

Testing [mopsocd](#) (Multi-objective Particle Swarm Optimization with Crowding Distance) and mopsopsa algorithm v.1

Here are results of running mopsocd and mopsopsa_v1 on testing functions.

Load algorithms, test functions and utilities:

```
source('../mopsocd.R')
source('../mopsocds.R')
source('../moea.test.dtlz2.R')
source('../mopsopsa_v1.R')
```

Set number of points to be generated for True Pareto Front:

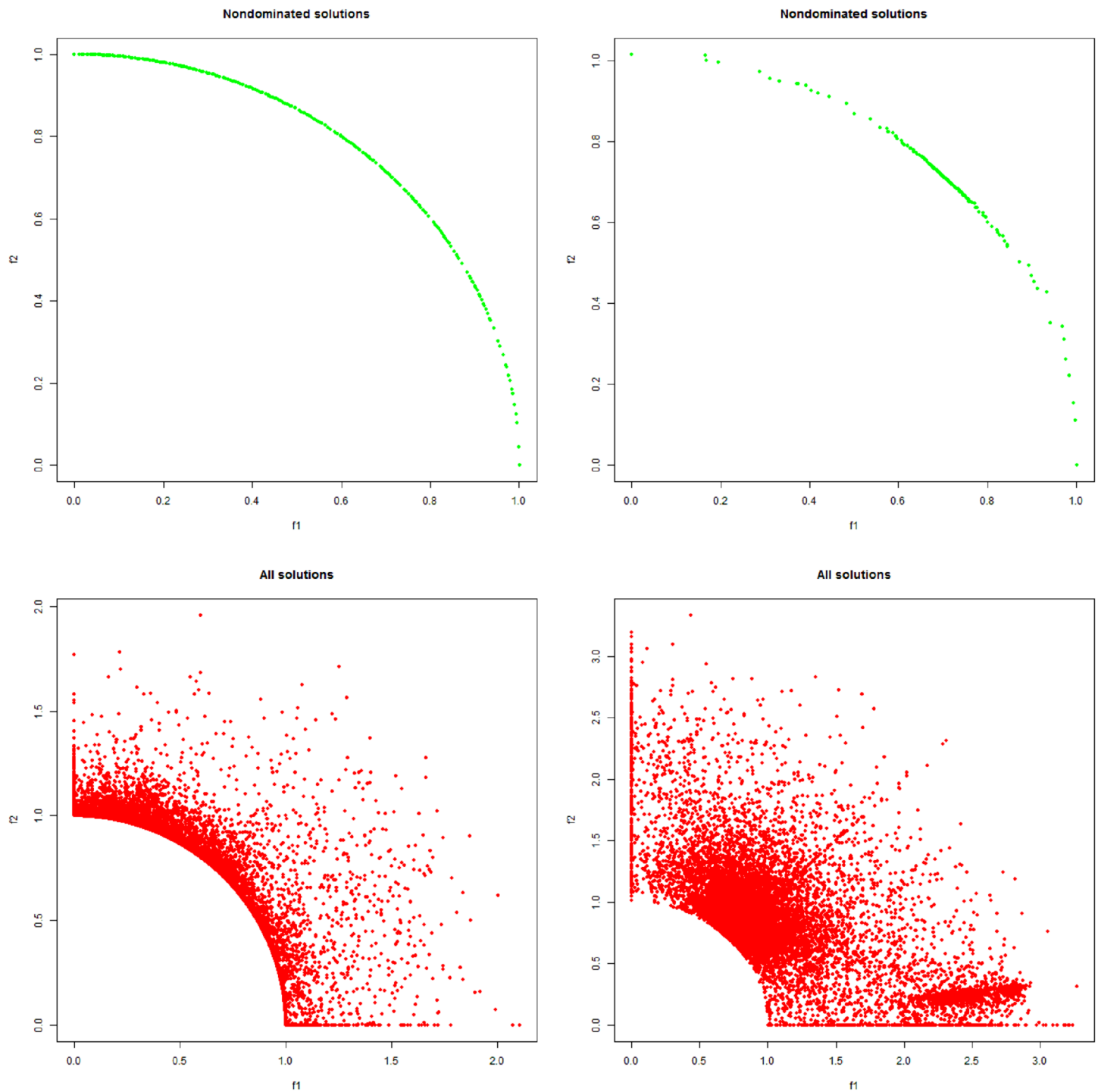
```
pfpoints <- 10000
```

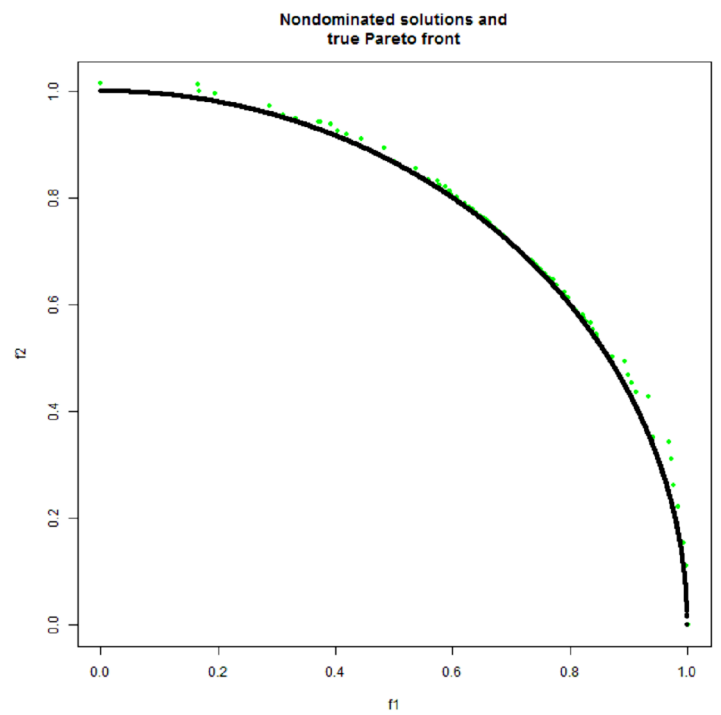
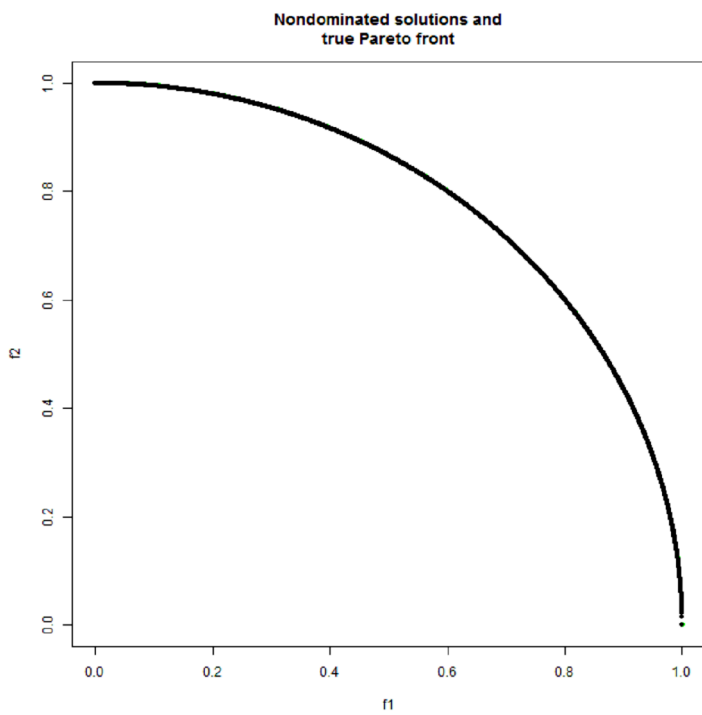
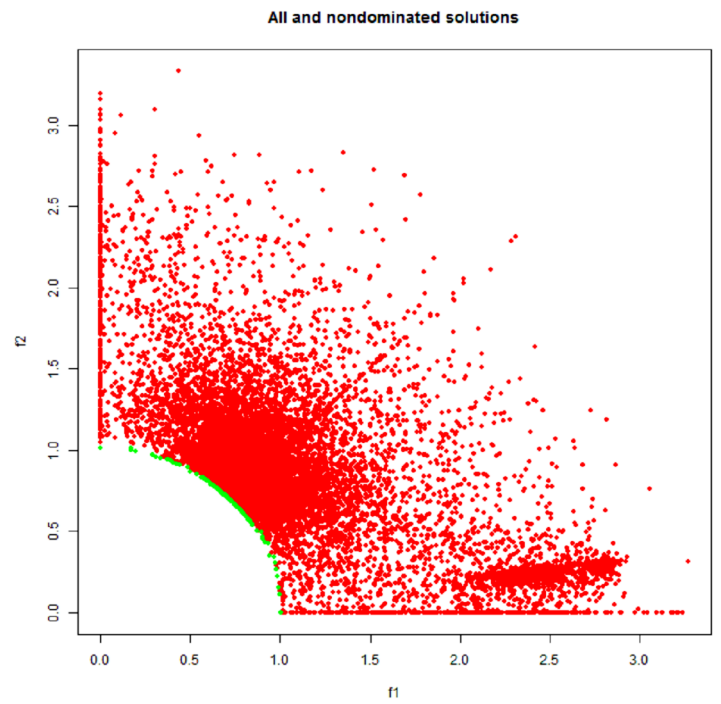
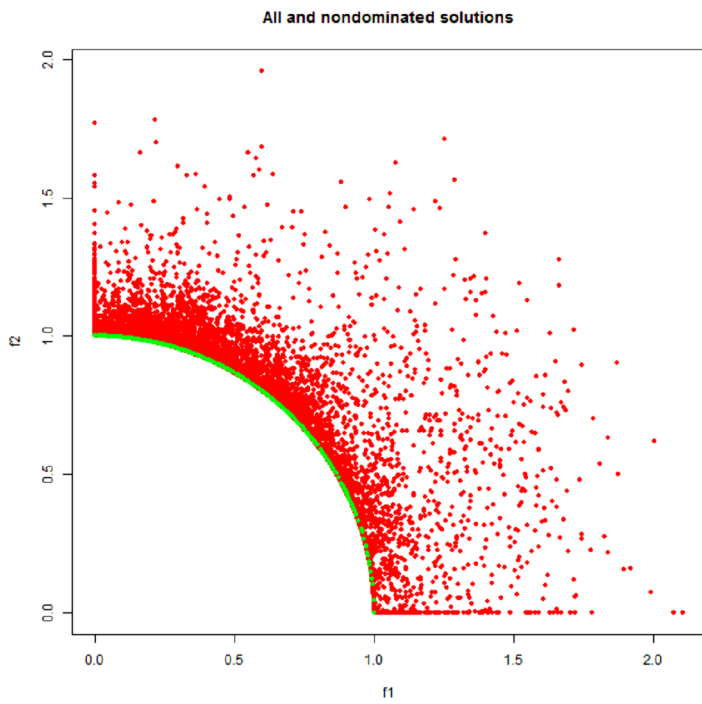
Visualizations of solutions MOPSOCD vs MOPSOPSA_V1

Color conventions: Black = True Pareto front, Green = Nondominated solutions, Red = All stored solutions

DTLZ2 Test Functions

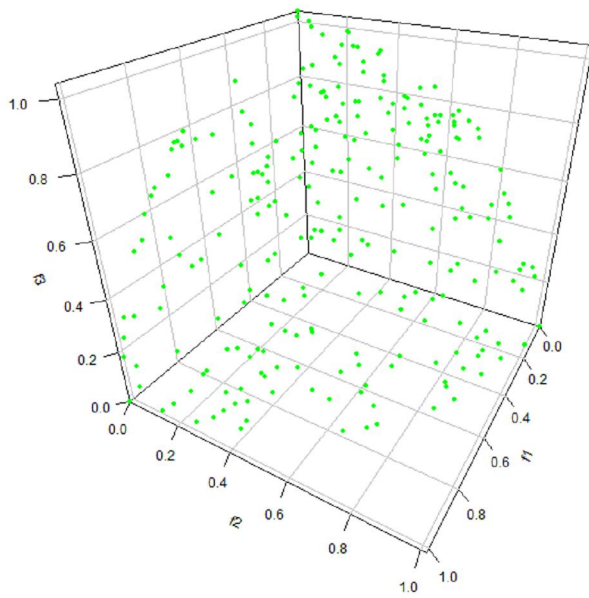
```
d <- 11
s1 <- mopsocds(dtlz2_2, varcnt=d, fncnt=2, lowerbound=rep(0, d), upperbound=rep(1,d), opt=0)
s2 <- mopsopsa_v1(dtlz2_2, varcnt=d, fncnt=2, lowerbound=rep(0, d), upperbound=rep(1,d), opt=0)
draw_n(s1, s2, dtlz2_2front, pfpoints)
```



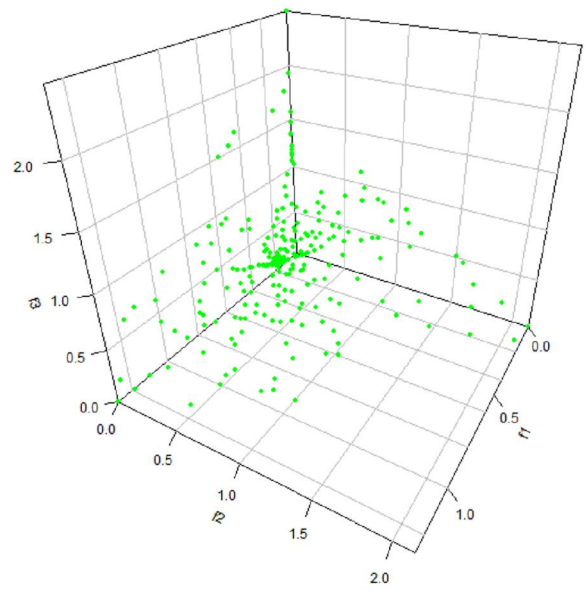


```
d <- 12
s1 <- mopsoods(dtlz2_□, varcnt=d, fncnt=□, lowerbound=rep(0, d), upperbound=rep(1,d), opt=0)
s2 <- mopsoopsa_v1(dtlz2_□, varcnt=d, fncnt=□, lowerbound=rep(0, d), upperbound=rep(1,d), opt=0)
draw_n(s1, s2, dtlz2_□front, pfpoints)
```

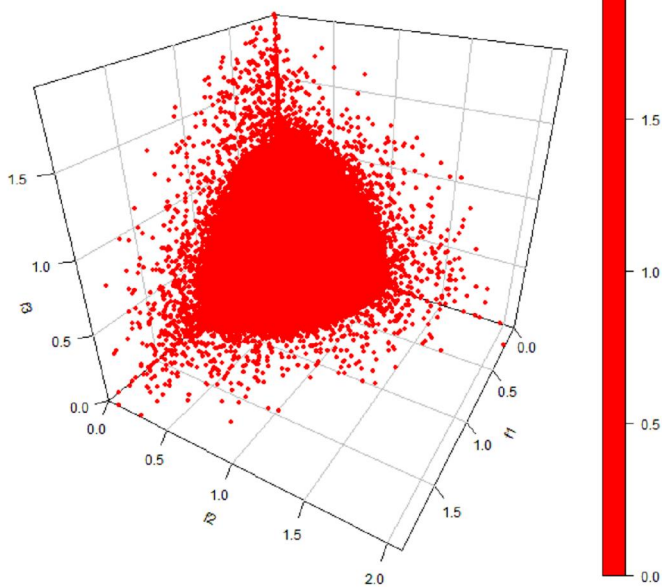
Nondominated solutions



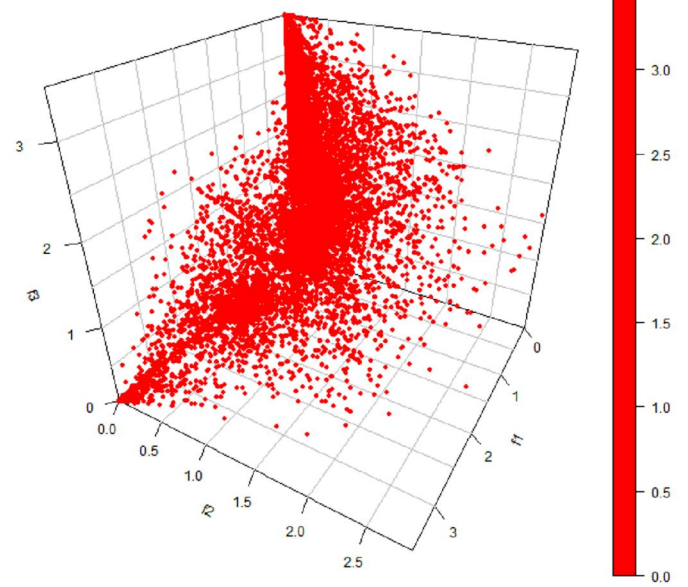
Nondominated solutions

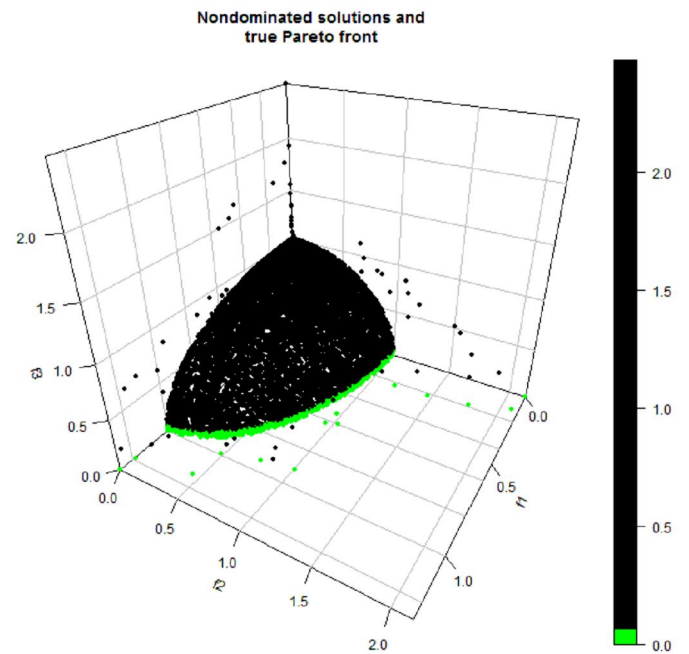
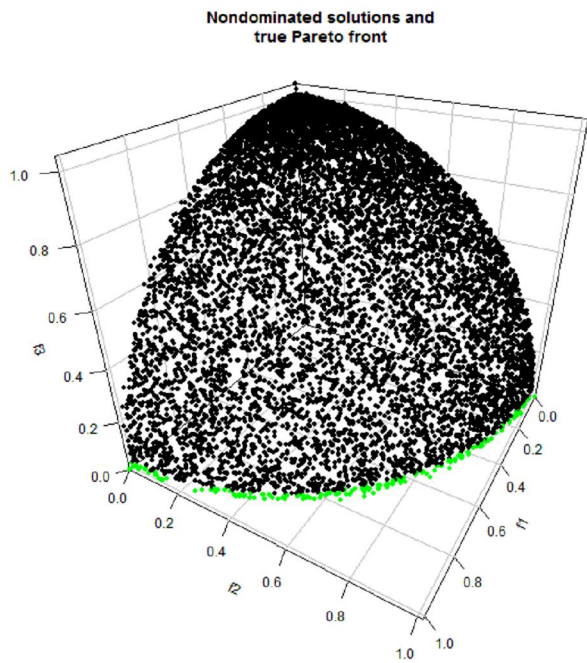
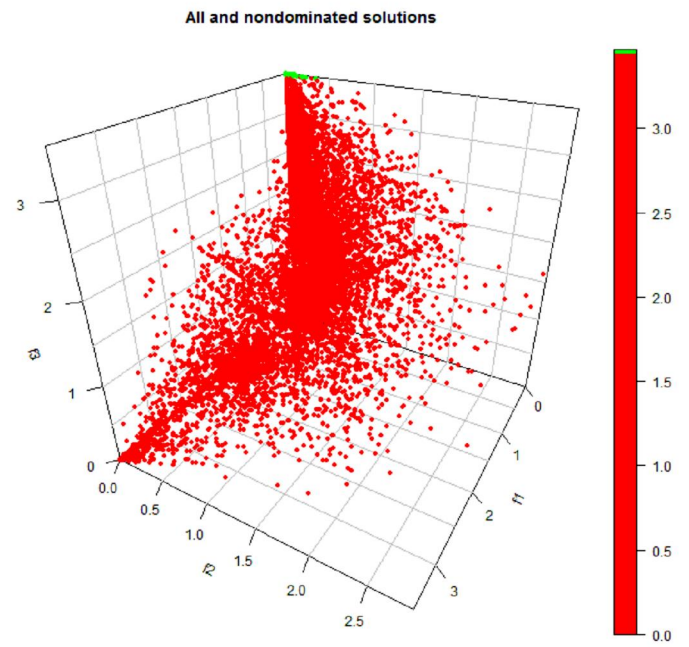
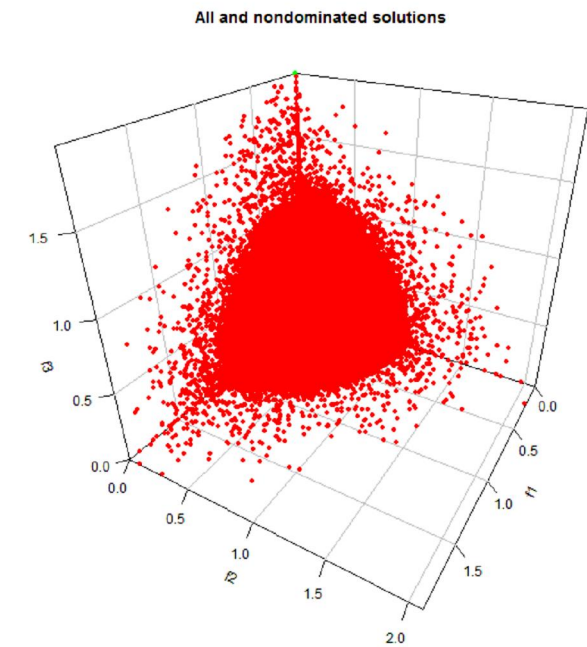


All solutions



All solutions

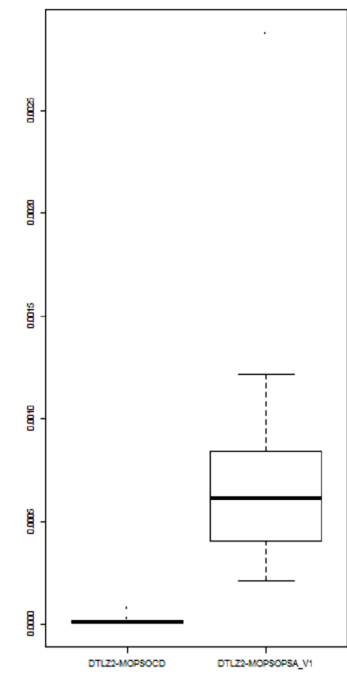




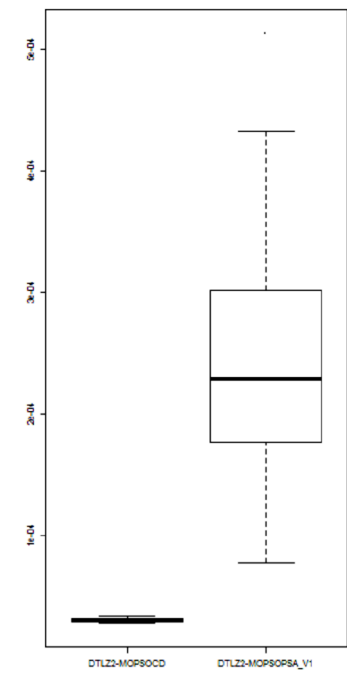
Boplots of results from 20 independent runs of MOPSOCD and MOPSOPSA_V1 on test functions for 2 objectives:

```
n <- 20
ob <- 2
mat <- per_es(n, test_functions2, test_functions_fronts2, ob=2, d=11, pfpoints, al_func=c(mopsocds, mopsopsa_v1))
titles = c('MOPSOCD-MOPSOCD', 'MOPSOPSA_V1-MOPSOPSA_V1')
per_ops(n, mat, titles)
```

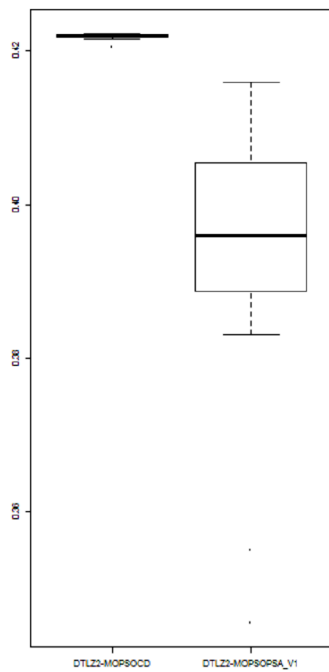
per_ops "performance measures on 20 runs"



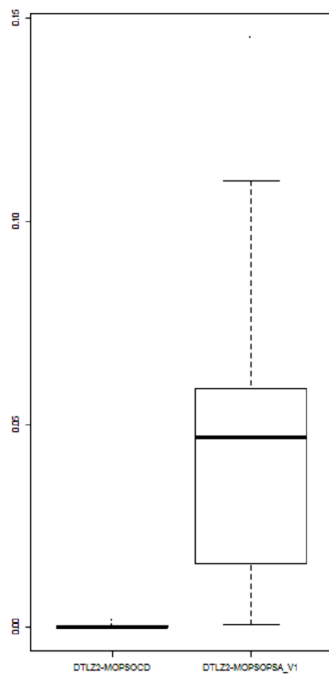
DTLZ2-MOPSOCD DTLZ2-MOPSOBSA_V1 "performance measures on 20 runs"



DTLZ2-MOPSOCD DTLZ2-MOPSOBSA_V1 "performance measures on 20 runs"



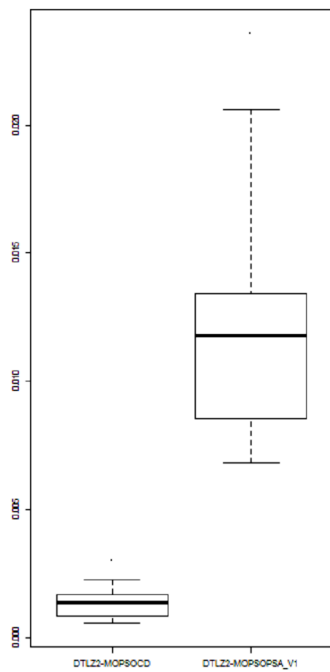
```
ob[1] "performance measures on 20 runs"
```



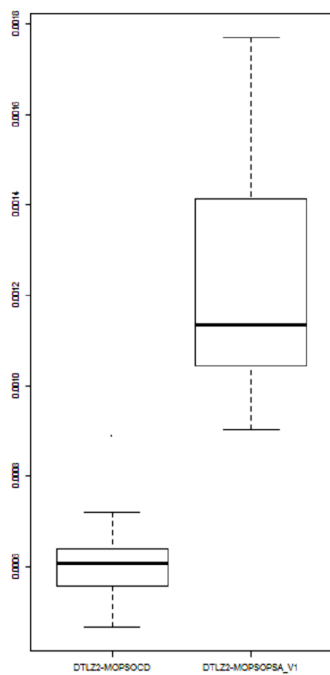
```
mat_2ob <- as.data.frame(mat)
```

```
ob <- 
mat <- perf_test(n, test_functions, test_functions_fronts, ob=, d=12, pfpoints, al_func=c(mopsocds, mopsopsa_v1))
titles = c('DTLZ2-MOPSOC', 'DTLZ2-MOPSOSA_V1')
perf_boxplots(n, mat, titles)
```

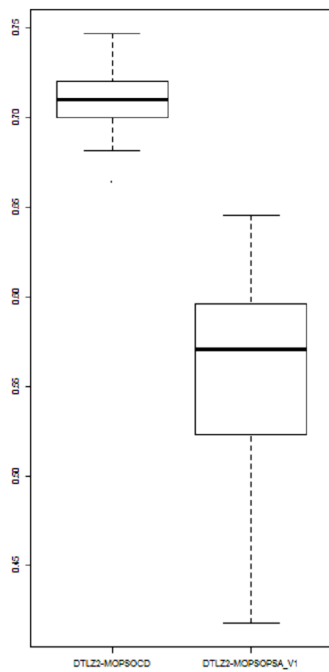
```
ob[1] "performance measures on 20 runs"
```



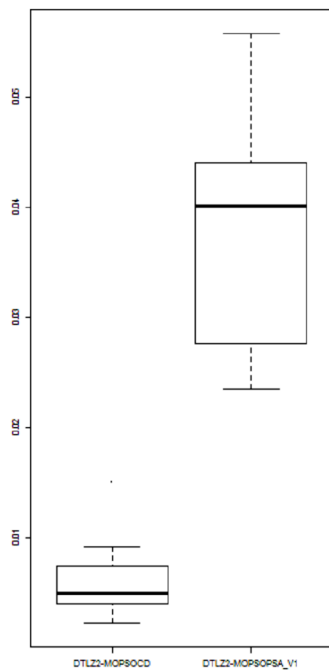
DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



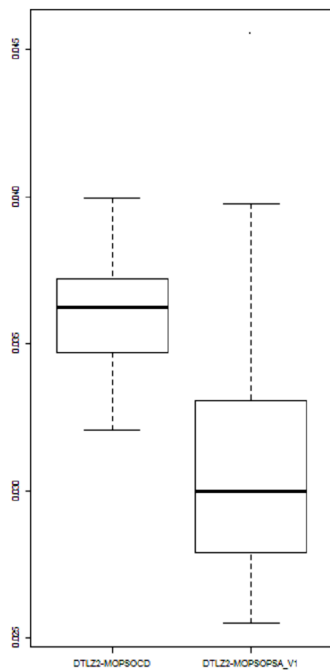
```
## 010 "00 performance measures on 20 runs"
```



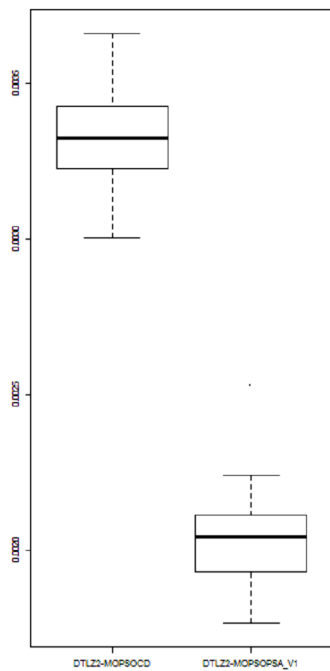
```
mat_obj0 <- as.data.frame(mat)
```

```
ob <- 0
mat <- perf_test(n, test_functions0, test_functions_fronts0, ob0=0, d=10, pfpoints, al0_func=c(mopsocd, mopsopsa_v1))
titles = c('00002-M000000', '00002-M000000_01')
perf_boxplots(n, mat, titles)
```

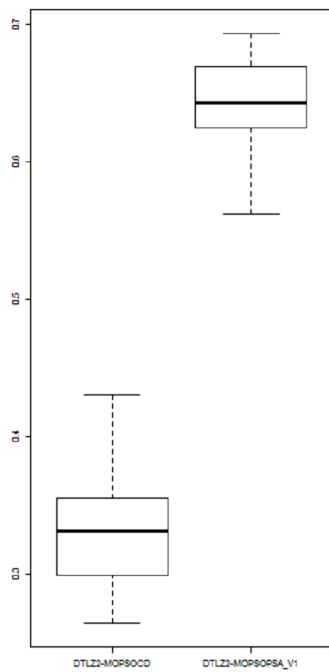
```
## 010 "00 performance measures on 20 runs"
```

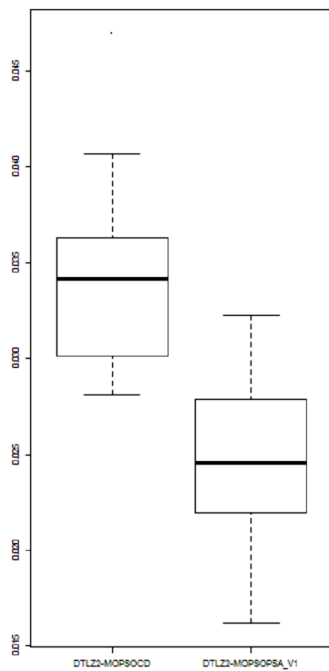
DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



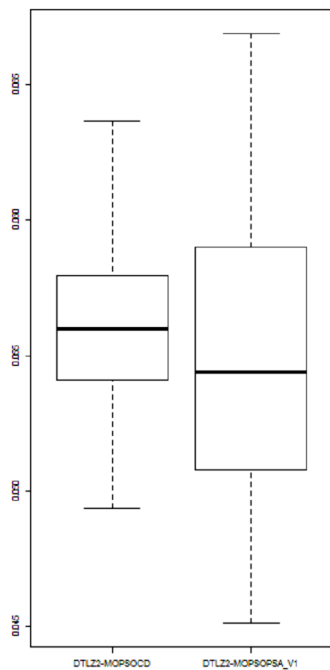
```
ob[1] "ob performance measures on 20 runs"
```



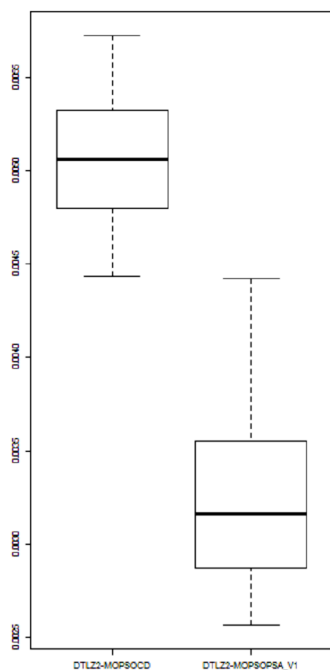
```
mat_obj <- as.data.frame(mat)
```

```
ob <- 
mat <- perf_test(n, test_functions, test_functions_fronts, ob=, d=1, pfpnts, al_func=c(mopsocd, mopsosa_v1))
titles = c('DTLZ2-MOPSOSA_V1', 'DTLZ2-MOPSOSA_V1_01')
perf_boxplots(n, mat, titles)
```

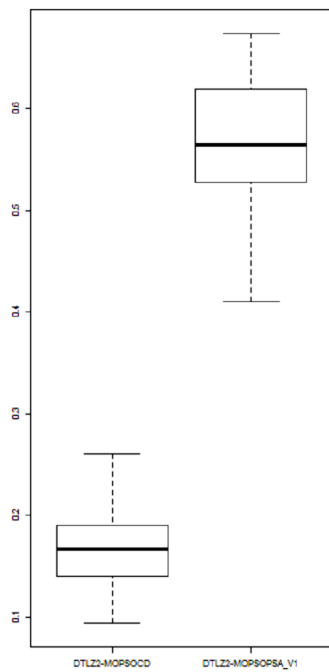
```
ob[1] "ob performance measures on 20 runs"
```



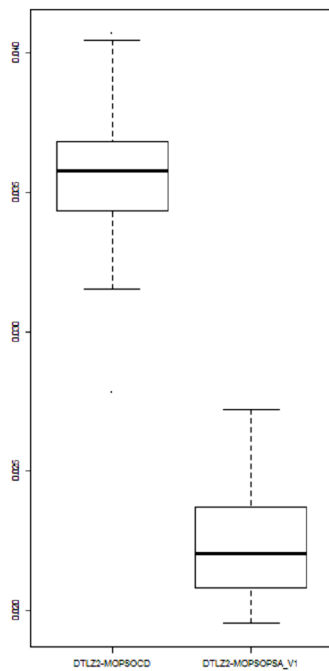
DTLZ2-MOPSOCD "DTLZ2-MOPSOBSA_V1" performance measures on 20 runs



DTLZ2-MOPSOCD "DTLZ2-MOPSOBSA_V1" performance measures on 20 runs



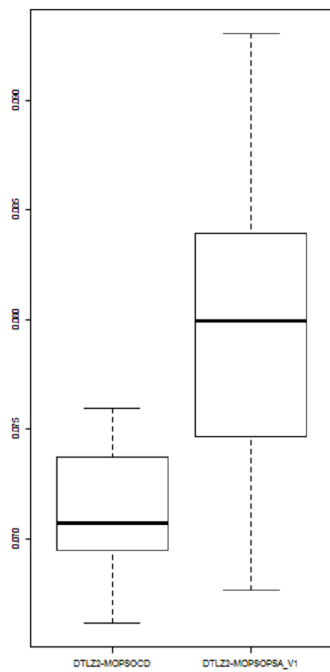
```
## 010 "00 performance measures on 20 runs"
```



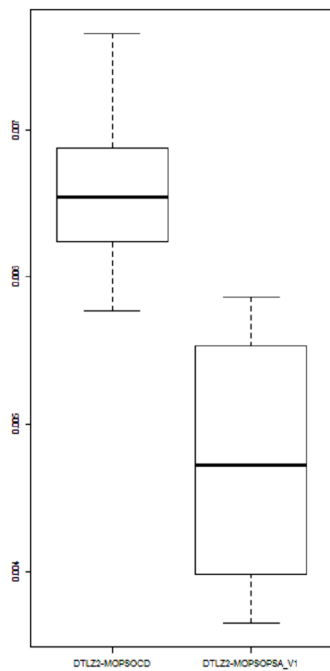
```
mat_0ob <- as.data.frame(mat)
```

```
ob <- 0
mat <- perf_test(n, test_functions_00, test_functions_fronts_00, ob_0=0, d=10, pfpoints, al_0_func=c(mopsocd, mopsopsa_v1))
titles = c('000002-M000000_00', '000002-M000000_01')
perf_boxplots(n, mat, titles)
```

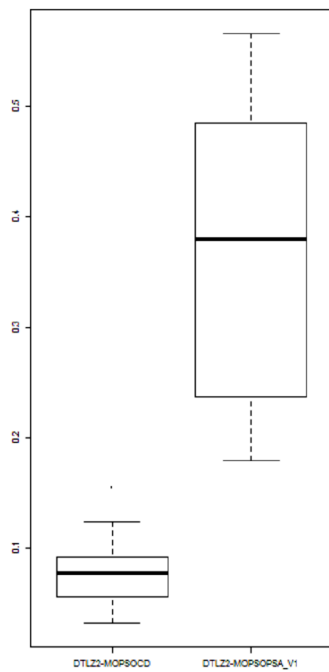
```
## 010 "00 performance measures on 20 runs"
```



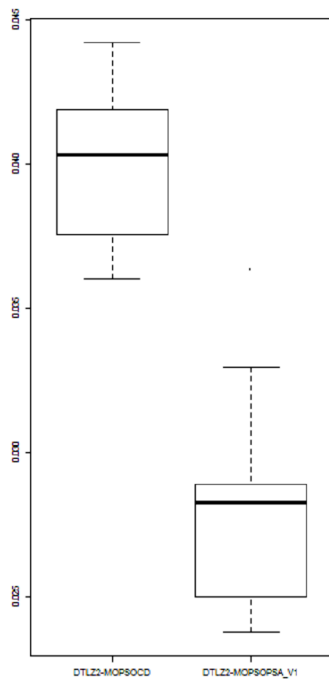
DTLZ2-MOPSOCD DTLZ2-MOPSOBSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOCD DTLZ2-MOPSOBSA_V1 "Box plot performance measures on 20 runs"



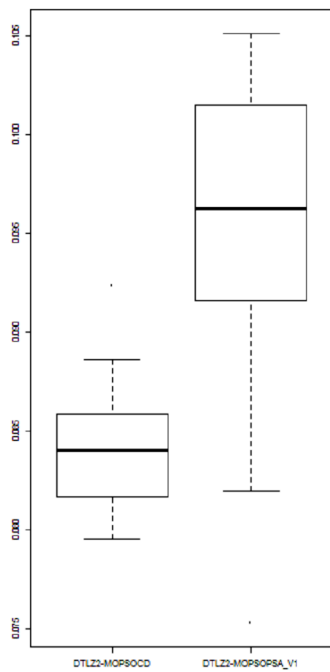
```
## 10 "10 performance measures on 20 runs"
```



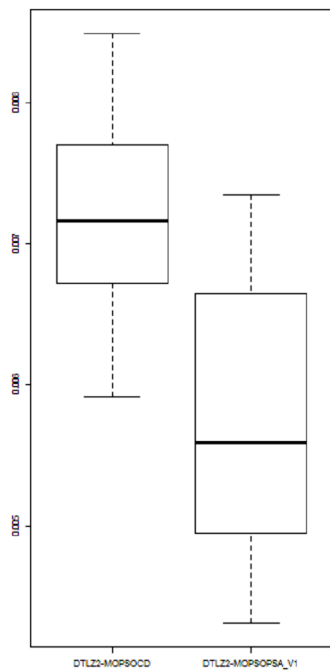
```
mat_obj <- as.data.frame(mat)
```

```
obj <- 
mat <- perf_test(n, test_functions, test_functions_fronts, obj=, d=1, pfpoints, al_func=c(mopsocd, mopsopsa_v1))
titles = c('DTLZ2-MOPSocD', 'DTLZ2-MOPSopsA_V1')
perf_boxplots(n, mat, titles)
```

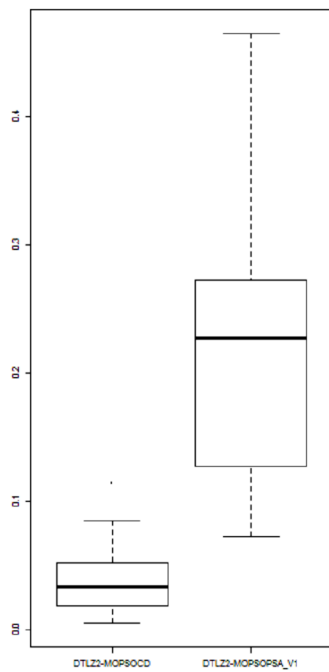
```
## 10 "10 performance measures on 20 runs"
```



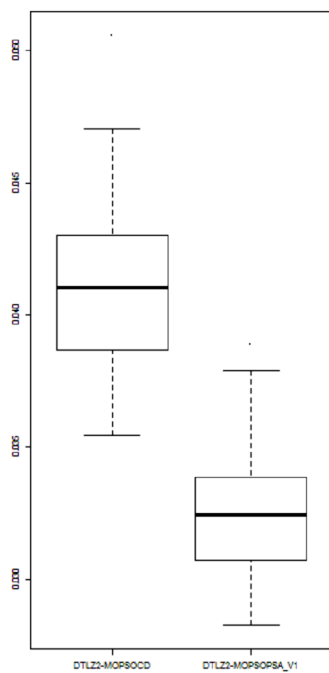
DTLZ2-MOPSOCD DTLZ2-MOPSOBSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOCD DTLZ2-MOPSOBSA_V1 "Box plot performance measures on 20 runs"



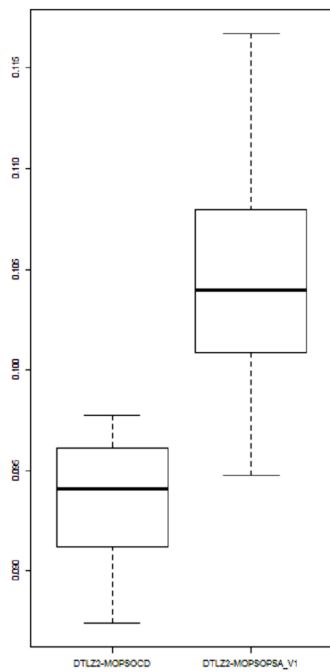
```
## [1] "Performance measures on 20 runs"
```



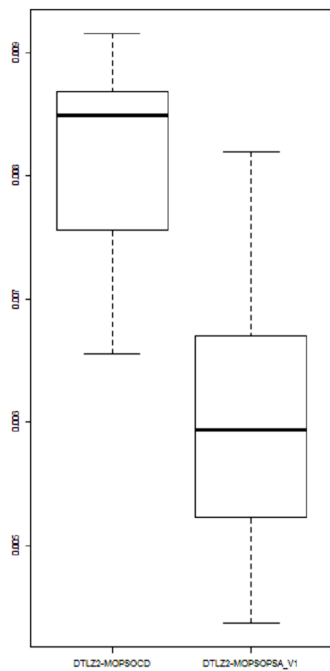
```
mat_obj <- as.data.frame(mat)
```

```
obj <- 
mat <- perf_test(n, test_functions, test_functions_fronts, obj=, d=1, pfpnts, alg_func=c(mopsocd, mopsosa_v1))
titles = c('DTLZ2-MOPSOC', 'DTLZ2-MOPSOSA_V1')
perf_boxplots(n, mat, titles)
```

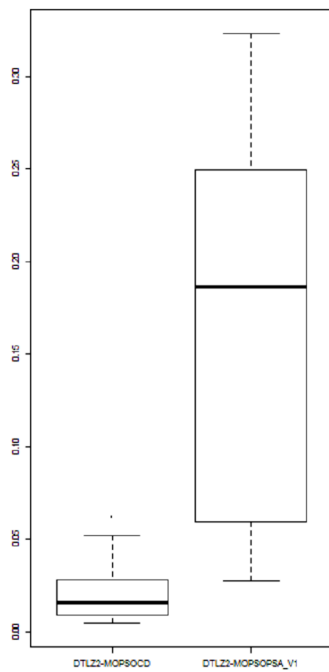
```
## [1] "Performance measures on 20 runs"
```

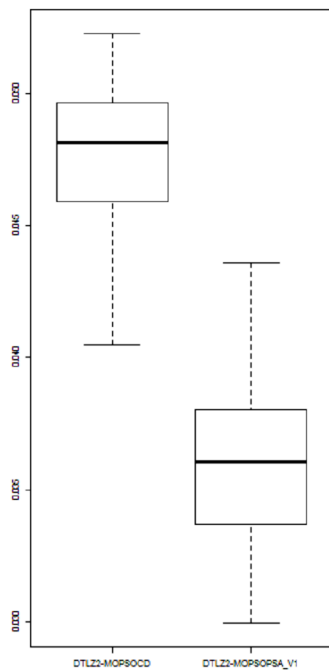
DTLZ2-MOPSOSA_V1 "DTLZ2-MOPSOSA_V1 performance measures on 20 runs"



DTLZ2-MOPSOSA_V1 "DTLZ2-MOPSOSA_V1 performance measures on 20 runs"



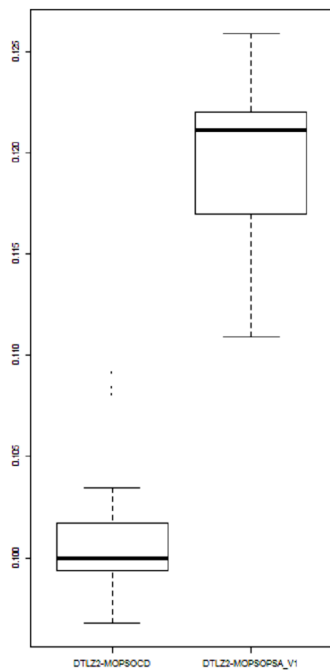
```
## 10 "10 performance measures on 20 runs"
```



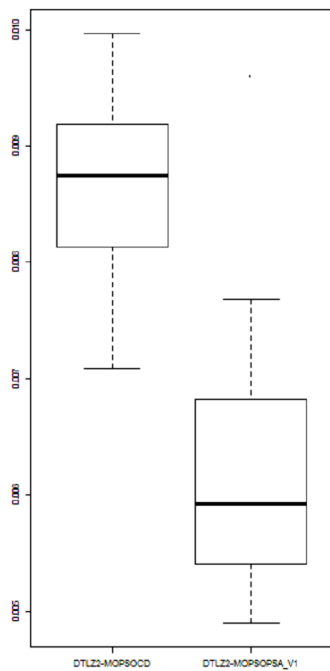
```
mat_obj <- as.data.frame(mat)
```

```
ob <- 10
mat <- perf_test(n, test_functions10, test_functions_fronts10, ob=10, d=1, pfpoints, al_func=c(mopsocd, mopsopsa_v1))
titles = c('DTLZ2-MOPSocD', 'DTLZ2-MOPSopsA_V1')
perf_boxplots(n, mat, titles)
```

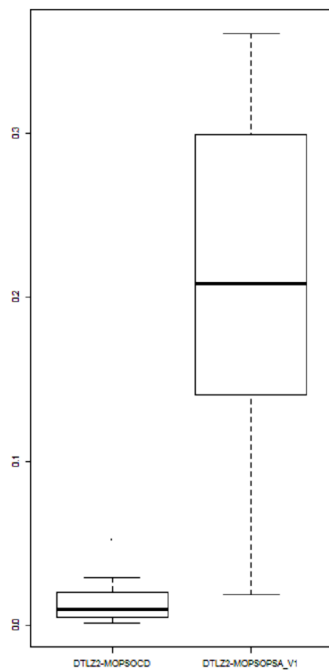
```
## 10 "10 performance measures on 20 runs"
```



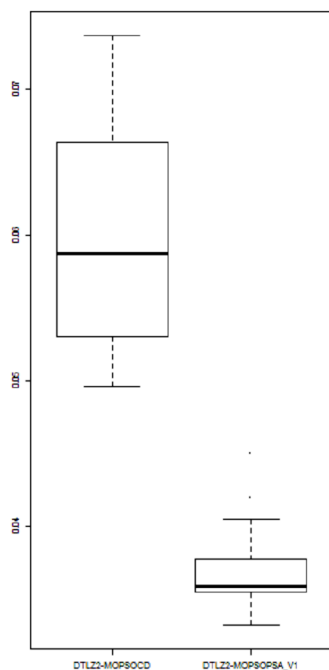
DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



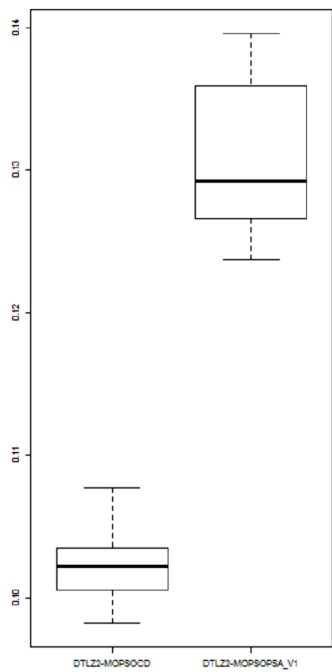
```
ob[1] "ob performance measures on 20 runs"
```



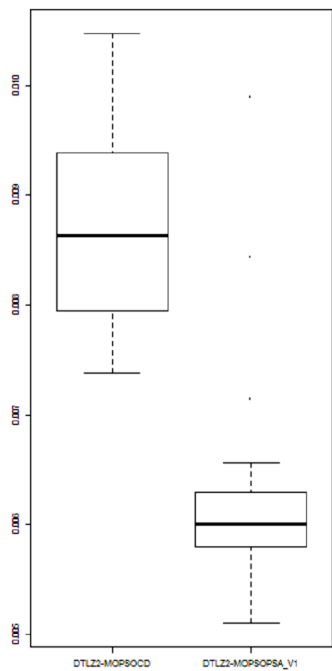
```
mat_10ob <- as.data.frame(mat)
```

```
ob <- 12
mat <- perf_test(n, test_functions12, test_functions_fronts12, ob=12, d=21, pfpnts, al_func=c(mopsocd, mopsopsa_v1))
titles = c('DTLZ2-MOPSOC', 'DTLZ2-MOPSOSA_V1')
perf_boxplots(n, mat, titles)
```

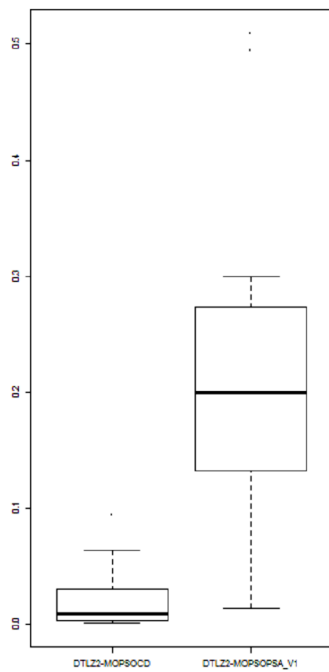
```
ob[1] "ob performance measures on 20 runs"
```



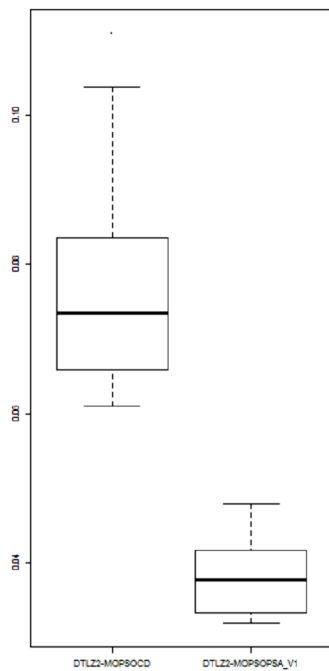
DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOC DTLZ2-MOPSORSA_V1 "Box plot performance measures on 20 runs"



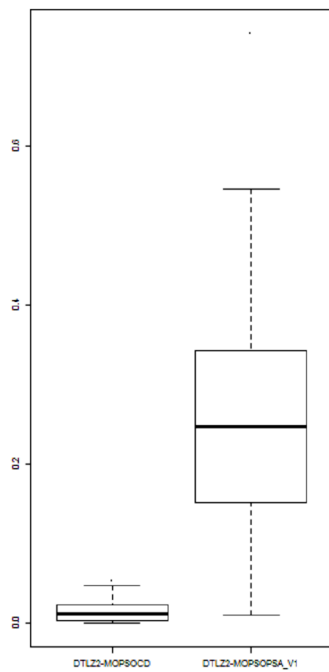
```
## 010 "00 performance measures on 20 runs"
```



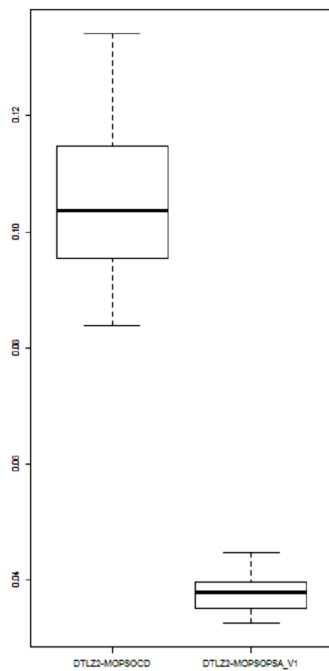
```
mat_12ob <- as.data.frame(mat)
```

```
ob <- 10
mat <- perf_test(n, test_functions100, test_functions_fronts100, ob=10, d=20, pfpoints, al_func=c(mopsocd, mopsopsa_v1))
titles = c('00002-M000000', '00002-M000000_01')
perf_boxplots(n, mat, titles)
```

```
## 010 "00 performance measures on 20 runs"
```

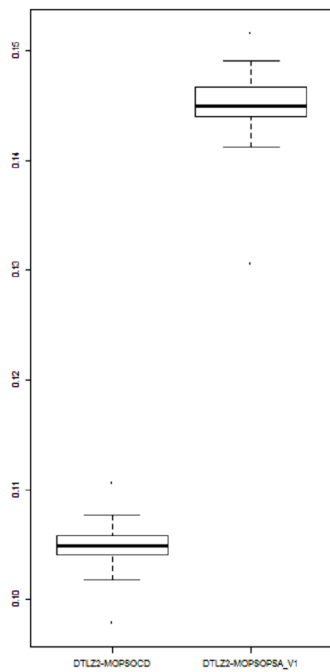
```
ob<-10 "Box performance measures on 20 runs"
```



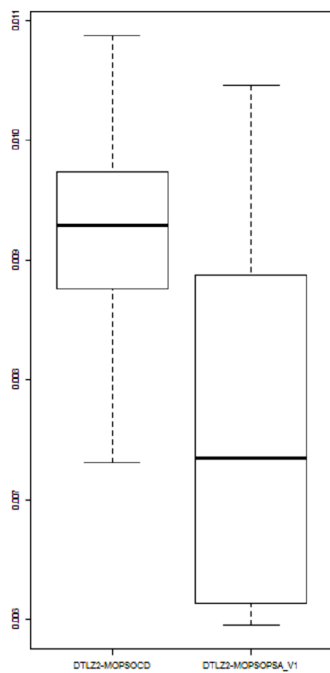
```
mat_1ob<- as.data.frame(mat)
```

```
ob<- 10
mat<- perf_test(n, test_functions1ob, test_functions_fronts1ob, ob=10, d=20, pfpoints, al_func=c(mopsocd, mopsopsa_v1))
titles = c('DTLZ2-MOPSocD', 'DTLZ2-MOPSopsA_V1')
perf_boxplots(n, mat, titles)
```

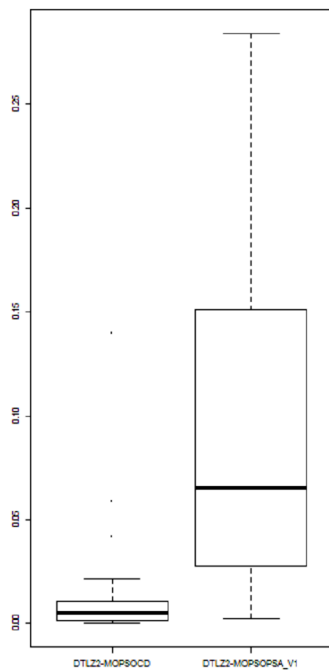
```
ob<-10 "Box performance measures on 20 runs"
```

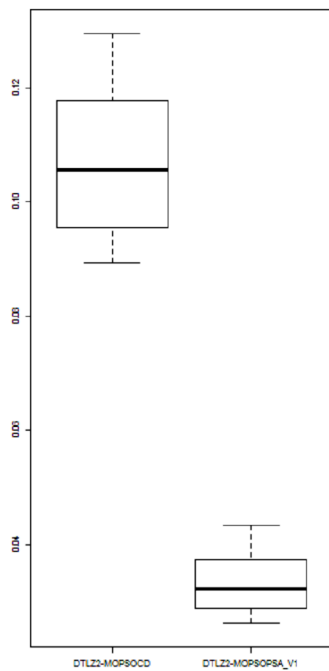
DTLZ2-MOPSOC DTLZ2-MOPSOPSA_V1 "Box plot performance measures on 20 runs"



DTLZ2-MOPSOC DTLZ2-MOPSOPSA_V1 "Box plot performance measures on 20 runs"



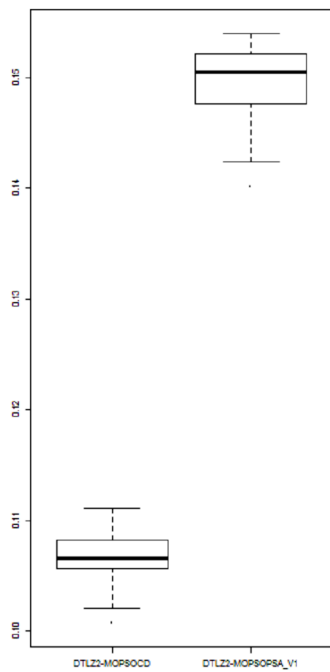
```
## 10 "Box performance measures on 20 runs"
```



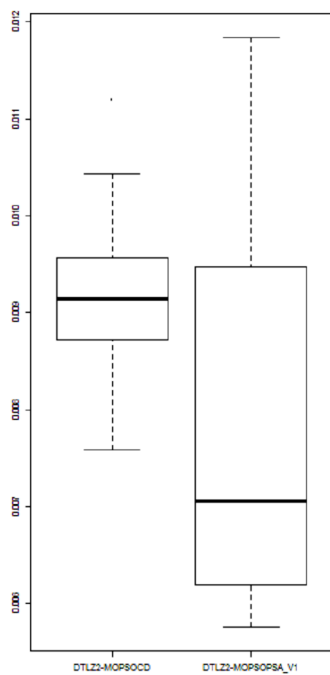
```
mat_10ob <- as.data.frame(mat)
```

```
ob <- 20
mat <- perf_test(n, test_functions20, test_functions_fronts20, ob=20, d=2, pfpairs, all_func=c(mopsocd, mopsopsa_v1))
titles = c('DTLZ2-MOPSocD', 'DTLZ2-MOPSopsA_V1')
perf_boxplots(n, mat, titles)
```

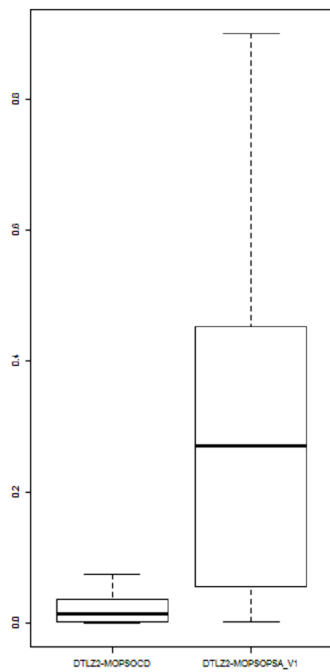
```
## 10 "Box performance measures on 20 runs"
```



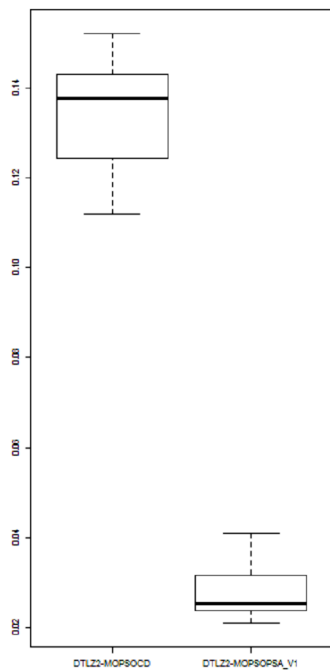
DTLZ2-MOPSOSA_V1 performance measures on 20 runs



DTLZ2-MOPSOSA_V1 performance measures on 20 runs



```
boxplot(mat_20ob[, "performance measures on 20 runs"])
```



```
mat_20ob <- as.data.frame(mat)
```