,229,229,229,217,216,215,200,200,176,160,151,151,135,120,116,116,114,112,79,7
8.2,74,71.5,55.6,48.9,46.4,124,124,116,111,109,93.3,77.4,75.7,284,284,284,284,284,248,248,135,135,129,129,124,112,11
2,111,109,107,94.5,87.4,52.3,41.4,315,315,315,263,263,139,134,123,123,122,113,112,112,110,110,106,104,103,102,91.2,8
9.1,85.7,82,68.6,68.6,68.2,36,335,315,315,315,315,315,315,315,315,315,315,315,315,315,315,315,314,288,265,264,264,26
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4,264,264,263,263,263,263,263,159,160,160,160,135,135,132,133,133,133)
> y7 <-
c(133,133,133,133,133,133,133,133,133,133,123,116,116,112,115,110,110,110,107,104,104,100,99,99,99,92,95.4,92,94.5,9
1.6,90.8,89.1,88.7,75.7,75.7,75.7,74.9,74,69,69,68.6,68.6,68.6,59.8,59,58.5,58.5,51,50.6,49.8,47.7,48.5,46,315,315,3
15,315,315,315,294,162,136,136,130,121,120,110,104,104,99,99,99,99,99,99,91.6,88.3,72.8,68.6,68.6,300,300,250,250,22
0,160,133,133,126,125,108,101,101,99,91.6,91.6,91.2,75.3,76.1,75.7,71.9,60.6,58.5,315,315,263,263,160,135,133,133,12
3,113,110,110,107,104,103,89.1,87.8,312,115,107,99,92,88.3,71.1,311,311,311,311,311,311,311,311,287,261,138,135,134,
134,120,108,103,100,99,99,87.4,69.8,47.7,314,315,315,315,263,263,139,133,123,113,112,112,110,103,100,99,99,99,99,89.
1,88.3,68.6,68.6,315,315,315,263,263,160,133,123,113,112,112,110,104,103,100,99,99,99,99,91.6,89.1,88.3,68.6,68.6,68
.2,315,315,315,315,315,315,288,263,140,136,135,135,106,104,100,99,99,91.6,91.2,89.1,68.6,306,256,256,256,256,255,254
,159,134,133,133,133,125,125,117,108,102,99,99,91.6,84.9,74,74,74,58.5,38.9,309,309,309,263,263,262,181,138,135,134,
134,120,119,108,102,100,99,99,92,91.2,86.2,67.7,67.7,315,315,315,315,315,315,288,263,139,133,113,112,104,104,100,99,
99,91.6,91.6,89.1,68.6,68.2,352,352,278,270,266,214,214,206,614,614)
> y8 <-
c(605,604,604,603,600,298,295,294,294,285,285,285,285,285,255,253,217,735,725,725,722,716,312,286,286,286,276,276,26
4,264,255,233,212,205,200,186,178,174,171,164,126,91.6,84.9,82.4,70.7,58.5,56.9,52.3,46.8,735,735,735,735,734,734,73
4,733,732,725,724,724,723,722,722,722,722,722,722,722,722,722,722,722,721,720,720,720,709,639,626,491,504,437,440,40
6,392,317,312,286,284,286,286,286,286,286,286,286,284,276,276,276,275,275,275,264,262,240,240,232,226,207,212,207,20
5,189,199,185,189,186,186,183,182,170,175,163,167,166,164,149,127,39.3,130,131,130,130,127,127,124,110,99,99.1,99.5,
99.5,95.4,90.3,90.8,90.3,91.2,79.5,734,733,722,722,721,720,504,312,312,286,287,286,285,286,285,285,285,285,285,244,2
00,197,197,183,180,174,126,99,90.8,82.4,696,694,683,683,301,301,289,284,267,256,256,230,245,243,226,208,208,202,202,
156,117,115,86.6,77.8,68.6,53.1,43.9,39.7,733,721,721,714,296,286,286,276,256,253,213,200,186,180,164,128,125,94.1,9
1.6,82.4,82.4,70.7,58.5,57.7,51,46.8,691,316,288,281,265,206,204,704,704,703,695,694,694,693,693,691,477,309,288,288
,281,277,278,260,222,200,166,121,99,91.2,71.1,51.9,45.6,734,729,729,722,714,675,297,309,287,287,284,276,257,253,232,
212,186,179,177,174,164,124,91.2,82.8,82.8,79,70.7,58.5,56.9,52.3,46.8,735,730,729)
> y9 <-
c(722,716,298,308,287,287,284,276,258,253,232,212,212,205,199,186,180,178,174,164,124,91.2,82.8,79.5,82.4,70.7,58.5,
56.9,52.3,46.8,734,733,732,723,721,721,721,503,313,286,285,287,276,233,216,213,205,197,164,125,99,91.2,70.7,57.3,51.
9,46.8,696,684,684,684,684,683,683,300,300,289,289,285,279,278,259,258,259,254,207,206,184,182,182,165,51.4,703,702,
694,693,692,691,476,309,289,289,289,289,282,279,261,251,232,205,199,175,165,122,99.5,91.2,69.4,53.9,51.9,45.6,733,73
3,731,723,721,720,720,502,307,288,286,286,276,233,210,200,193,183,170,164,129,99,91.2,82.4,70.7,56,51.4,46.8,52.3,49
.3,49.3,41.4,34.7,177,177,177,177,177,155,152,47.2,47.2,46.8,46.8,46.8,43.1,43.1,41,40.1,192,192,192,163,163,46.4,43
.1,43.1,40.6,40.6,40.1,40.1,40.1,33.4,33.4,199,195,193,192,192,192,192,192,192,192,192,192,192,192,192,192,192,192,1
61,164,164,164,164,164,164,164,163,163,163,163,49.3,48.9,46.4,46.4,46.4,46.4,46.4,46.4,46.4,46.4,46.4,46.4,46.4,46.4
,46.4,46.4,46.4,46.4,46.4,46.4,46.4,44.3,43.1,41.4,40.1,40.6,40.1,39.3,36,36,192,192,192,192,192,163,163,48.5,48.5,4
8.5,45.2,43.1,43.1,43.1,36,36,36,36,36,36,36,183,183,178,178,150,99,46.4,46.4,43.1,43.1,39.3,36,192,192,163,163,46.4
,46.4,46.4,46.4,42.6,41,40.6,33.4,33.4,161,43.1,43.1,33.4,197,190,190,190,190,190,190,190,190,162,46.4,46.4,46.4,42.
6,39.7,37.2,36)
> y10 <-
c(36,36,192,192,192,192,163,163,46.4,42.6,40.6,40.6,40.1,40.1,40.1,36,33.4,192,192,192,163,163,46.4,46.4,42.6,40.6,4
0.6,40.1,40.1,36,33.4,33.4,193,192,192,192,192,192,163,163,47.7,47.7,47.7,43.1,41.4,36,36,36,33.4,33.4,189,189,189,1
89,187,185,185,46.4,46.4,46.4,46.4,46.4,43.5,43.5,36,36,195,195,195,190,190,162,61.5,46.4,46.4,46.4,46.4,42.6,42.6,3
7.2,36,36,35.5,193,192,192,192,192,192,163,163,46.4,43.1,40.6,40.1,40.1,33.4)
> B <- c(y0,y1,y2,y3,y4,y5,y6,y7,y8,y9,y10)
> a0 <-
c(0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
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0,0,0,0,0,0,0,0,0,0,0)
> a1 <-
c(0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
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202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.20
2,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,
4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.
202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.20
2,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,
4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.
202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.20
2,4.202,4.202)
> a2 <-
c(4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,
4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.
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2,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,
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4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.202,4.
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> a3 <-
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8,0.468,0.468,0.468,0.468,0.468,0.468,0.468,0.468,0.468,0.468)
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5,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745)
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c(0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,0.745,
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59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59)
> a7 <-
c(0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59
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9,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59,0.59
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448)
> a8 <-
c(0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,
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8,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448)
> a9 <-
c(0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,0.448,
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3,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,
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413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.41
3,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413)
> a10 <-
c(0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,
0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.
413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.41
3,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,
0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.413,0.
413)
> R <- c(a0,a1,a2,a3,a4,a5,a6,a7,a8,a9,a10)
> b0 <-
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> b1 <-
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,93,337,155,152,73,83,180,64,64,275,275,109,266,268,277,574,569,572,568,568,611,297,210,477,492,500,500,485,485,485,
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c(268,275,62,62,51,111,159,78,149,78,94,151,176,149,33,397,397,392,395,391,391,297,363,363,360,360,360,360,375,375,3
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,73,227,227,57,40,127,241,241,122,83,57,65,72,130,26,188,191,187,188,247,247,247,247,420,341,181,174,174,174,174,150
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,147,242,167,236,152,157,247,247,204,236,243,189,241,191,27,38,466,188,188,191,187,188,247,247,247,247,247,341,181,1
74,174,174,174,150,218,144,218,144,147,157,137,169,246,188,186,174,206,247,243,247,189,193,246,171,137,140,191,217,6
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9,90,124,123,188,191,187,188,188,247,247,247,247,247,341,181,174,174,174,174,150,218,144,218,144,147,157,185,137,169
,169,250,188,186,186,174,206,243,247,247,189,193,191,246,171,217,137,121,140,191,217,69,94,124,123,424,188,191,188,1
88,188,188,247,247,247)
> k6 <-
c(247,247,247,247,341,199,410,174,174,181,147,144,218,185,137,134,250,186,174,206,243,247,247,189,191,217,121,140,12
4,199,199,199,199,187,188,191,247,247,247,247,247,247,247,393,157,157,156,147,147,144,144,194,194,169,111,363,188,18
8,209,209,157,76,247,247,243,243,243,206,241,189,194,203,241,121,193,192,192,424,199,199,197,188,188,247,247,247,247
,247,247,341,142,157,157,156,216,144,143,147,147,125,137,110,169,236,167,167,157,247,247,247,247,243,189,236,236,239
,226,131,239,123,124,424,188,188,188,188,191,188,247,247,247,247,247,247,247,341,199,181,174,174,174,144,147,144,185
,137,134,250,188,186,174,206,247,247,243,189,130,217,140,121,69,124,123,424,188,188,188,188,191,188,247,247,247,247,
247,247,247,341,199,181,174,174,174,144,147,144,185,137,134,250,188,186,174,206,247,247,243,189,130,217,140,121,69,1
24,123,130,130,160,147,143,126,126,140,199,199,199,199,199,181,179,130,130,145,145,130,120,132,132,125,136,122,70,52
,24,199,199,199,176,176,117,145,130,82,82,162,162,162,129,129,136,123,157,102,125,123,69,53,53,53,53,25,154,199,199,
199,199,199,199,199,199,199,199,199,199,199,199,199,132,177,177,177,177,177,177,178,176,176,176,176,73,100,100,1
00,145,145,91,145,145,145)
> k7 <-
c(145,145,145,145,145,145,145,145,145,145,130,54,54,145,53,129,129,129,129,123,123,127,127,127,127,53,58,53,58,70,70
,123,53,34,34,34,34,33,53,53,53,53,53,33,33,33,33,22,64,47,63,63,21,199,199,199,199,199,199,236,100,145,145,91,130,1
27,154,136,123,127,127,127,127,127,127,125,123,161,53,53,199,199,180,180,105,77,145,145,130,130,136,123,123,127,125,
125,54,53,53,53,46,29,33,199,199,176,176,100,145,145,145,82,162,129,129,136,123,157,123,123,199,162,136,127,125,126,
53,199,199,199,199,199,199,199,199,135,176,100,145,145,145,130,129,126,127,127,127,126,140,28,199,199,199,199,176,17
6,117,145,130,162,162,162,129,157,127,127,127,127,127,123,123,53,53,199,199,199,176,176,100,145,130,162,162,162,129,
123,157,127,127,127,127,127,125,123,123,53,53,53,199,199,199,199,199,199,132,176,117,145,145,145,136,123,127,127,127
,125,125,123,53,199,180,180,180,180,178,176,100,145,145,145,145,130,130,80,125,123,127,127,125,69,53,53,53,33,42,199
,199,199,180,180,180,131,100,145,145,145,130,130,129,126,127,127,127,114,70,126,53,53,199,199,199,199,199,199,132,17
6,117,145,162,162,123,136,127,127,127,125,125,123,53,53,367,367,383,376,376,378,378,376,409,409)
> k8 <-
c(407,406,408,408,408,375,391,373,373,386,386,386,386,307,408,382,374,409,411,411,405,400,375,374,387,374,306,369,38
5,382,374,255,248,306,380,336,306,184,172,126,280,63,180,55,63,29,136,133,51,409,409,409,409,409,409,409,409,409,404
,404,404,404,403,403,403,403,403,403,405,405,403,405,408,403,403,403,403,397,372,368,291,297,223,223,238,247,164,375
,372,387,372,372,372,372,372,372,372,387,304,304,304,304,304,304,382,419,242,242,255,123,99,248,99,306,148,380,238,3
38,239,336,237,236,141,184,123,136,136,126,83,180,64,74,74,275,275,266,268,275,51,45,45,45,45,111,63,49,159,63,78,40
9,409,404,407,403,403,297,375,375,372,372,372,387,372,387,387,387,387,387,381,380,245,245,336,380,184,275,45,63,55,4
09,409,403,403,332,331,372,385,300,377,377,162,238,242,123,410,410,380,380,118,128,123,133,82,84,103,72,26,409,409,4
09,400,191,372,372,304,355,371,248,380,336,380,126,266,280,184,63,181,55,63,65,136,133,51,408,373,374,417,385,347,34
1,409,409,409,404,408,407,403,403,403,297,375,372,372,385,317,304,383,394,306,126,273,45,63,67,133,51,409,407,407,40
5,400,409,191,381,372,372,387,304,374,371,255,213,336,380,306,184,126,275,63,180,55,149,63,65,136,133,51,409,407,407
)
> k9 <-
c(405,400,191,375,372,372,387,304,374,371,255,248,213,306,380,336,380,306,184,126,275,63,180,149,55,63,65,136,133,51
,409,409,409,404,405,403,403,297,375,372,420,372,304,255,441,248,306,341,126,275,45,63,63,136,133,51,409,403,403,403
,403,411,411,332,332,372,372,387,304,338,378,379,379,384,249,380,246,245,245,126,133,409,409,408,403,403,403,297,399
,372,372,372,372,387,304,386,399,255,341,306,306,126,275,45,63,67,139,133,51,409,409,409,404,403,405,405,297,375,387
,372,372,304,255,248,380,245,336,184,126,275,45,63,55,63,136,133,51,41,27,27,45,60,73,73,73,73,73,76,76,42,42,27,27,
27,27,27,42,29,73,73,73,73,73,42,27,27,59,59,59,59,59,20,20,91,74,73,73,73,73,73,73,73,73,73,73,73,73,73,73,73,73,83
,76,76,76,76,76,76,73,73,73,73,73,19,18,42,42,42,42,42,42,42,42,42,42,42,42,42,42,42,42,42,42,42,42,27,18,59,59,42,3
3,24,24,73,73,73,73,73,73,73,42,42,42,40,27,27,27,24,24,24,24,24,24,76,76,73,73,73,47,42,42,27,27,33,24,73,73,73,
73,42,42,42,42,27,59,59,20,20,73,27,59,23,76,73,73,73,73,73,73,73,73,73,42,42,42,27,42,23,24)
> k10 <-
c(24,24,73,73,73,73,73,73,42,27,59,59,59,59,59,24,20,73,73,73,73,73,42,42,27,59,59,59,59,24,20,20,73,73,73,73,73,73,
73,73,42,42,42,27,59,24,24,24,20,20,76,76,76,76,74,73,73,42,42,42,42,42,27,27,24,24,76,76,76,73,73,73,28,42,42,42,42
,27,27,15,24,24,24,73,73,73,73,73,73,73,73,42,27,59,59,59,20)
> L2 <- c(k0,k1,k2,k3,k4,k5,k6,k7,k8,k9,k10)
>
> library(generalCorr)
Loading required package: np
Nonparametric Kernel Methods for Mixed Datatypes (version 0.60-17)
[vignette("np_faq",package="np") provides answers to frequently asked questions]
[vignette("np",package="np") an overview]
[vignette("entropy_np",package="np") an overview of entropy-based methods]
Loading required package: xtable
Loading required package: meboot
Loading required package: dynlm
Loading required package: zoo

Attaching package: ‘zoo’

The following objects are masked from ‘package:base’:

    as.Date, as.Date.numeric

Loading required package: nlme
Loading required package: tdigest
Loading required package: hdrcde
This is hdrcde 3.4
Loading required package: psych
```

```
Loading required package: lattice
> # Perform partial correlation analysis
> results1 <- parcor_ijk(R,B, L2)

> results2 <- parcor_ijk(MFE, B, L2)

> results3 <- parcor_ijk(ED, B, L2)

> results4 <- parcor_ijk(L2, B, L)

>
> # Function to calculate p-values for partial correlations
> calculate_p_value <- function(partial_correlation, n) {
+   t_value <- partial_correlation * sqrt((n - 3) / (1 - partial_correlation^2))
+   p_value <- 2 * pt(-abs(t_value), df = n - 2)
+   return(p_value)
+ }
>
> # Extract partial correlations
> partial_correlations1 <- as.numeric(results1["ouij"])
> partial_correlations2 <- as.numeric(results2["ouij"])
> partial_correlations3 <- as.numeric(results3["ouij"])
> partial_correlations4 <- as.numeric(results4["ouij"])
>
>
> # Number of observations (replace with your actual number of observations)
> n <- 3097
>
> # Calculate p-values
> p_values1 <- sapply(partial_correlations1, calculate_p_value, n = n)
> p_values2 <- sapply(partial_correlations2, calculate_p_value, n = n)
> p_values3 <- sapply(partial_correlations3, calculate_p_value, n = n)
> p_values4 <- sapply(partial_correlations4, calculate_p_value, n = n)
>
> # Display results
> results_with_p_values1 <- cbind(results1, p_values = p_values1)
> results_with_p_values2 <- cbind(results2, p_values = p_values2)
> results_with_p_values3 <- cbind(results3, p_values = p_values3)
> results_with_p_values4 <- cbind(results4, p_values = p_values4)
>
>
>
> print(results_with_p_values1)
     results1    p_values
ouij -0.09054951 4.495803e-07
ouji -0.3995881  4.495803e-07
> print(results_with_p_values2)
     results2   p_values
ouij -0.1788967 1.112129e-23
ouji -0.4883367 1.112129e-23
> print(results_with_p_values3)
     results3  p_values
ouij 0.1858259 1.877532e-25
ouji 0.4755824 1.877532e-25
>
> print(results_with_p_values4)
     results4  p_values
ouij 0.7976832 0
ouji 0.9430381 0
>
>  # For dependence
> gmcxy_np(R,B)
$corxy
[1] 0.4241235

$coryx
[1] 0.2021847

> gmcxy_np(MFE,B)
$corxy
[1] 0.5661945

$coryx
[1] 0.2022448

> gmcxy_np(ED,B)
```

```
$corxy
[1] 0.568034

$coryx
[1] 0.2022448

>
>
>
>
>
>
```