Relatório Tese - Capítulo 4

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Análises da Tese - Capítulo 4

Carregamento de Pacotes

```
library(readxl)
library(dplyr)
library(corrplot)
library(Benchmarking)
library(deaR)
library(writexl)
library(raster)
library(rgdal)
library(tidyverse)
library(ggplot2)
```

Carregamento do banco de dados

```
dados<- read_excel("C:\\Users\\UFES\\Desktop\\Tese_DenilsonSoares\\Capítulo 4\\dados_Cap4.xls
x")
```

Transformando Ideb, Meta e IRD em números

```
dados$Ideb_2017=as.numeric(dados$Ideb_2017)
dados$Meta_2017=as.numeric(dados$Meta_2017)
dados$IRD=as.numeric(dados$IRD)
```

Invertendo TDI e IED

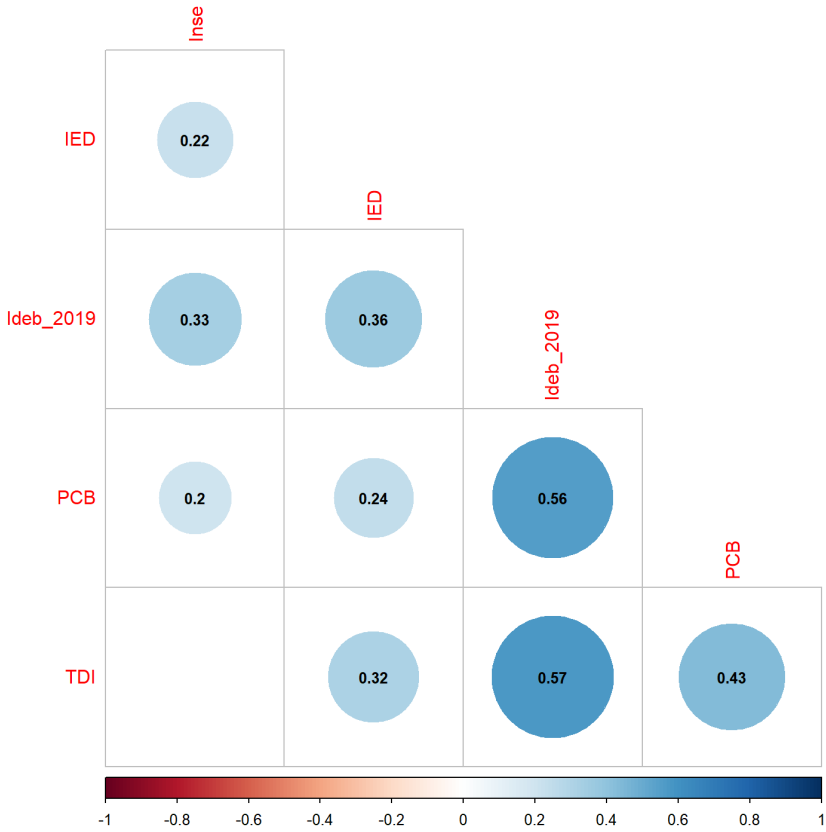
```
dados$IED=100-dados$IED
dados$TDI=100-dados$TDI
```

Análises Descritivas - Correlação - 2019

```
dados_2019a=dados[, c(3, 7:11)]
dados_2019=na.omit(dados_2019a)
summary(dados_2019a)
```

```
##      codigo           Ideb_2019          TDI             Inse
##  Min.   :32000057   Min.   :3.100   Min.   :39.60   Min.   :4.070
##  1st Qu.:32019900   1st Qu.:4.300   1st Qu.:67.47   1st Qu.:4.660
##  Median :32035290   Median :4.700   Median :75.30   Median :4.820
##  Mean   :32036372   Mean   :4.667   Mean   :74.10   Mean   :4.810
##  3rd Qu.:32048805   3rd Qu.:5.100   3rd Qu.:81.47   3rd Qu.:5.005
##  Max.   :32096801   Max.   :6.100   Max.   :95.90   Max.   :5.460
##       IED              PCB
##  Min.   : 30.00   Min.   : 4.023
##  1st Qu.: 64.58   1st Qu.:18.710
##  Median : 75.90   Median :30.391
##  Mean   : 74.87   Mean   :33.548
##  3rd Qu.: 84.75   3rd Qu.:45.003
##  Max.   :100.00   Max.   :88.000
```

```
M = cor(dados_2019[,2:6])
testRes = cor.mtest(dados_2019[,2:6], conf.level = 0.95)
corrplot(M, p.mat = testRes$p, method = 'circle', type = 'lower', insig='blank',
         addCoef.col ='black', number.cex = 0.8, order = 'AOE', diag=FALSE)
```

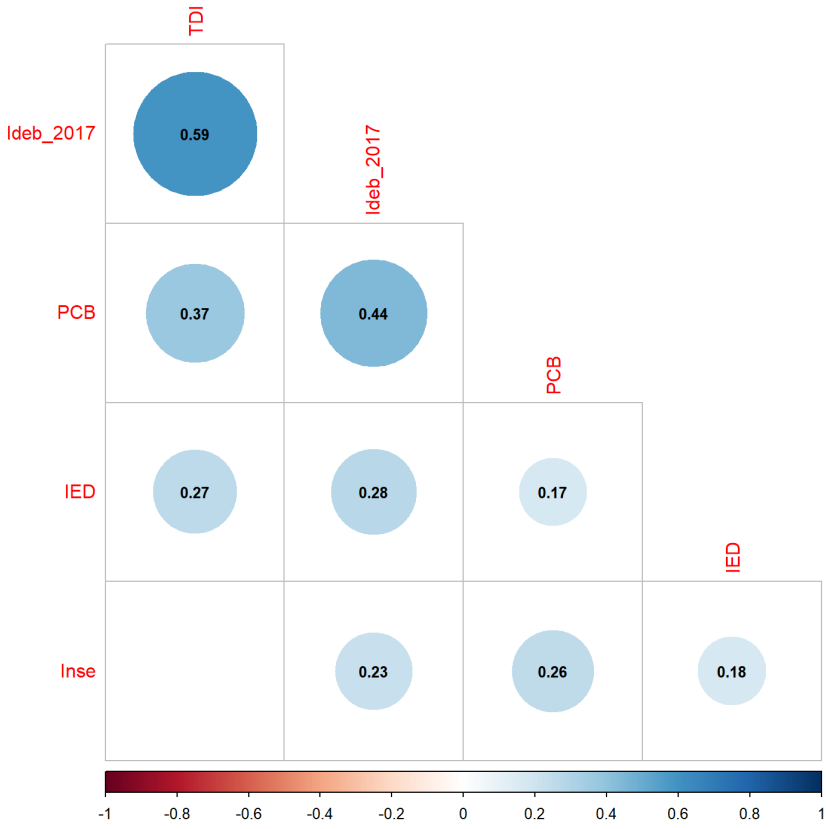


Análises Descritivas - Correlação - 2017

```
dados_2017a=dados[, c(3, 6:11)]
dados_2017b=dados_2017a[, -3]
dados_2017=na.omit(dados_2017b)
summary(dados_2017)
```

```
##      codigo           Ideb_2017          TDI             Inse
##  Min.   :32000057   Min.   :2.900   Min.   :39.60   Min.   :4.070
##  1st Qu.:32017954   1st Qu.:4.000   1st Qu.:70.15   1st Qu.:4.620
##  Median :32033176   Median :4.400   Median :77.15   Median :4.815
##  Mean   :32034705   Mean   :4.388   Mean   :75.37   Mean   :4.795
##  3rd Qu.:32047813   3rd Qu.:4.900   3rd Qu.:82.42   3rd Qu.:5.013
##  Max.   :32096801   Max.   :5.900   Max.   :94.80   Max.   :5.460
##       IED              PCB
##  Min.   : 30.00   Min.   : 4.023
##  1st Qu.: 66.38   1st Qu.:19.464
##  Median : 76.90   Median :35.071
##  Mean   : 75.66   Mean   :36.526
##  3rd Qu.: 85.70   3rd Qu.:49.669
##  Max.   :100.00   Max.   :88.000
```

```
N = cor(dados_2017[,2:6])
testRes2 = cor.mtest(dados_2017[,2:6], conf.level = 0.95)
corrplot(N, p.mat = testRes2$p, method = 'circle', type = 'lower', insig='blank',
         addCoef.col ='black', number.cex = 0.8, order = 'AOE', diag=FALSE)
```



Análises DEA - 2019

```
y_2019= read_data(datadea = dados_2019,
                  ni = 4,
                  no = 1,
                  dmus = 1,
                  inputs = 3:6,
                  outputs = 2,
                  nc_inputs = NULL,
                  nc_outputs = NULL,
                  nd_inputs = NULL,
                  nd_outputs = NULL,
                  ud_inputs = NULL,
                  ud_outputs = NULL)


result_2019<- model_basic(y_2019,
                          dmu_eval = NULL,
                          dmu_ref = NULL,
                          orientation = "oo",
                          rts =  "vrs")

eff_2019<-efficiencies(result_2019)
eficiencia_2019=1/eff_2019
summary(eficiencia_2019)
```

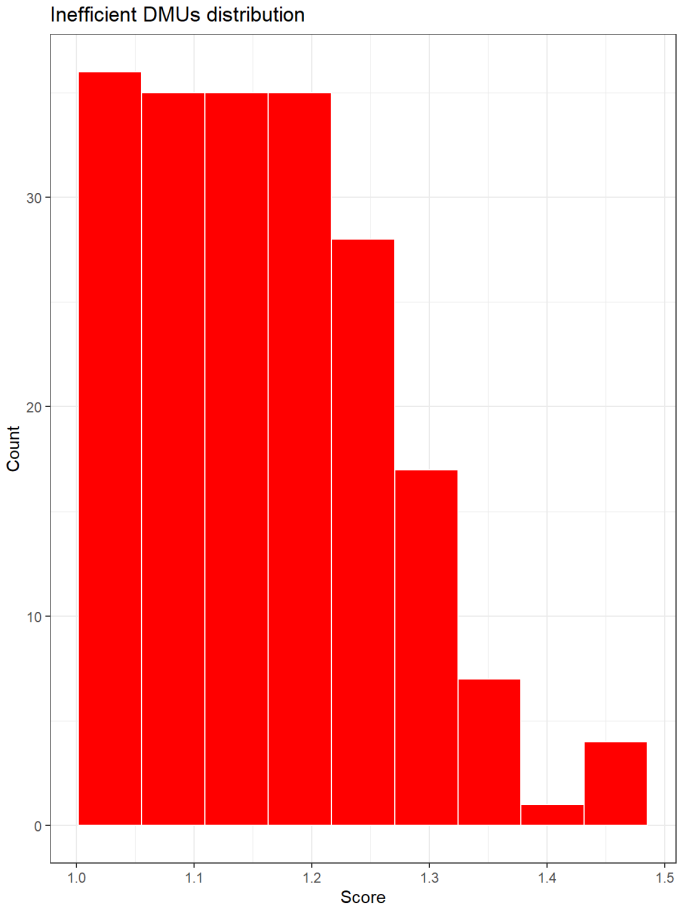
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.6732  0.8214  0.8848  0.8833  0.9538  1.0000
```

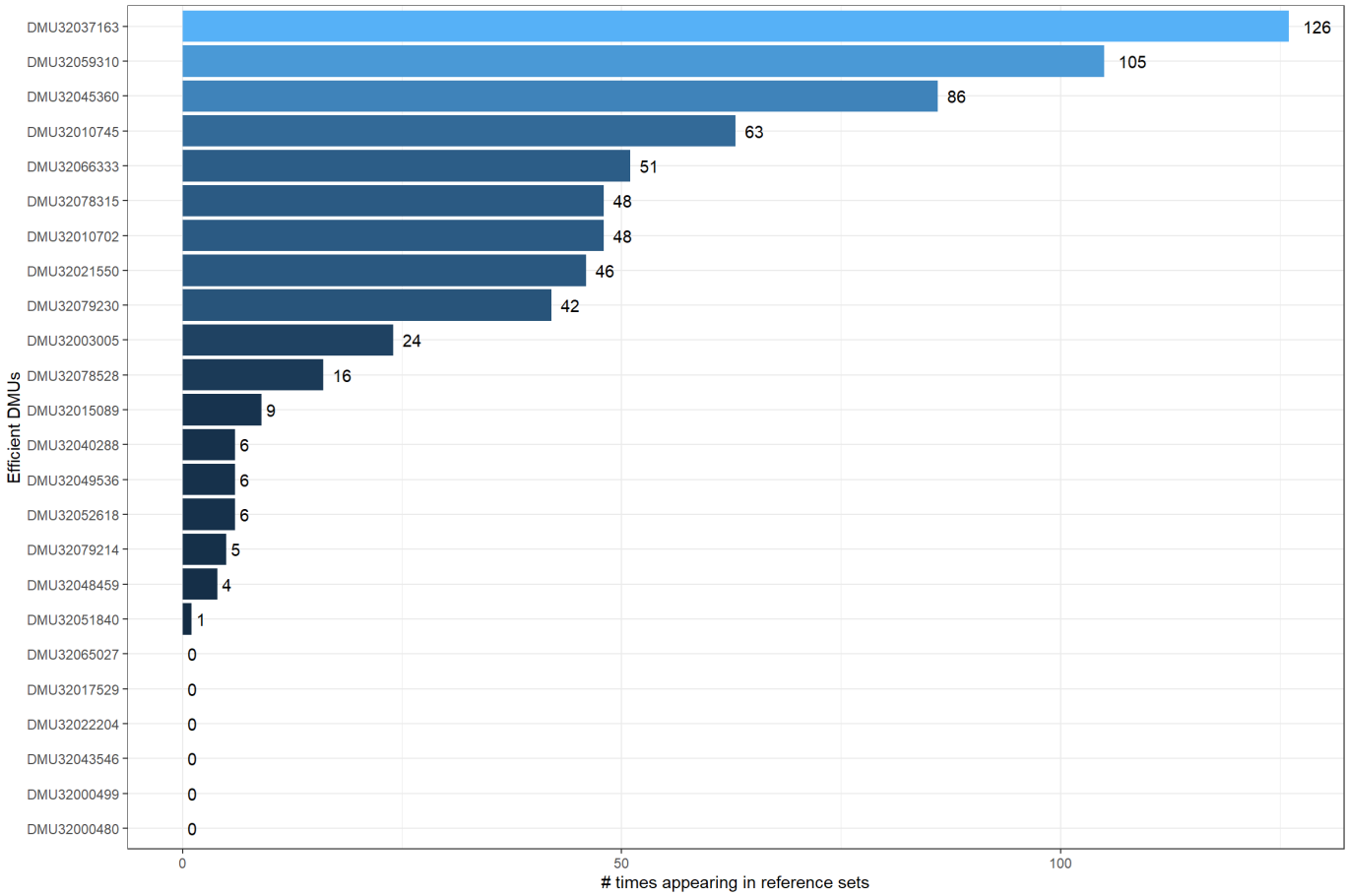
```
sd(eficiencia_2019)
```

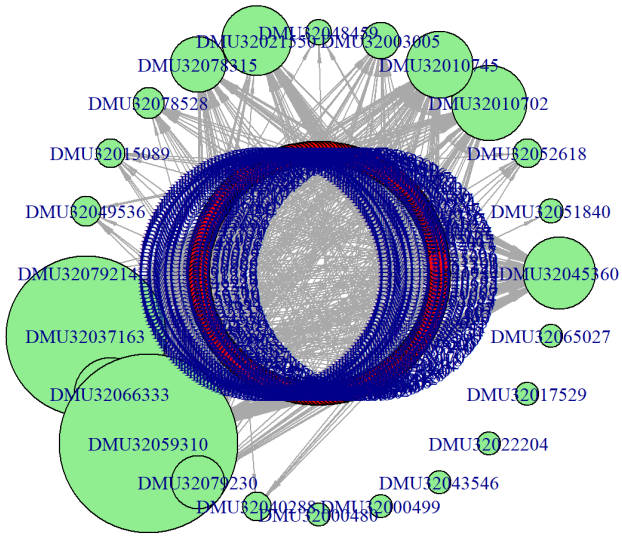
```
## [1] 0.08107331
```

```
plot(result_2019)
```

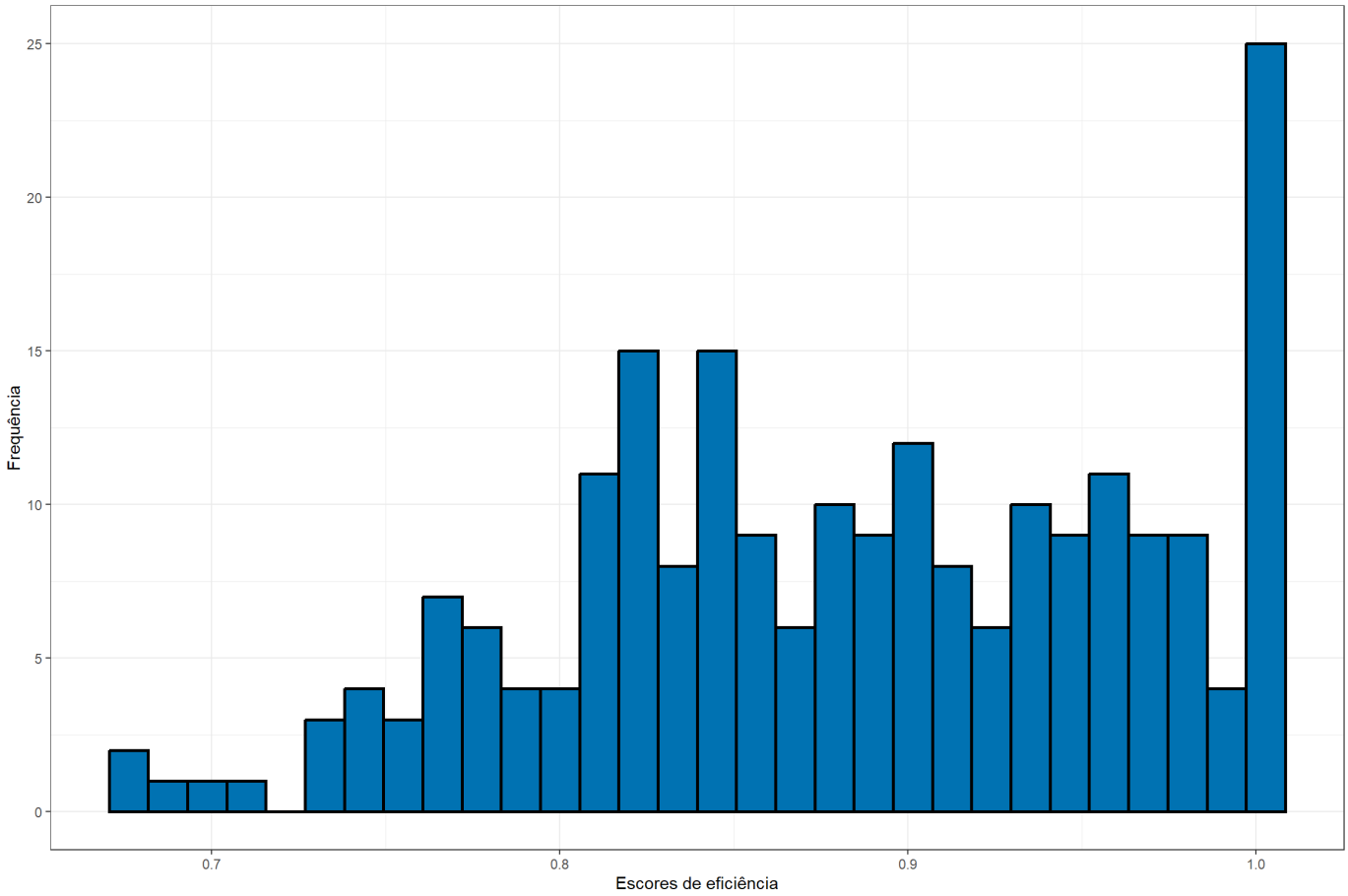

Efficient/Inefficient DMUs
Count
200
150
100
50
0
198
24
Efficient
Inefficient


Inefficient DMUs distribution
Count
30
20
10
0
1.0
1.1
1.2
1.3
1.4
1.5
Score


Efficient DMUs
DMU32037163 126
DMU32059310 105
DMU32045360 86
DMU32010745 63
DMU32066333 51
DMU32078315 48
DMU32010702 48
DMU32021550 46
DMU32079230 42
DMU32003005 24
DMU32078528 16
DMU32015089 9
DMU32040288 6
DMU32049536 6
DMU32052618 6
DMU32079214 5
DMU32048459 4
DMU32051840 1
DMU32065027 0
DMU32017529 0
DMU32022204 0
DMU32043546 0
DMU32000499 0
DMU32000480 0
0
50
100
times appearing in reference sets




```
dadosw=data.frame(cbind(eff_2019, eficiencia_2019))

ggplot(data = dadosw, aes(x = eficiencia_2019)) +
  geom_histogram(fill='#0072B2', color ='black', lwd=1)+
  ylab("Frequência") +
  xlab("Escores de eficiência") +
  theme_bw()
```



Análises DEA - 2017

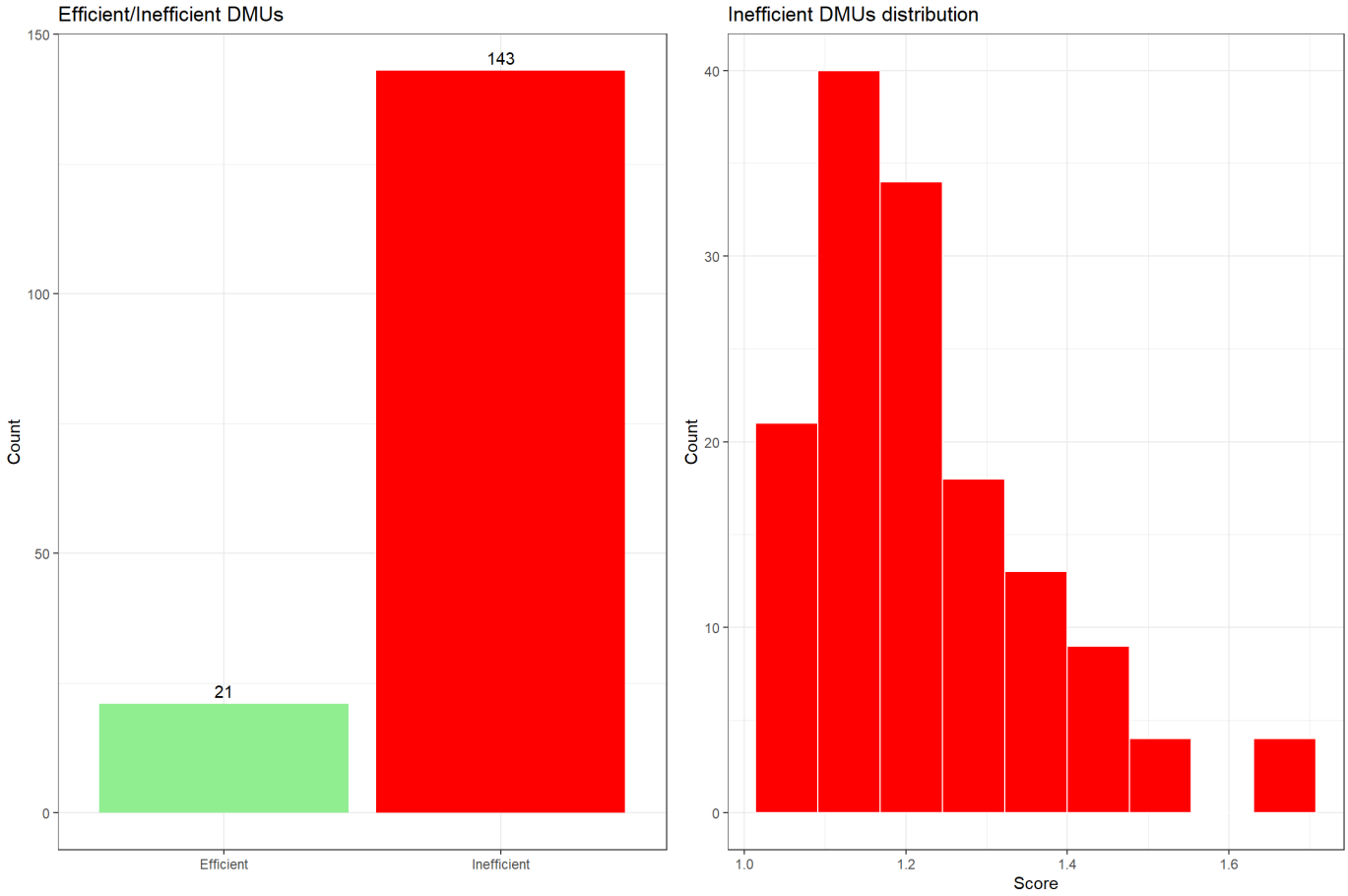
```
y_2017= read_data(datadea = dados_2017,
                  ni = 4,
                  no = 1,
                  dmus = 1,
                  inputs = 3:6,
                  outputs = 2,
                  nc_inputs = NULL,
                  nc_outputs = NULL,
                  nd_inputs = NULL,
                  nd_outputs = NULL,
                  ud_inputs = NULL,
                  ud_outputs = NULL)


result_2017<- model_basic(y_2017,
                          dmu_eval = NULL,
                          dmu_ref = NULL,
                          orientation = "oo",
                          rts =  "vrs")


eff_2017<-efficiencies(result_2017)
eficiencia_2017=1/eff_2017
summary(eficiencia_2017)
```

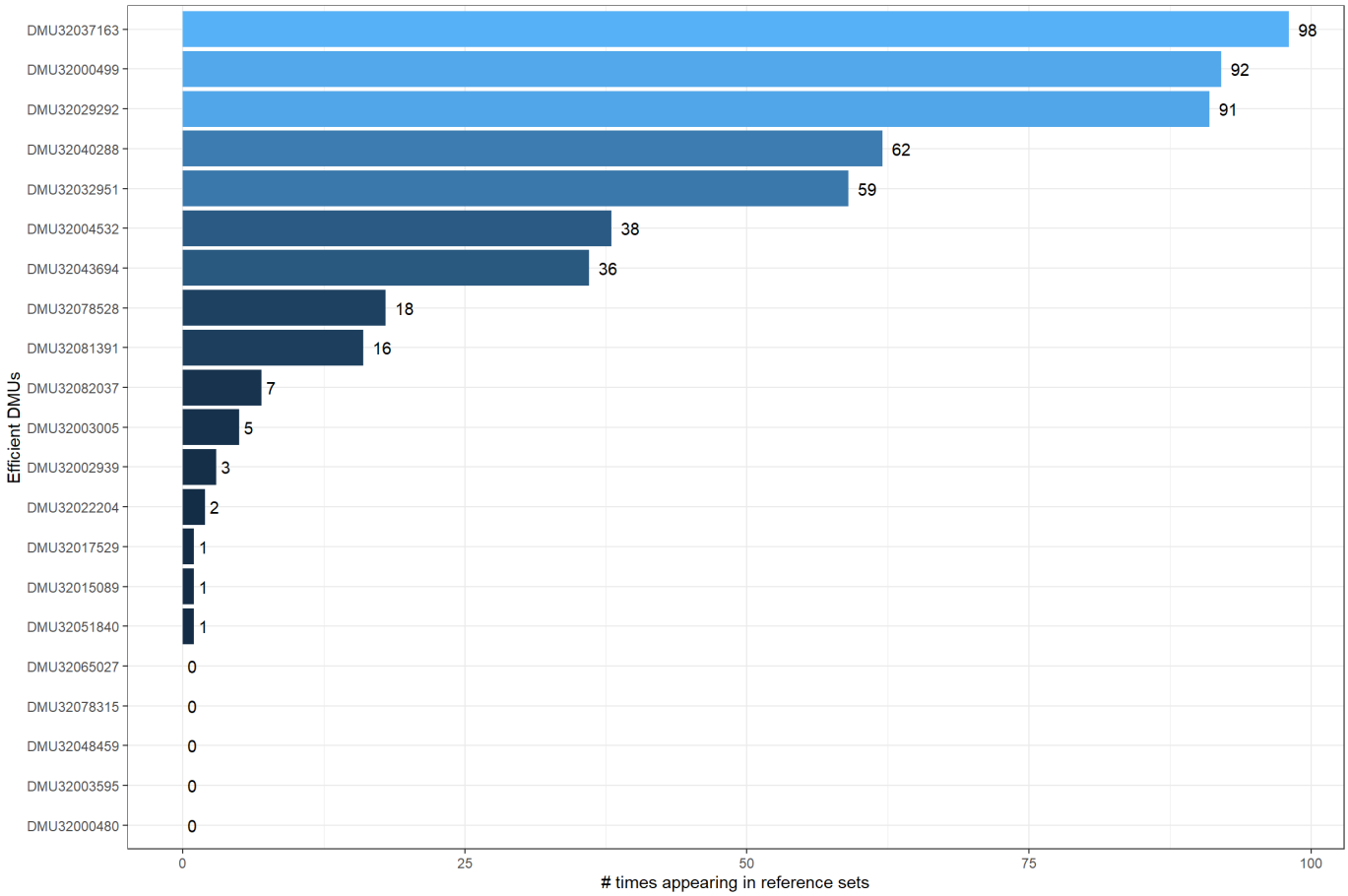
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.5855  0.7807  0.8559  0.8499  0.9179  1.0000
```

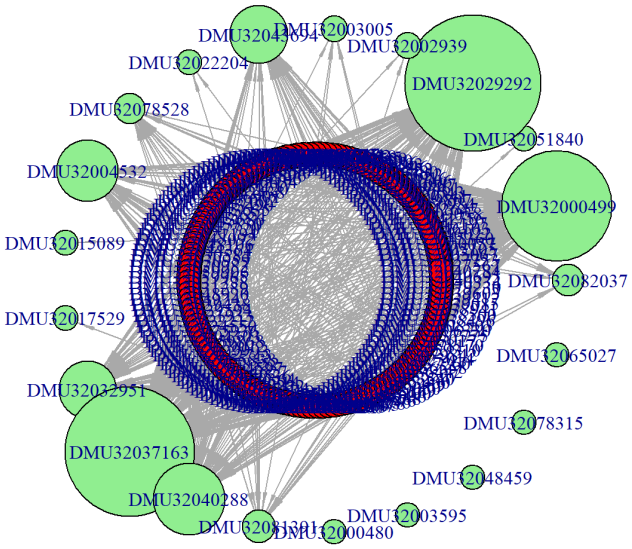
```
sd(eficiencia_2017)
```

```
## [1] 0.09968064
```

```
plot(result_2017)
```


Efficient/Inefficient DMUs
Count
150
100
50
0
143
21
Efficient
Inefficient
Inefficient DMUs distribution
Count
40
30
20
10
0
1.0
1.2
1.4
1.6
Score


Efficient DMUs
DMU32037163 98
DMU32000499 92
DMU32029292 91
DMU32040288 62
DMU32032951 59
DMU32004532 38
DMU32043694 36
DMU32078528 18
DMU32081391 16
DMU32082037 7
DMU32003005 5
DMU32002939 3
DMU32022204 2
DMU32017529 1
DMU32015089 1
DMU32051840 1
DMU32065027 0
DMU32078315 0
DMU32048459 0
DMU32003595 0
DMU32000480 0
0
25
50
75
100
times appearing in reference sets



Índice de Malmquist

```
dadosx=dados[, c(3, 6:11)]
dadosx2=na.omit(dadosx)

x0 <- as.matrix(dadosx2[,4:7])
y0 <- as.matrix(dadosx2[,2])
x1 <- as.matrix(dadosx2[,4:7])
y1 <- as.matrix(dadosx2[,3])

m <- malmq(x0,y0,,x1,y1,,RTS="vrs")
```

```
print(m$mq) #Índice de Malmquist para produtividade
```

```
##   [1] 1.0000000 1.0681792 0.8799105 0.9723010 1.0207987 1.0003923 1.0019655
##   [8] 0.9357217 1.1921733 1.0000000 1.0189195 1.1046498 1.0000000 1.0357976
##  [15] 0.9910044 1.0246780 1.1527476 1.0391825 1.0000000 1.0122263 1.0831541
##  [22] 0.9975715 1.0005517 1.0000661 0.9949457 1.1061864 0.9963557 1.0857250
##  [29] 0.9675133 0.9772169 0.9953974 1.0000000 1.0111204 1.2051375 1.0475864
##  [36] 0.9838265 1.1330085 1.0000000 1.0048742 1.0861741 1.0117447 1.0000000
##  [43] 1.0326309 1.0281692 1.1014281 1.0029802 1.0000000 1.0208457 1.0000000
##  [50] 1.1206819 1.0354104 1.0000000 1.1275563 1.0035565 0.9285187 1.4017778
##  [57] 0.9950861 1.0722647 1.0030714 0.9828061 1.1557004 1.0000000 1.0517649
##  [64] 1.0004479 1.0885287 1.0053249 0.8696097 1.0262266 1.0636115 1.0000000
##  [71] 1.0759288 0.9870307 1.1675635 1.1300840 1.0061779 0.9957487 1.1283612
##  [78] 1.0000000 1.1866914 1.0991993 1.0559794 1.0000000 1.0034627 1.0586603
##  [85] 1.0134620 1.0008596 1.0565815 1.0160480 1.0002495 0.9377652 1.0703549
##  [92] 1.0837643 0.9779519 0.9545722 1.0515471 1.0223960 1.0754351 1.0000000
##  [99] 1.0000570 1.0146137 1.0192803 1.0137558 1.0403252       Inf 1.0850070
## [106] 1.0153386 1.0016375 1.0070510 1.1243977 0.9901858 1.0041195 0.9953536
## [113] 1.0092235 1.0490647 0.9968244 1.0221649 1.0036861 0.9986583 1.0051816
## [120] 1.0851202 0.9350471 0.9721012 1.1827792 1.0469764 1.0975481 0.9832872
## [127] 1.0264299 1.1958289 1.0000000 1.0000000 1.0175511 1.0053675 1.0801872
## [134] 1.0134863 1.0000000 1.0000000 0.9776197 1.0085702 1.0440696 1.0089003
## [141] 1.0000000 1.2449160 1.0000000 1.0387757 1.0308466       Inf 1.0344936
## [148] 1.1042744 0.9987708 1.0188685 1.0000000 0.9980166 1.0272421 1.0283256
## [155] 1.1184868 1.0240039 0.9332948 1.0270874 1.0213509 0.8641291 1.1032213
## [162] 0.9993170 1.1033807 0.8675636
```

```
summary(m$mq) #Índice de Malmquist para produtividade
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.8641  1.0000  1.0120     Inf  1.0599     Inf
```

```
print(m$tc) # Índice de mudança tecnológica
```

```
##   [1] 1.0000000 1.0248065 1.0198676 0.9700545 0.9841130 0.9996078 1.0019655
##   [8] 0.9357217 1.1644290 1.0000000 0.9995867 1.0678016 1.0707021 0.9648876
##  [15] 1.0095659 1.0110264 1.0050554 0.9937909 1.0000000 1.0030873 0.9762882
##  [22] 0.9975715 0.9994486 1.0000473 0.9949457 0.9966434 0.9963557 1.0259464
##  [29] 0.9910242 1.0073000 0.9943357 1.0000000 0.9906589 1.0719023 1.0137440
##  [36] 0.9968066 1.0481628 1.0000000 0.9997090 1.0083378 0.9960165 0.9788303
##  [43] 1.0145665 1.0427872 1.0442298 0.9995145 1.0000000 1.0187135 0.9870821
##  [50] 1.0332302 0.9823340 1.0666411 1.0290619 0.9964561 1.0513083 1.4017778
##  [57] 0.9950861 0.9888363 0.9968200 0.9980117 1.0766152 1.0000000 1.0361483
##  [64] 0.9987394 1.0296274 1.0009056 0.9639037 1.0419765 1.0348248 0.9953102
##  [71] 1.0247816 1.0066916 1.0665539 1.1300840 0.9917435 1.0006555 1.0122925
##  [78] 1.0000000 1.0543463 0.9816861 1.0032502 1.0682002 0.9965493 0.9915109
##  [85] 0.9870956 1.0008596 0.9833565 1.0160480 0.9997505 0.9848093 0.9908958
##  [92] 1.0837643 0.9835202 0.9655224 1.0246557 1.0394372 1.0254072 1.0024172
##  [99] 0.9999430 0.9940193 0.9966624 0.9935029 1.0403252       Inf 0.9736338
## [106] 0.9961506 0.9983651 0.9929983 1.0231857 0.9865991 0.9959209 0.9956071
## [113] 0.9987915 0.9665177 0.9968244 0.9918390 1.0012012 1.0025762 0.9964464
## [120] 1.0657837 1.0295267 1.0175172 1.1221154 1.1533340 1.1027515 0.9970379
## [127] 1.1522813 1.1171735 1.0000000 1.0000000 1.0175511 0.9959986 0.9712966
## [134] 0.9994230 1.0000000 1.0000000 0.9949651 0.9859437 1.0013350 0.9964215
## [141] 1.0000000 1.2449160 1.0000000 0.9752866 1.0221066       Inf 1.0084445
## [148] 1.0482401 0.9980514 1.0188685 1.0000000 0.9980166 1.0433711 1.0071843
## [155] 0.9832085 1.0069667 1.0124473 1.0082981 0.9873868 0.8641291 1.0045115
## [162] 0.9993170 0.9922789 0.9965805
```

```
summary(m$tc) #Índice de mudança tecnológica
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.8641  0.9955  1.0000     Inf  1.0236     Inf
```

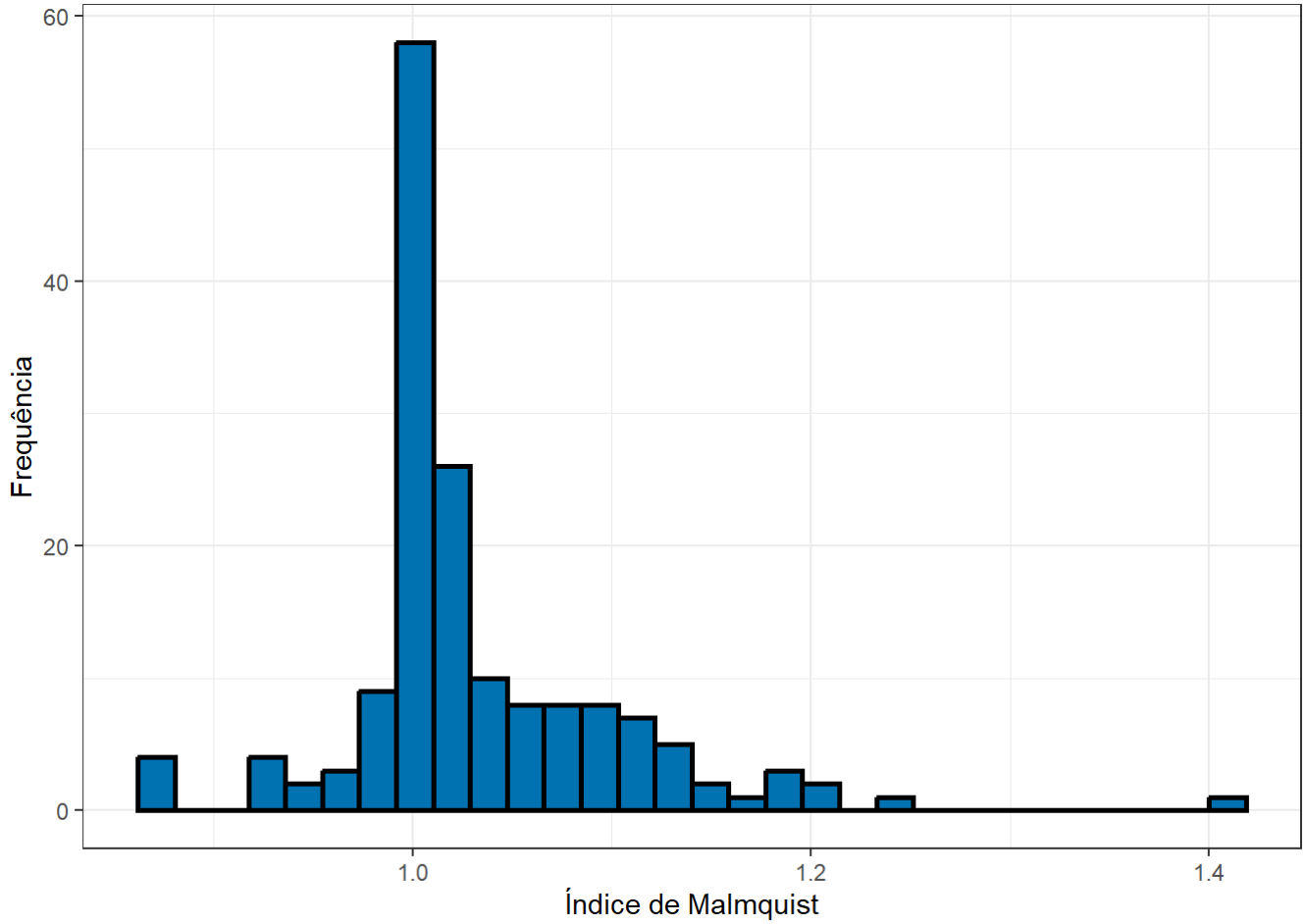
```
print(m$ec) #Índice de mudança de eficiência
```

```
##   [1] 1.0000000 1.0423228 0.8627693 1.0023158 1.0372779 1.0007848 1.0000000
##   [8] 1.0000000 1.0238266 1.0000000 1.0193408 1.0345085 0.9339666 1.0734904
##  [15] 0.9816144 1.0135027 1.1469493 1.0456751 1.0000000 1.0091109 1.1094614
##  [22] 1.0000000 1.0011037 1.0000188 1.0000000 1.1099119 1.0000000 1.0582668
##  [29] 0.9762762 0.9701349 1.0010678 1.0000000 1.0206544 1.1242978 1.0333836
##  [36] 0.9869784 1.0809471 1.0000000 1.0051667 1.0771927 1.0157911 1.0216276
##  [43] 1.0178051 0.9859818 1.0547757 1.0034674 1.0000000 1.0020931 1.0130869
##  [50] 1.0846391 1.0540309 0.9375225 1.0957129 1.0071257 0.8832031 1.0000000
##  [57] 1.0000000 1.0843704 1.0062713 0.9847641 1.0734572 1.0000000 1.0150718
##  [64] 1.0017107 1.0572064 1.0044153 0.9021749 0.9848845 1.0278179 1.0047119
##  [71] 1.0499103 0.9804698 1.0947065 1.0000000 1.0145545 0.9950964 1.1146593
##  [78] 1.0000000 1.1255233 1.1197055 1.0525584 0.9361541 1.0069373 1.0677243
##  [85] 1.0267111 1.0000000 1.0744643 1.0000000 1.0004992 0.9522302 1.0801892
##  [92] 1.0000000 0.9943384 0.9886588 1.0262444 0.9836054 1.0487884 0.9975886
##  [99] 1.0001139 1.0207184 1.0226937 1.0203853 1.0000000 1.0604754 1.1143893
## [106] 1.0192621 1.0032778 1.0141518 1.0989185 1.0036353 1.0082322 0.9997454
## [113] 1.0104446 1.0854066 1.0000000 1.0305755 1.0024819 0.9960922 1.0087664
## [120] 1.0181431 0.9082300 0.9553659 1.0540620 0.9077825 0.9952814 0.9862085
## [127] 0.8907806 1.0704057 1.0000000 1.0000000 1.0000000 1.0094065 1.1121085
## [134] 1.0140715 1.0000000 1.0000000 0.9825669 1.0229491 1.0426777 1.0125237
## [141] 1.0000000 1.0000000 1.0000000 1.0650979 1.0085510 1.0155955 1.0258309
## [148] 1.0534555 1.0007207 1.0000000 1.0000000 1.0000000 0.9845414 1.0209905
## [155] 1.1375887 1.0169194 0.9218207 1.0186347 1.0343979 1.0000000 1.0982665
## [162] 1.0000000 1.1119663 0.8705404
```

```
summary(m$ec) #Índice de mudança de eficiência
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.8628  1.0000  1.0049  1.0166  1.0352  1.1469
```

```
dadosw2=data.frame(cbind(m$mq, m$tc, m$ec))

ggplot(data = dadosw2, aes(x = X1)) +
  geom_histogram(fill='#0072B2', color ='black', lwd=1)+
  ylab("Frequência") +
  xlab("Índice de Malmquist") +
  theme_bw()
```



Parceiros de excelência

```
references(result_2019)
```

```
## $DMU32025920
## DMU32078315 DMU32037163 DMU32059310
##     0.14745     0.25556     0.59698
##
## $DMU32027206
## DMU32045360 DMU32010745 DMU32078528 DMU32037163 DMU32059310
##     0.15578     0.15055     0.04901     0.43545     0.20920
##
## $DMU32027567
## DMU32010745 DMU32078315 DMU32079214 DMU32059310
##     0.09863     0.45265     0.10330     0.34542
##
## $DMU32027753
## DMU32048459 DMU32059310
##     0.26378     0.73622
##
## $DMU32082037
## DMU32052618 DMU32015089 DMU32037163 DMU32059310
##     0.88982     0.00082     0.02513     0.08423
##
## $DMU32005067
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.09983     0.30329     0.54448     0.05240
##
## $DMU32005105
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.09111     0.19700     0.26295     0.44895
##
## $DMU32000057
## DMU32010745 DMU32078315 DMU32037163
##     0.60034     0.07003     0.32963
##
## $DMU32045379
## DMU32045360 DMU32010702
##     0.17252     0.82748
##
## $DMU32046022
## DMU32045360 DMU32010745 DMU32078315 DMU32079214 DMU32059310
##     0.23535     0.12768     0.36995     0.23239     0.03463
##
## $DMU32046103
## DMU32045360 DMU32078315 DMU32059310
##     0.44006     0.02680     0.53315
##
## $DMU32046197
## DMU32045360 DMU32010702 DMU32059310
##     0.52529     0.35684     0.11787
##
## $DMU32041756
## DMU32052618 DMU32048459 DMU32078528 DMU32059310
##     0.18663     0.02245     0.08048     0.71044
##
## $DMU32009038
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.11399     0.53362     0.31780     0.03460
```

```
##
## $DMU32042647
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.27072     0.68958     0.00881     0.03089
##
## $DMU32082231
## DMU32010702 DMU32021550 DMU32037163
##     0.71476     0.13710     0.14814
##
## $DMU32050984
## DMU32045360 DMU32010702 DMU32059310
##     0.32841     0.18895     0.48264
##
## $DMU32019807
## DMU32010702 DMU32037163
##     0.40987     0.59013
##
## $DMU32020180
## DMU32021550 DMU32037163 DMU32066333
##     0.33024     0.52614     0.14362
##
## $DMU32020333
## DMU32003005 DMU32078528 DMU32037163 DMU32066333
##     0.12977     0.09172     0.28116     0.49735
##
## $DMU32020341
## DMU32021550 DMU32037163 DMU32066333
##     0.16134     0.62686     0.21180
##
## $DMU32020643
## DMU32021550 DMU32037163 DMU32066333 DMU32079230
##     0.01710     0.45669     0.42954     0.09667
##
## $DMU32009461
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.16169     0.12229     0.43286     0.28316
##
## $DMU32080867
## DMU32010702 DMU32037163
##     0.42822     0.57178
##
## $DMU32000979
## DMU32003005 DMU32078528 DMU32015089 DMU32037163
##     0.12993     0.40890     0.03797     0.42320
##
## $DMU32000987
## DMU32078315 DMU32037163 DMU32059310
##     0.07307     0.53517     0.39176
##
## $DMU32001606
## DMU32045360 DMU32010745 DMU32078315 DMU32059310
##     0.10192     0.32516     0.43224     0.14069
##
## $DMU32001916
## DMU32010745 DMU32078315 DMU32037163
##     0.68432     0.06121     0.25447
```

```
##
## $DMU32005601
## DMU32078315 DMU32037163 DMU32059310
##     0.17509     0.81376     0.01115
##
## $DMU32005652
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.17025     0.08780     0.70526     0.03669
##
## $DMU32005954
## DMU32010745 DMU32015089 DMU32037163 DMU32059310
##     0.22603     0.42428     0.23485     0.11484
##
## $DMU32026480
## DMU32078315 DMU32037163 DMU32059310
##     0.37871     0.19839     0.42290
##
## $DMU32026536
## DMU32078315 DMU32059310
##     0.24706     0.75294
##
## $DMU32026552
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.13627     0.54088     0.03250     0.29035
##
## $DMU32026846
## DMU32010745 DMU32003005 DMU32037163
##     0.09004     0.47671     0.43325
##
## $DMU32052103
## DMU32010702 DMU32037163 DMU32059310
##     0.08301     0.45978     0.45721
##
## $DMU32052189
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.11306     0.01024     0.39168     0.48502
##
## $DMU32052316
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.13475     0.23316     0.17817     0.45392
##
## $DMU32052499
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.19143     0.61655     0.08588     0.10615
##
## $DMU32052529
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.13921     0.10760     0.47386     0.27933
##
## $DMU32052545
## DMU32045360 DMU32021550 DMU32037163 DMU32079230
##     0.08647     0.13820     0.29463     0.48069
##
## $DMU32052693
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.00094     0.41709     0.05294     0.52903
```

```
##
## $DMU32052731
## DMU32045360 DMU32010702 DMU32021550 DMU32037163
##     0.18399     0.72902     0.03055     0.05644
##
## $DMU32052847
## DMU32045360 DMU32010702 DMU32021550 DMU32037163
##     0.20808     0.30902     0.40217     0.08073
##
## $DMU32033745
## DMU32045360 DMU32010745 DMU32037163 DMU32079230
##     0.15717     0.04171     0.73347     0.06765
##
## $DMU32033796
## DMU32021550 DMU32037163 DMU32066333
##     0.39754     0.15235     0.45010
##
## $DMU32033940
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.06188     0.01136     0.37635     0.30398     0.24642
##
## $DMU32034016
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.01209     0.22887     0.33195     0.21869     0.20840
##
## $DMU32034652
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.14659     0.27618     0.47259     0.10463
##
## $DMU32034857
## DMU32021550 DMU32037163 DMU32066333
##     0.34497     0.03066     0.62437
##
## $DMU32034954
## DMU32045360 DMU32021550 DMU32037163 DMU32066333 DMU32079230
##     0.01741     0.02780     0.44132     0.17306     0.34041
##
## $DMU32035012
## DMU32010702 DMU32021550 DMU32037163
##     0.22223     0.14451     0.63326
##
## $DMU32035080
## DMU32021550 DMU32066333 DMU32079230
##     0.56569     0.23689     0.19741
##
## $DMU32073445
## DMU32021550 DMU32037163 DMU32066333 DMU32079230
##     0.28159     0.20048     0.33417     0.18376
##
## $DMU32076410
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.04886     0.08279     0.26217     0.09922     0.50695
##
## $DMU32054092
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.33805     0.38105     0.09296     0.18794
```

```
##
## $DMU32054343
## DMU32078315 DMU32059310
##     0.21176     0.78824
##
## $DMU32010699
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.29492     0.16813     0.15859     0.37835
##
## $DMU32010710
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.18420     0.22198     0.06831     0.52552
##
## $DMU32010729
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.06931     0.25518     0.12398     0.55153
##
## $DMU32010753
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.07402     0.23704     0.09846     0.59048
##
## $DMU32016158
## DMU32045360 DMU32010745 DMU32037163 DMU32066333 DMU32079230
##     0.01715     0.26012     0.21665     0.23336     0.27272
##
## $DMU32096801
## DMU32010745 DMU32003005 DMU32037163 DMU32079230
##     0.38390     0.36633     0.23236     0.01740
##
## $DMU32028059
## DMU32052618 DMU32078528 DMU32015089 DMU32037163 DMU32059310
##     0.33457     0.07016     0.08862     0.23495     0.27170
##
## $DMU32046383
## DMU32045360 DMU32078315 DMU32059310
##     0.17827     0.26148     0.56025
##
## $DMU32028580
## DMU32010702 DMU32049536 DMU32059310
##     0.47982     0.35268     0.16750
##
## $DMU32028806
## DMU32078315 DMU32037163 DMU32059310
##     0.02409     0.17456     0.80136
##
## $DMU32029292
## DMU32010702 DMU32049536 DMU32059310
##     0.04291     0.74959     0.20750
##
## $DMU32029306
## DMU32078315 DMU32059310
##     0.02353     0.97647
##
## $DMU32046634
## DMU32078315 DMU32059310
##     0.17647     0.82353
```

```
##
## $DMU32002939
## DMU32003005 DMU32037163
##     0.40797     0.59203
##
## $DMU32003595
## DMU32010745 DMU32003005 DMU32079230 DMU32040288
##     0.69635     0.18370     0.00410     0.11584
##
## $DMU32020910
## DMU32045360 DMU32010702 DMU32021550
##     0.23024     0.38578     0.38398
##
## $DMU32011717
## DMU32010702 DMU32037163 DMU32059310
##     0.07150     0.01159     0.91691
##
## $DMU32012420
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.07486     0.04692     0.10052     0.77769
##
## $DMU32012438
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.04554     0.17144     0.16459     0.61844
##
## $DMU32046901
## DMU32045360 DMU32078528 DMU32059310
##     0.40336     0.13389     0.46275
##
## $DMU32047002
## DMU32045360 DMU32078315 DMU32059310
##     0.21390     0.09261     0.69349
##
## $DMU32043490
## DMU32045360 DMU32078528 DMU32037163 DMU32059310
##     0.21232     0.15205     0.20534     0.43029
##
## $DMU32043635
## DMU32045360 DMU32010745 DMU32037163 DMU32079230
##     0.06690     0.07376     0.28229     0.57705
##
## $DMU32043651
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.23600     0.30966     0.23631     0.21803
##
## $DMU32043686
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.40999     0.14641     0.31010     0.13350
##
## $DMU32043694
## DMU32021550 DMU32066333 DMU32079230
##     0.10277     0.69423     0.20300
##
## $DMU32043830
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.17412     0.40324     0.17369     0.24895
```

```
##
## $DMU32047720
## DMU32045360 DMU32010702 DMU32059310
##     0.38382     0.35500     0.26119
##
## $DMU32021194
## DMU32045360 DMU32021550 DMU32037163 DMU32066333 DMU32079230
##     0.01758     0.49026     0.35435     0.02760     0.11021
##
## $DMU32048092
## DMU32048459 DMU32015089 DMU32059310
##     0.28988     0.29686     0.41327
##
## $DMU32048106
## DMU32010745 DMU32079214 DMU32059310
##     0.08475     0.32817     0.58708
##
## $DMU32044364
## DMU32045360 DMU32010702 DMU32059310
##     0.19045     0.75869     0.05086
##
## $DMU32030584
## DMU32078315 DMU32037163 DMU32059310
##     0.32450     0.26368     0.41182
##
## $DMU32030959
## DMU32010745 DMU32078315 DMU32037163
##     0.78953     0.12141     0.08906
##
## $DMU32030983
## DMU32078315 DMU32059310
##     0.29412     0.70588
##
## $DMU32059906
## DMU32045360 DMU32010702 DMU32059310
##     0.39505     0.55062     0.05433
##
## $DMU32059965
## DMU32045360 DMU32010702 DMU32021550
##     0.18828     0.22452     0.58720
##
## $DMU32060696
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.34407     0.13490     0.19870     0.32233
##
## $DMU32031238
## DMU32010745 DMU32003005 DMU32037163
##     0.16704     0.14896     0.68400
##
## $DMU32031289
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.03252     0.41952     0.15146     0.39650
##
## $DMU32048920
## DMU32045360 DMU32010702
##     0.02236     0.97764
```

```
##
## $DMU32049242
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.00210     0.26305     0.25285     0.48199
##
## $DMU32078587
## DMU32045360 DMU32078315 DMU32059310
##     0.12188     0.01610     0.86202
##
## $DMU32016700
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.04717     0.57003     0.25747     0.12533
##
## $DMU32055510
## DMU32045360 DMU32078528 DMU32037163 DMU32059310
##     0.21096     0.26849     0.07031     0.45023
##
## $DMU32029438
## DMU32049536 DMU32059310
##     0.05882     0.94118
##
## $DMU32029594
## DMU32078315 DMU32059310
##     0.47059     0.52941
##
## $DMU32021933
## DMU32021550 DMU32037163 DMU32066333
##     0.29192     0.42737     0.28071
##
## $DMU32022158
## DMU32021550 DMU32037163 DMU32066333 DMU32079230
##     0.17442     0.29169     0.25295     0.28094
##
## $DMU32022212
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.01296     0.35377     0.41759     0.21568
##
## $DMU32024550
## DMU32078315 DMU32037163 DMU32059310
##     0.17761     0.01614     0.80625
##
## $DMU32075936
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.05970     0.07907     0.47386     0.13148     0.25589
##
## $DMU32004303
## DMU32010745 DMU32078315 DMU32037163
##     0.40165     0.12600     0.47235
##
## $DMU32004532
## DMU32010745 DMU32003005 DMU32037163
##     0.58734     0.29124     0.12142
##
## $DMU32059850
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.50011     0.08294     0.03751     0.37943
```

```
##
## $DMU32059868
## DMU32045360 DMU32010702 DMU32059310
##     0.10140     0.58715     0.31145
##
## $DMU32029012
## DMU32049536 DMU32059310
##     0.58824     0.41176
##
## $DMU32029993
## DMU32045360 DMU32010702 DMU32059310
##     0.09132     0.61001     0.29867
##
## $DMU32012713
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.05754     0.11176     0.02818     0.80251
##
## $DMU32055838
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.22410     0.10091     0.18066     0.49433
##
## $DMU32078552
## DMU32045360 DMU32078315 DMU32059310
##     0.28405     0.50831     0.20764
##
## $DMU32014597
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.32768     0.25918     0.01939     0.24034     0.15342
##
## $DMU32014627
## DMU32021550 DMU32037163 DMU32066333
##     0.37662     0.19270     0.43068
##
## $DMU32050364
## DMU32078315 DMU32037163 DMU32059310
##     0.26798     0.46303     0.26899
##
## $DMU32079222
## DMU32045360 DMU32051840 DMU32010745
##     0.30982     0.42275     0.26742
##
## $DMU32057474
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.10106     0.01916     0.37954     0.50024
##
## $DMU32057504
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.07521     0.04052     0.51405     0.37023
##
## $DMU32006349
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.09286     0.03127     0.44739     0.42848
##
## $DMU32007175
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.05605     0.10575     0.51020     0.32799
```

```
##
## $DMU32013272
## DMU32052618 DMU32015089 DMU32037163 DMU32059310
##     0.35960     0.56597     0.06034     0.01410
##
## $DMU32013728
## DMU32078315 DMU32037163 DMU32059310
##     0.34383     0.20430     0.45187
##
## $DMU32013906
## DMU32010745 DMU32078315 DMU32079214 DMU32059310
##     0.09948     0.48036     0.18419     0.23598
##
## $DMU32017243
## DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.03638     0.53732     0.10975     0.31655
##
## $DMU32017391
## DMU32010745 DMU32078315 DMU32037163
##     0.39593     0.01022     0.59385
##
## $DMU32015550
## DMU32010745 DMU32003005 DMU32037163 DMU32079230
##     0.37716     0.02059     0.50564     0.09661
##
## $DMU32015631
## DMU32010745 DMU32003005 DMU32037163
##     0.12341     0.20784     0.66875
##
## $DMU32015070
## DMU32003005 DMU32078528 DMU32015089 DMU32037163
##     0.15766     0.43500     0.07477     0.33256
##
## $DMU32025149
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.14099     0.07620     0.34191     0.44090
##
## $DMU32044950
## DMU32045360 DMU32010702 DMU32059310
##     0.51082     0.24865     0.24053
##
## $DMU32079389
## DMU32045360 DMU32010702 DMU32059310
##     0.09725     0.53284     0.36991
##
## $DMU32031661
## DMU32010745 DMU32015089 DMU32037163 DMU32059310
##     0.08858     0.14533     0.06048     0.70562
##
## $DMU32032200
## DMU32045360 DMU32010702 DMU32059310
##     0.08192     0.36476     0.55332
##
## $DMU32032269
## DMU32045360 DMU32010702 DMU32059310
##     0.01700     0.37287     0.61012
```

```
##
## $DMU32032277
## DMU32045360 DMU32010702 DMU32059310
##     0.14804     0.82400     0.02797
##
## $DMU32032633
## DMU32049536 DMU32059310
##      0.6425      0.3575
##
## $DMU32032951
## DMU32045360 DMU32078528 DMU32059310
##     0.46087     0.01348     0.52566
##
## $DMU32033478
## DMU32045360 DMU32010702 DMU32059310
##     0.48297     0.41963     0.09740
##
## $DMU32014236
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.10864     0.23432     0.34415     0.31289
##
## $DMU32007876
## DMU32010702 DMU32037163 DMU32059310
##     0.08789     0.27116     0.64095
##
## $DMU32082274
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.07616     0.21167     0.45067     0.26150
##
## $DMU32058268
## DMU32052618 DMU32048459 DMU32078528 DMU32059310
##     0.03871     0.37965     0.25161     0.33002
##
## $DMU32018096
## DMU32045360 DMU32010745 DMU32037163 DMU32079230
##     0.06032     0.21007     0.39635     0.33327
##
## $DMU32018100
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.02496     0.13005     0.61705     0.22793
##
## $DMU32018169
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.10347     0.00267     0.32062     0.25063     0.32262
##
## $DMU32019050
## DMU32010745 DMU32003005 DMU32037163
##     0.42737     0.22575     0.34688
##
## $DMU32019459
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.00576     0.59116     0.25932     0.14376
##
## $DMU32078722
## DMU32045360 DMU32078528 DMU32037163 DMU32066333
##      0.2196      0.1894      0.5294      0.0616
```

```
##
## $DMU32033400
## DMU32078315 DMU32059310
##         0.2         0.8
##
## $DMU32033540
## DMU32078315 DMU32059310
##     0.08235     0.91765
##
## $DMU32035500
## DMU32045360 DMU32078528 DMU32066333 DMU32079230 DMU32040288
##     0.10676     0.18453     0.40882     0.11134     0.18855
##
## $DMU32035519
## DMU32021550 DMU32066333 DMU32079230
##     0.08597     0.34988     0.56415
##
## $DMU32035527
## DMU32010702 DMU32021550 DMU32037163
##     0.09066     0.50038     0.40897
##
## $DMU32036116
## DMU32045360 DMU32078528 DMU32066333 DMU32040288
##     0.06823     0.30051     0.36459     0.26667
##
## $DMU32036205
## DMU32045360 DMU32010745 DMU32037163 DMU32066333 DMU32079230
##     0.03788     0.03896     0.41751     0.15570     0.34994
##
## $DMU32036442
## DMU32021550 DMU32066333 DMU32079230
##     0.27398     0.51045     0.21557
##
## $DMU32036523
## DMU32003005 DMU32037163 DMU32066333
##     0.36623     0.06236     0.57141
##
## $DMU32036558
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.03289     0.23162     0.11492     0.62058
##
## $DMU32037180
## DMU32021550 DMU32037163 DMU32066333 DMU32079230
##     0.22101     0.08733     0.35437     0.33729
##
## $DMU32037260
## DMU32003005 DMU32066333 DMU32040288
##     0.43264     0.24745     0.31991
##
## $DMU32074425
## DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.02315     0.39677     0.42254     0.15754
##
## $DMU32023014
## DMU32010745 DMU32078315 DMU32037163
##     0.44341     0.01191     0.54468
```

```
##
## $DMU32079842
## DMU32052618 DMU32015089 DMU32037163 DMU32059310
##     0.21969     0.44399     0.24040     0.09592
##
## $DMU32058918
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.41242     0.00621     0.08405     0.49733
##
## $DMU32078170
## DMU32045360 DMU32078315 DMU32079214 DMU32059310
##     0.04680     0.30939     0.11483     0.52898
##
## $DMU32030177
## DMU32010702 DMU32049536 DMU32059310
##     0.10938     0.05812     0.83250
##
## $DMU32037775
## DMU32045360 DMU32010745 DMU32037163 DMU32079230
##     0.02766     0.19879     0.63153     0.14201
##
## $DMU32006330
## DMU32045360 DMU32078315 DMU32059310
##     0.06230     0.34862     0.58908
##
## $DMU32007000
## DMU32010745 DMU32078315 DMU32037163 DMU32059310
##     0.04052     0.40206     0.20238     0.35504
##
## $DMU32008503
## DMU32045360 DMU32010745 DMU32037163 DMU32059310
##     0.18016     0.15680     0.10098     0.56206
##
## $DMU32038496
## DMU32045360 DMU32010702 DMU32037163 DMU32059310
##     0.31234     0.19096     0.45413     0.04257
##
## $DMU32038500
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.00417     0.54911     0.26124     0.18547
##
## $DMU32038534
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.26209     0.24867     0.31413     0.17510
##
## $DMU32038755
## DMU32010702 DMU32021550 DMU32037163
##     0.32597     0.34005     0.33398
##
## $DMU32038941
## DMU32021550 DMU32037163 DMU32066333
##     0.28111     0.07520     0.64368
##
## $DMU32039085
## DMU32010702 DMU32021550 DMU32037163
##     0.05858     0.68712     0.25430
```

```
##
## $DMU32039409
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.11611     0.36115     0.38946     0.13328
##
## $DMU32039417
## DMU32010702 DMU32021550 DMU32037163
##     0.57462     0.36499     0.06039
##
## $DMU32039603
## DMU32045360 DMU32021550 DMU32079230
##     0.34368     0.40123     0.25509
##
## $DMU32039867
## DMU32045360 DMU32021550 DMU32066333 DMU32079230
##     0.11047     0.34203     0.41594     0.13157
##
## $DMU32039883
## DMU32045360 DMU32078528 DMU32066333 DMU32040288
##     0.02308     0.00058     0.69476     0.28157
##
## $DMU32062648
## DMU32045360 DMU32010702 DMU32021550 DMU32037163
##     0.44655     0.11034     0.00615     0.43695
##
## $DMU32081634
## DMU32010702 DMU32021550 DMU32037163
##     0.22387     0.58190     0.19423
##
## $DMU32040067
## DMU32021550 DMU32037163 DMU32066333
##     0.32741     0.28835     0.38424
##
## $DMU32040300
## DMU32045360 DMU32010745 DMU32078528 DMU32066333 DMU32079230
##     0.01470     0.01123     0.13787     0.59951     0.23668
##
## $DMU32040334
## DMU32021550 DMU32037163 DMU32066333
##     0.65759     0.29630     0.04611
##
## $DMU32040695
## DMU32045360 DMU32040288
##     0.17391     0.82609
##
## $DMU32040733
## DMU32021550 DMU32037163 DMU32066333
##     0.13576     0.51918     0.34505
##
## $DMU32040784
## DMU32021550 DMU32037163 DMU32066333
##     0.36617     0.62988     0.00395
##
## $DMU32041640
## DMU32003005 DMU32037163
##     0.31923     0.68077
```

```
##
## $DMU32063199
## DMU32010745 DMU32003005 DMU32037163 DMU32066333 DMU32079230
##     0.27471     0.10014     0.21736     0.12592     0.28187
##
## $DMU32081391
## DMU32021550 DMU32037163 DMU32066333
##     0.67740     0.32115     0.00145
```