

ROC curve:

1.

data: E with 2 continuous variables and 2 discrete variables

GxE: g[,1]\*e[,1],g[,3]\*e[,2],g[,5]\*e[,3],g[,8]\*e[,4],g[,15]\*e[,1],g[,18]\*e[,2],  
g[,24]\*e[,4],g[,25]\*e[,1],g[,35]\*e[,2],g[,36]\*e[,4],g[,40]\*e[,1],g[,43]\*e[,2]

error: n(0,1)

n=200,p=50, seq(0,1,by=0.01), rep=10

coefficients: (0.2, 0.8)

auc\_BL: 0.8456522 0.8539130 0.8328261 0.8480435 0.8373913 0.8501087 0.8369565  
0.8422826 0.8455435 0.8523913

sd: 0.00703911

auc(fpr\_BL,tpr\_BL)

[1] 0.8433228

auc\_BLSS: 0.8804348 0.8736957 0.8802174 0.8594565 0.8819565 0.8619565 0.8805435  
0.8556522 0.8402174 0.8577174

sd: 0.01422594

auc(fpr\_BLSS,tpr\_BLSS)

[1] 0.8688641

auc\_LADBL: 0.8375000 0.8345652 0.8485870 0.8358696 0.8342391 0.8334783 0.8339130  
0.8493478 0.8341304 0.8445652

sd: 0.006350624

auc(fpr\_LADBL,tpr\_LADBL)

[1] 0.8389576

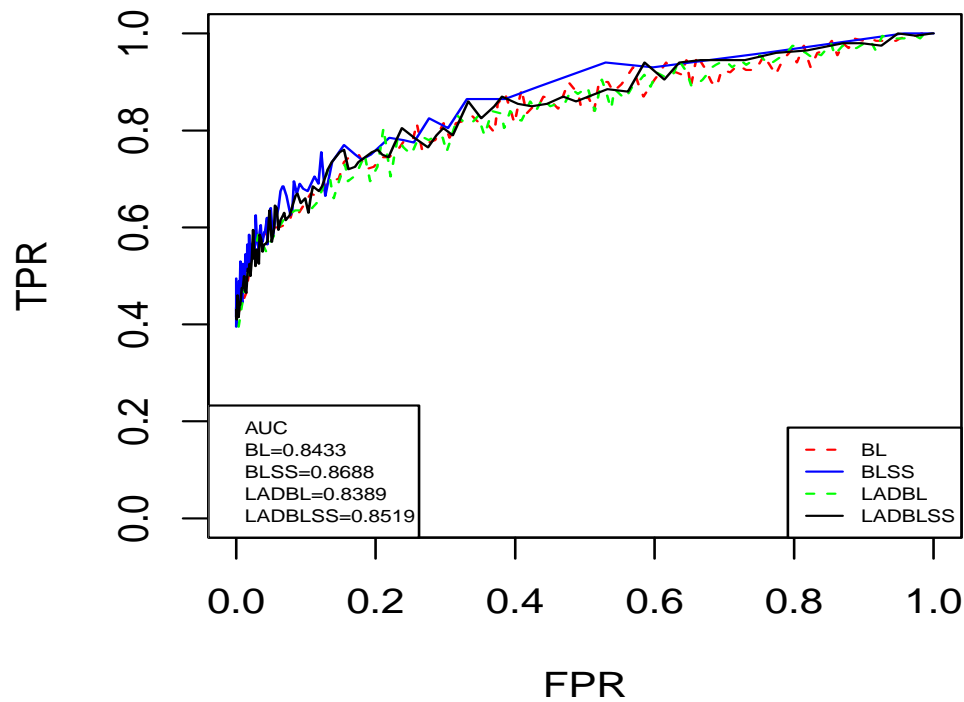
auc\_LADBLSS

[1] 0.8492391 0.8554348 0.8421739 0.8590217 0.8493478 0.8559783 0.8700000 0.8291304  
0.8611957 0.8722826

sd: 0.01279945

auc(fpr\_LADBLSS,tpr\_LADBLSS)

[1] 0.8519783



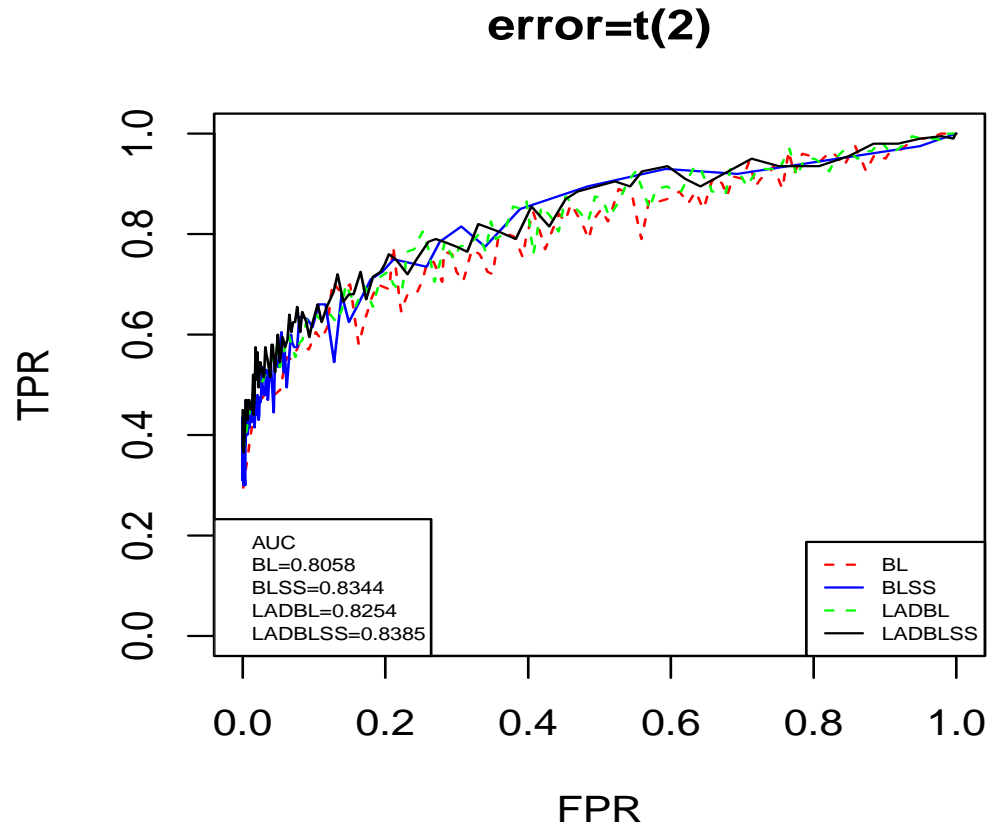
error: t(2)

```
auc_BL: 0.8033696 0.8011957 0.8145652 0.8154348 0.8122826 0.8018478 0.8068478
0.8070652 0.8032609 0.8025000
sd: 0.005412866
auc(fpr_BL,tpr_BL)
[1] 0.8058065
```

```
auc_BLSS: 0.8421739 0.8145652 0.8527174 0.8143478 0.8190217 0.8252174 0.8400000
0.8516304 0.8323913 0.8225000
sd: 0.01452787
auc(fpr_BLSS,tpr_BLSS)
[1] 0.8344674
```

```
auc_LADBL: 0.8341304 0.8198913 0.8323913 0.8156522 0.8331522 0.8327174 0.8098913
0.8245652 0.8279348 0.8281522
sd: 0.008281946
auc(fpr_LADBL,tpr_LADBL)
[1] 0.8254272
```

```
auc_LADBLSS
[1] 0.8251087 0.8491304 0.8347826 0.8508696 0.8211957 0.8578261 0.8480435 0.8419565
0.8266304 0.8258696
sd: 0.0130565
auc(fpr_LADBLSS,tpr_LADBLSS)
[1] 0.8385348
```



2.

data: E with 2 continuous variables and 2 discrete variables

GxE:  $g[1]*e[1], g[3]*e[2], g[5]*e[3], g[8]*e[4], g[15]*e[1], g[18]*e[2],$   
 $g[24]*e[4], g[25]*e[1], g[35]*e[2], g[36]*e[4], g[40]*e[1], g[43]*e[2]$

error:  $n(0,1)$

$n=200, p=50, seq(0,1, by=0.01), rep=10$

coefficients: (0.01, 0.3)

auc\_BL

[1] 0.7870652 0.7883696 0.7944565 0.7983696 0.8028261 0.7971739 0.7829348 0.7970652  
0.7910870 0.7921739

sd: 0.005995693

auc(fpr\_BL, tpr\_BL)

[1] 0.7948043

auc\_BLSS

[1] 0.7896739 0.8150000 0.8200000 0.8105435 0.8157609 0.8105435 0.8216304 0.7956522  
0.8182609 0.7891304

sd: 0.0124623

auc(fpr\_BLSS, tpr\_BLSS)

[1] 0.809663

auc\_LADBL

[1] 0.7763043 0.7590217 0.7830435 0.7828261 0.7779348 0.7839130 0.7753261 0.7643478  
0.7638043 0.7839130

sd: 0.009365112

auc(fpr\_LADBL, tpr\_LADBL)

[1] 0.7742283

auc\_LADBLSS

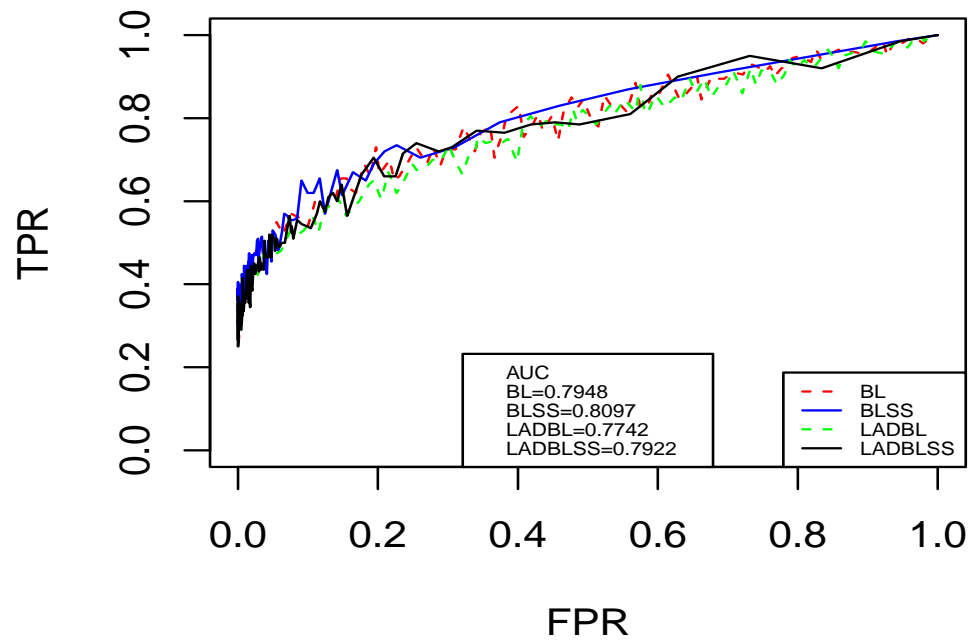
[1] 0.8056522 0.7861957 0.7820652 0.7733696 0.7872826 0.8057609 0.7958696 0.7994565  
0.7679348 0.7932609

sd: 0.01280267

auc(fpr\_LADBLSS, tpr\_LADBLSS)

[1] 0.7921935

error=n(0,1)



error: t(2)

auc\_BL

```
[1] 0.6739130 0.6725000 0.6820652 0.6998913 0.6729348 0.6670652 0.7002174 0.6894565
0.6945652 0.7040217
```

sd: 0.01365086

auc(fpr\_BL,tpr\_BL)

```
[1] 0.686513
```

auc\_BLSS

```
[1] 0.7060870 0.7108696 0.6956522 0.7235870 0.6648913 0.6684783 0.7132609 0.7169565
0.7030435 0.6831522
```

sd: 0.02025809

auc(fpr\_BLSS,tpr\_BLSS)

```
[1] 0.7001739
```

auc\_LADBL

```
[1] 0.7479348 0.7641304 0.7377174 0.7336957 0.7364130 0.7533696 0.7468478 0.7418478  
0.7676087 0.7647826
```

sd: 0.01255379

auc(fpr\_LADBL,tpr\_LADBL)

```
[1] 0.7489359
```

auc\_LADBLSS

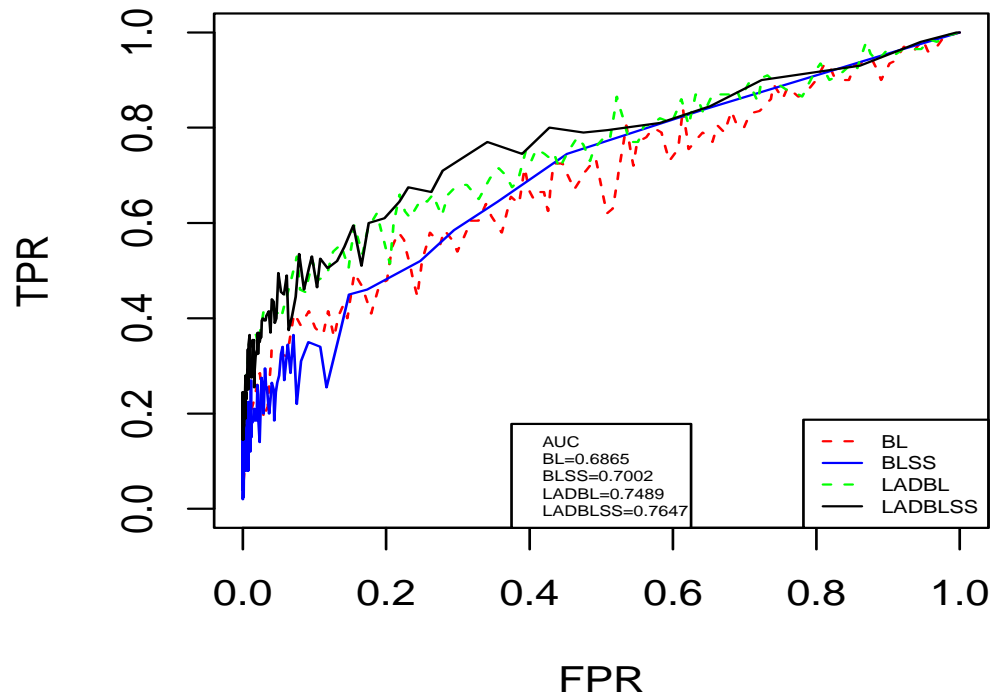
```
[1] 0.7540217 0.7828261 0.7490217 0.7808696 0.7875000 0.7494565 0.7694565 0.7816304  
0.7513043 0.7619565
```

sd: 0.0154704

auc(fpr\_LADBLSS,tpr\_LADBLSS)

```
[1] 0.764762
```

**error=t(2)**



3.

data: E with 2 continuous variables and 2 discrete variables

GxE:  $g[,1]*e[,1], g[,3]*e[,2], g[,5]*e[,3], g[,8]*e[,4], g[,15]*e[,1], g[,18]*e[,2],$   
 $g[,24]*e[,4], g[,25]*e[,1], g[,35]*e[,2], g[,36]*e[,4], g[,40]*e[,1], g[,43]*e[,2]$

error:  $n(0,1)$

$n=200, p=50, \text{seq}(0,1, \text{by}=0.005), \text{rep}=30$

coefficients: (0.01, 0.3)

4.

data: E with 2 continuous variables and 2 discrete variables

GxE: g[,1]\*e[,1],g[,3]\*e[,2],g[,5]\*e[,3],g[,8]\*e[,4],g[,15]\*e[,1],g[,18]\*e[,2],  
g[,24]\*e[,4],g[,25]\*e[,1],g[,35]\*e[,2],g[,36]\*e[,4],g[,40]\*e[,1],g[,43]\*e[,2]

error: n(0,1)

n=200,p=50, seq(0,1,by=0.01), rep=30

coefficients: (0.1, 0.5)

auc\_BL

[1] 0.8306522 0.8289130 0.8390217 0.8088043 0.8403261 0.8239130 0.8259783 0.8270652  
0.8308696 0.8405435 0.8258696 0.8244565  
[13] 0.8311957 0.8460870 0.8417391 0.8307609 0.8256522 0.8269565 0.8257609 0.8351087  
0.8293478 0.8319565 0.8303261 0.8404348  
[25] 0.8303261 0.8344565 0.8206522 0.8321739 0.8332609 0.8395652

sd: 0.007483808

auc(fpr\_BL,tpr\_BL)

[1] 0.8307519

auc\_BLSS

[1] 0.8418478 0.8544565 0.8486957 0.8535870 0.8364130 0.8468478 0.8431522 0.8401087  
0.8482609 0.8607609 0.8458696 0.8703261 0.8807609  
[14] 0.8571739 0.8556522 0.8778261 0.8218478 0.8631522 0.8513043 0.8801087 0.8578261  
0.8675000 0.8530435 0.8525000 0.8398913 0.8311957  
[27] 0.8363043 0.8180435 0.8772826 0.8521739

sd: 0.01589554

auc(fpr\_BLSS,tpr\_BLSS)

[1] 0.8502525

auc\_LADBL

[1] 0.8195652 0.8231522 0.8201087 0.8176087 0.8095652 0.8118478 0.8132609 0.8311957  
0.8190217 0.8189130 0.8186957 0.8142391 0.8215217  
[14] 0.8205435 0.8183696 0.8217391 0.8157609 0.8351087 0.8151087 0.8160870 0.8098913  
0.8196739 0.8102174 0.8266304 0.8261957 0.8082609  
[27] 0.8309783 0.8192391 0.8306522 0.8170652

sd: 0.00680021

auc(fpr\_LADBL,tpr\_LADBL)

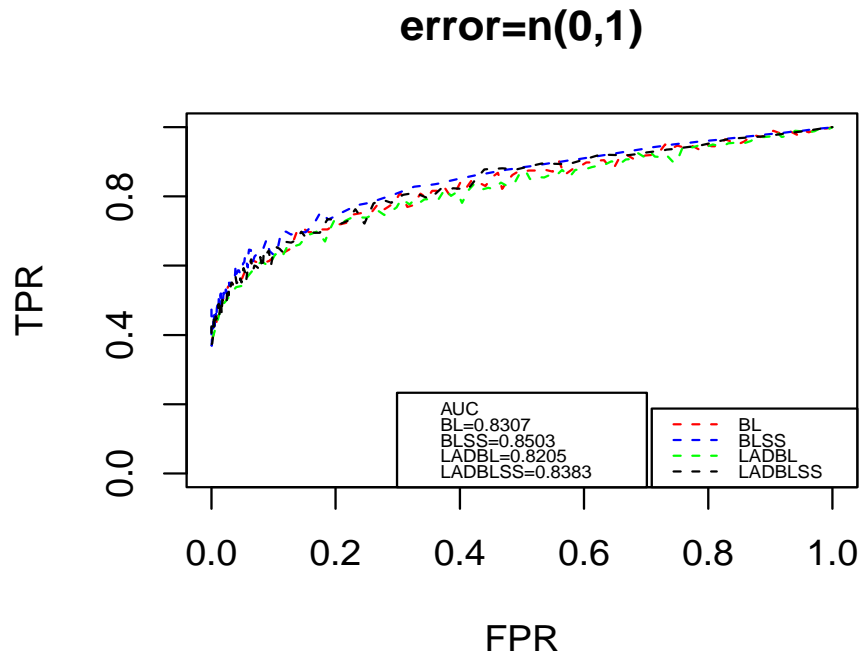
[1] 0.8204464

auc\_LADBLSS

[1] 0.8323913 0.8011957 0.8392391 0.8386957 0.8464130 0.8577174 0.8397826 0.8519565  
0.8354348 0.8519565 0.8343478 0.8383696 0.8425000



```
[14] 0.8422826 0.8275000 0.8367391 0.8102174 0.8156522 0.8418478 0.8336957 0.8590217
0.8475000 0.8511957 0.8451087 0.8532609 0.8439130
[27] 0.8370652 0.8407609 0.8225000 0.8671739
sd: 0.01410697
auc(fpr_LADBLSS,tpr_LADBLSS)
[1] 0.8382617
```



error=t(2)

```
auc_BL
[1] 0.7768478 0.7701087 0.7719565 0.7688043 0.7643478 0.7539130 0.7759783 0.7588043
0.7601087 0.7773913 0.7651087 0.7422826 0.7593478
[14] 0.7665217 0.7618478 0.7436957 0.7757609 0.7855435 0.7666304 0.7545652 0.7714130
0.7666304 0.7772826 0.7441304 0.7541304 0.7708696
[27] 0.7701087 0.7839130 0.7704348 0.7764130
sd: 0.01120099
auc(fpr_BL,tpr_BL)
[1] 0.7666171
```

auc\_BLSS

[1] 0.7289130 0.7775000 0.8085870 0.8147826 0.7752174 0.8075000 0.7983696 0.7841304  
0.7897826 0.7660870 0.7839130 0.7355435 0.7556522  
[14] 0.7543478 0.8151087 0.7722826 0.7384783 0.7460870 0.7541304 0.7898913 0.7485870  
0.7743478 0.8114130 0.8014130 0.7792391 0.8086957  
[27] 0.7867391 0.7917391 0.7438043 0.8179348  
sd: 0.0265289  
auc(fpr\_BLSS,tpr\_BLSS)  
[1] 0.779287

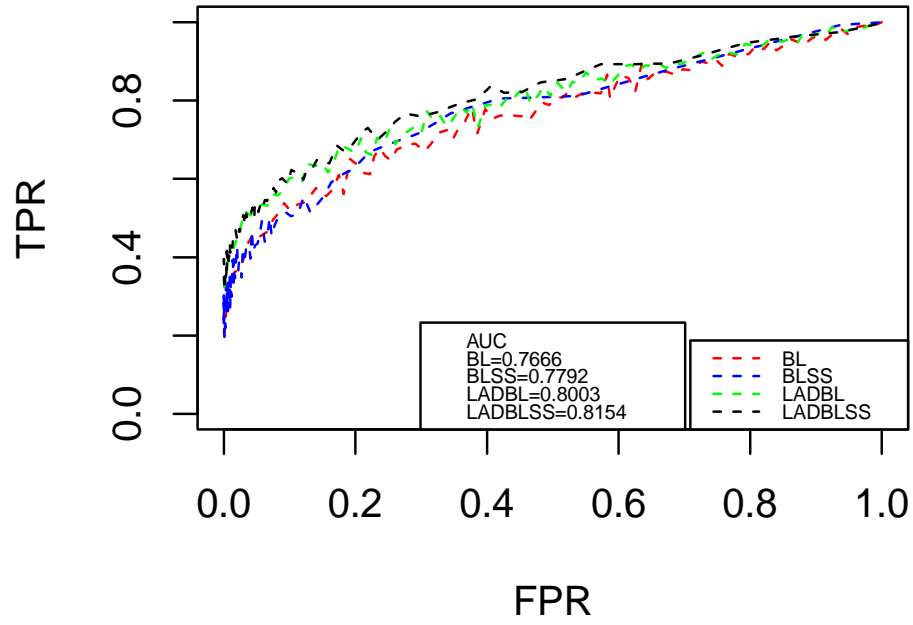
auc\_LADBL

[1] 0.8017391 0.8115217 0.8193478 0.8077174 0.7938043 0.7946739 0.8020652 0.8004348  
0.8118478 0.7983696 0.8019565 0.8080435 0.7982609  
[14] 0.8047826 0.8018478 0.8161957 0.8133696 0.7995652 0.7958696 0.8073913 0.7836957  
0.7892391 0.7853261 0.8151087 0.8111957 0.8008696  
[27] 0.8113043 0.7938043 0.8028261 0.7948913  
sd: 0.008998633  
auc(fpr\_LADBL,tpr\_LADBL)  
[1] 0.8003158

auc\_LADBLSS

[1] 0.8168478 0.8098913 0.8072826 0.8217391 0.8220652 0.8238043 0.8289130 0.8083696  
0.8196739 0.8040217 0.8461957 0.8042391 0.8120652  
[14] 0.8360870 0.8276087 0.8185870 0.8109783 0.8094565 0.8311957 0.8025000 0.7969565  
0.8100000 0.8194565 0.7990217 0.8123913 0.8271739  
[27] 0.8194565 0.8002174 0.8242391 0.8222826  
sd: 0.01162349  
auc(fpr\_LADBLSS,tpr\_LADBLSS)  
[1] 0.8154025

**error=t(2)**



5.

data: E with 2 continuous variables and 2 discrete variables

GxE:  $g[,1]*e[,1], g[,3]*e[,2], g[,5]*e[,3], g[,8]*e[,4], g[,15]*e[,1], g[,18]*e[,2],$   
 $g[,24]*e[,4], g[,25]*e[,1], g[,35]*e[,2], g[,36]*e[,4], g[,40]*e[,1], g[,43]*e[,2]$

error:  $n(0,1)$

$n=200, p=50$ , seq(0,1,by=0.005), rep=30

coefficients: (0.1, 0.5)