```
## Load libraries
library(splines)
library(MASS)
library(xtable)
library(qvalue)

##Source functions
source("../functions.R")
```

Simulations are performed for a variety of alternative distributions:

```
altsGrid <- as.matrix(expand.grid(dist=c("z","t"),nrBlocks=c(10,20),corr=c(0.2,0.5,0.9)))
alts <- apply(altsGrid, 1, function(x){paste("alt",x[1],"large",x[2],x[3],sep="_")})
alts

##  [1] "alt_z_large_10_0.2" "alt_t_large_10_0.2"
##  [3] "alt_z_large_20_0.2" "alt_t_large_20_0.2"
##  [5] "alt_z_large_10_0.5" "alt_t_large_10_0.5"
##  [7] "alt_z_large_20_0.5" "alt_t_large_20_0.5"
##  [9] "alt_z_large_10_0.9" "alt_t_large_10_0.9"
## [11] "alt_z_large_20_0.9" "alt_t_large_20_0.9"
```

Make FDR-TPR table:

```
for(alt in alts)
{
  ##For each simulation, get the FDR-TPR table: (BL = Boca-Leek method)
  scen1 <- scen2a <- scen2b <- scen3a <- scen3b <- NULL

  ##------------------Set 1----------------##

  ##Load p-values and £\pi_0(x)£ estimates for the simulations:
  for(l in listSimRes(alt, 1))
  {
    load(l)
  }

  ##Get BH and Storey q-values for each simulation:
  qValuesSimsBH <- getQValuesSimsBH(pValuesSims)
  qValuesSimsStorey <- getQValuesSimsStorey(pValuesSims)

  ##Get estimated FDR for each simulation for the final estimates
  FDRreg <- getFDRregSims(pi0EstSim, qValuesSimsBH)

  ##get FDR-TPR table
  scen1 <- estFDR.TPR(FDR.BL = FDRreg,
```

```
                      FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
                      FDR.Scott = FDR.ScottMat, FDR.Scott_emp = FDR.ScottMat_emp, nullHypSim

##------------------Set 2---------------##

##Load p-values and £\pi_0(x)£ estimates for the simulations:
for(l in listSimRes(alt, 2))
{
  load(l)
}

##Get BH and Storey q-values for each simulation:
qValuesSimsBH <- getQValuesSimsBH(pValuesSims)
qValuesSimsStorey <- getQValuesSimsStorey(pValuesSims)

##--------Linear fit-------##

##Get estimated FDR for each simulation for the final estimates
FDRreg <- getFDRregSims(pi0EstSim.lin, qValuesSimsBH)

##get FDR-TPR table
scen2a <- estFDR.TPR(FDR.BL = FDRreg,
                      FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
                      FDR.Scott = FDR.Lin.ScottMat, FDR.Scott_emp = FDR.Lin.ScottMat_emp, r

##--------Spline fit-------##

##Get estimated FDR for each simulation for the final estimates
FDRreg <- getFDRregSims(pi0EstSim.spl, qValuesSimsBH)

##get FDR-TPR table
scen2b <- estFDR.TPR(FDR.BL = FDRreg,
                      FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
                      FDR.Scott = FDR.Spl.ScottMat, FDR.Scott_emp = FDR.Spl.ScottMat_emp, r

##------------------Set 3---------------##

##Load p-values and £\pi_0(x)£ estimates for the simulations:
for(l in listSimRes(alt, 3))
{
  load(l)
}

##Get BH and Storey q-values for each simulation:
qValuesSimsBH <- getQValuesSimsBH(pValuesSims)
```

```
qValuesSimsStorey <- getQValuesSimsStorey(pValuesSims)

##--------Linear fit-------##

##Get estimated FDR for each simulation for the final estimates
FDRreg <- getFDRregSims(pi0EstSim.lin, qValuesSimsBH)

##get FDR-TPR table
scen3a <- estFDR.TPR(FDR.BL = FDRreg,
                     FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
                     FDR.Scott = FDR.Lin.ScottMat, FDR.Scott_emp = FDR.Lin.ScottMat_emp, r

##--------Spline fit-------##

##Get estimated FDR for each simulation for the final estimates
FDRreg <- getFDRregSims(pi0EstSim.spl, qValuesSimsBH)

##get FDR-TPR table
scen3b <- estFDR.TPR(FDR.BL = FDRreg,
                     FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
                     FDR.Scott = FDR.Spl.ScottMat, FDR.Scott_emp = FDR.Spl.ScottMat_emp, r

##-------------------Set 4----------------##

##Load p-values and £\pi_0(x)£ estimates for the simulations:
for(l in listSimRes(alt, 4))
{
  load(l)
}

##Get BH and Storey q-values for each simulation:
qValuesSimsBH <- getQValuesSimsBH(pValuesSims)
qValuesSimsStorey <- getQValuesSimsStorey(pValuesSims)

##--------Linear fit-------##

##Get estimated FDR for each simulation:
##first pull out just the final estimates
pi0_final <- lapply(pi0EstSim.lin, function(x){x[[3]]})

FDRreg <- t(mapply(function(q,pi0){q*pi0}, data.frame(t(qValuesSimsBH)), pi0_final, SIMPLI

##get FDR-TPR table
scen4a <- estFDR.TPR(FDR.BL = FDRreg,
                     FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
```

```
                      FDR.Scott = FDR.Lin.ScottMat, FDR.Scott_emp = FDR.Lin.ScottMat_emp, r

  ##--------Spline fit-------##

  ##Get estimated FDR for each simulation:
  ##first pull out just the final estimates
  pi0_final <- lapply(pi0EstSim.spl, function(x){x[[3]]})

  FDRreg <- t(mapply(function(q,pi0){q*pi0}, data.frame(t(qValuesSimsBH)), pi0_final, SIMPLI

  ##get FDR-TPR table
  scen4b <- estFDR.TPR(FDR.BL = FDRreg,
                      FDR.BH = qValuesSimsBH, FDR.Storey = qValuesSimsStorey,
                      FDR.Scott = FDR.Spl.ScottMat, FDR.Scott_emp = FDR.Spl.ScottMat_emp, r

  print("")
  print(alt)
  print(scen1)
  print(scen2a)
  print(scen2b)
  print(scen3a)
  print(scen3b)
  print(scen4a)
  print(scen4b)

  save(list=c("scen1","scen2a","scen2b","scen3a","scen3b","scen4a","scen4b"),
       file=paste(alt,"FDR_TPR_sims.RData",sep="/"))
}
```

```
## [1] ""
## [1] "alt_z_large_10_0.2"
##                   FDR       TPR
## BL        0.05355989 0.5156749
## Scott     0.07834688 0.5155371
## Scott_emp 0.06076209 0.4730177
## Storey    0.05129523 0.5124650
## BH        0.04427963 0.4988641
##                   FDR       TPR
## BL        0.05023165 0.4822208
## Scott     0.09334947 0.6304185
## Scott_emp 0.08777677 0.5979585
## Storey    0.04808959 0.4718826
## BH        0.04323806 0.4611360
##                   FDR       TPR
## BL        0.05521238 0.4912519
## Scott     0.13325123 0.6279189
```

```
## Scott_emp 0.11120024 0.5980446
## Storey    0.04808959 0.4718826
## BH        0.04323806 0.4611360
##                 FDR       TPR
## BL        0.05211468 0.4460991
## Scott     0.08628730 0.5950804
## Scott_emp 0.09849207 0.5638793
## Storey    0.04966483 0.4344547
## BH        0.04537712 0.4274169
##                 FDR       TPR
## BL        0.05780106 0.4515775
## Scott     0.14342286 0.5924520
## Scott_emp 0.13167972 0.5659644
## Storey    0.04966483 0.4344547
## BH        0.04537712 0.4274169
##                 FDR       TPR
## BL        0.05320482 0.7176369
## Scott     0.05699604 0.7183461
## Scott_emp 0.02398552 0.6038272
## Storey    0.05025280 0.7135057
## BH        0.02937152 0.6547508
##                 FDR       TPR
## BL        0.05742520 0.7208558
## Scott     0.05882192 0.7181213
## Scott_emp 0.02487641 0.6046741
## Storey    0.05025280 0.7135057
## BH        0.02937152 0.6547508
## [1] ""
## [1] "alt_t_large_10_0.2"
##                  FDR        TPR
## BL        0.017708315 0.08291195
## Scott     0.099488837 0.51344831
## Scott_emp 0.077544441 0.57219703
## Storey    0.016369051 0.07961507
## BH        0.008203974 0.05875763
##                 FDR       TPR
## BL        0.03394387 0.0728598
## Scott     0.15036324 0.6314602
## Scott_emp 0.08111338 0.6132335
## Storey    0.03380206 0.0640629
## BH        0.01519505 0.0427090
##                 FDR        TPR
## BL        0.04003707 0.08593269
## Scott     0.16693211 0.63236995
## Scott_emp 0.09914180 0.61472509
```

```
## Storey    0.03380206 0.06406290
## BH        0.01519505 0.04270900
##                  FDR        TPR
## BL        0.02195972 0.03721674
## Scott     0.15185345 0.58677461
## Scott_emp 0.09468046 0.59425013
## Storey    0.01642586 0.02972172
## BH        0.01190227 0.01944693
##                  FDR        TPR
## BL        0.02672109 0.04240092
## Scott     0.18022232 0.58461646
## Scott_emp 0.12692979 0.59687213
## Storey    0.01642586 0.02972172
## BH        0.01190227 0.01944693
##                  FDR       TPR
## BL        0.02605760 0.5484342
## Scott     0.05521727 0.7149496
## Scott_emp 0.02756896 0.6455823
## Storey    0.02364359 0.5389964
## BH        0.01031425 0.4394924
##                  FDR       TPR
## BL        0.03034103 0.5541065
## Scott     0.05611583 0.7153062
## Scott_emp 0.02820071 0.6467158
## Storey    0.02364359 0.5389964
## BH        0.01031425 0.4394924
## [1] ""
## [1] "alt_z_large_20_0.2"
##                  FDR       TPR
## BL        0.05276469 0.5149518
## Scott     0.06237882 0.5142504
## Scott_emp 0.06800646 0.4842772
## Storey    0.04985602 0.5130473
## BH        0.04370583 0.5014886
##                  FDR       TPR
## BL        0.05164006 0.4856349
## Scott     0.06876304 0.6341434
## Scott_emp 0.07990103 0.5931462
## Storey    0.05078305 0.4756711
## BH        0.04647166 0.4652839
##                  FDR       TPR
## BL        0.05710163 0.4919371
## Scott     0.08330818 0.6327476
## Scott_emp 0.09222928 0.5958408
## Storey    0.05078305 0.4756711
```

```
## BH        0.04647166 0.4652839
##                 FDR       TPR
## BL        0.05462447 0.4512105
## Scott     0.07649123 0.5996476
## Scott_emp 0.09291504 0.5597685
## Storey    0.05237612 0.4400023
## BH        0.04766079 0.4315387
##                 FDR       TPR
## BL        0.05718352 0.4586166
## Scott     0.09621693 0.6015333
## Scott_emp 0.10597336 0.5632163
## Storey    0.05237612 0.4400023
## BH        0.04766079 0.4315387
##                 FDR       TPR
## BL        0.05305587 0.7176070
## Scott     0.05338662 0.7185959
## Scott_emp 0.02473186 0.6100018
## Storey    0.04914738 0.7138663
## BH        0.02884830 0.6556764
##                 FDR       TPR
## BL        0.05551952 0.7201748
## Scott     0.05455776 0.7187206
## Scott_emp 0.02490346 0.6106701
## Storey    0.04914738 0.7138663
## BH        0.02884830 0.6556764
## [1] ""
## [1] "alt_t_large_20_0.2"
##                   FDR        TPR
## BL        0.016660899 0.08025413
## Scott     0.091391598 0.51604992
## Scott_emp 0.074224319 0.57835132
## Storey    0.015238867 0.07646558
## BH        0.008798305 0.05730164
##                 FDR        TPR
## BL        0.03232553 0.08040807
## Scott     0.13889284 0.63822254
## Scott_emp 0.07331274 0.60966730
## Storey    0.03180666 0.06766318
## BH        0.01752752 0.04490296
##                 FDR        TPR
## BL        0.03740305 0.09214760
## Scott     0.14710494 0.63914918
## Scott_emp 0.08492604 0.61340168
## Storey    0.03180666 0.06766318
## BH        0.01752752 0.04490296
```

```
##                  FDR        TPR
## BL         0.02590214 0.04303103
## Scott      0.13805980 0.59445642
## Scott_emp  0.09634005 0.60121180
## Storey     0.02078485 0.03411238
## BH         0.01280078 0.02290597
##                  FDR        TPR
## BL         0.03582164 0.05190514
## Scott      0.15127096 0.59680333
## Scott_emp  0.11008205 0.60331368
## Storey     0.02078485 0.03411238
## BH         0.01280078 0.02290597
##                  FDR       TPR
## BL         0.02663979 0.5543117
## Scott      0.05358348 0.7182754
## Scott_emp  0.02905014 0.6505893
## Storey     0.02360131 0.5443722
## BH         0.01024094 0.4428448
##                  FDR       TPR
## BL         0.02979183 0.5597480
## Scott      0.05409868 0.7187626
## Scott_emp  0.02830247 0.6514593
## Storey     0.02360131 0.5443722
## BH         0.01024094 0.4428448
## [1] ""
## [1] "alt_z_large_10_0.5"
##                  FDR       TPR
## BL         0.07253661 0.5188830
## Scott      0.17118929 0.5181463
## Scott_emp  0.15907541 0.4875517
## Storey     0.06454066 0.5170876
## BH         0.05388249 0.5000167
##                  FDR       TPR
## BL         0.05852886 0.4828340
## Scott      0.20310420 0.6257512
## Scott_emp  0.19854314 0.6097132
## Storey     0.05279155 0.4676279
## BH         0.04515695 0.4558373
##                  FDR       TPR
## BL         0.08574940 0.4916928
## Scott      0.32503841 0.6331887
## Scott_emp  0.27694683 0.6140412
## Storey     0.05279155 0.4676279
## BH         0.04515695 0.4558373
##                  FDR       TPR
```

```
## BL        0.05829232 0.4424395
## Scott     0.17436031 0.5806585
## Scott_emp 0.17661516 0.5434183
## Storey    0.04893477 0.4295006
## BH        0.04213535 0.4197150
##                  FDR       TPR
## BL        0.08581922 0.4498013
## Scott     0.32705906 0.5809821
## Scott_emp 0.30174725 0.5564543
## Storey    0.04893477 0.4295006
## BH        0.04213535 0.4197150
##                  FDR       TPR
## BL        0.06276439 0.7237369
## Scott     0.07464356 0.7243350
## Scott_emp 0.03258800 0.5902770
## Storey    0.05526517 0.7190344
## BH        0.03188789 0.6577580
##                  FDR       TPR
## BL        0.07636794 0.7266568
## Scott     0.08336709 0.7214180
## Scott_emp 0.03825587 0.5932577
## Storey    0.05526517 0.7190344
## BH        0.03188789 0.6577580
## [1] ""
## [1] "alt_t_large_10_0.5"
##                  FDR        TPR
## BL        0.02170291 0.09318462
## Scott     0.13460746 0.50829617
## Scott_emp 0.14208217 0.57364847
## Storey    0.01582585 0.08524978
## BH        0.00902167 0.06147073
##                  FDR        TPR
## BL        0.03326040 0.07854136
## Scott     0.19247684 0.63059001
## Scott_emp 0.13594148 0.61184465
## Storey    0.03400396 0.06973630
## BH        0.01650183 0.04446926
##                  FDR        TPR
## BL        0.06192962 0.09902712
## Scott     0.27584630 0.63501590
## Scott_emp 0.21287180 0.61319772
## Storey    0.03400396 0.06973630
## BH        0.01650183 0.04446926
##                   FDR        TPR
## BL        0.022745790 0.04373291
```

```
## Scott     0.233956403 0.57987162
## Scott_emp 0.215002919 0.59483975
## Storey    0.013425970 0.03001752
## BH        0.006858308 0.02106027
##                   FDR        TPR
## BL        0.038010404 0.05572533
## Scott     0.359303065 0.58076115
## Scott_emp 0.314335705 0.60118621
## Storey    0.013425970 0.03001752
## BH        0.006858308 0.02106027
##                   FDR       TPR
## BL        0.03106743 0.5443862
## Scott     0.06095579 0.7137559
## Scott_emp 0.03366738 0.6352732
## Storey    0.02519775 0.5338275
## BH        0.01008121 0.4318904
##                   FDR       TPR
## BL        0.04289746 0.5530007
## Scott     0.06610054 0.7122268
## Scott_emp 0.03844901 0.6399110
## Storey    0.02519775 0.5338275
## BH        0.01008121 0.4318904
## [1] ""
## [1] "alt_z_large_20_0.5"
##                   FDR       TPR
## BL        0.06425587 0.5196063
## Scott     0.09986521 0.5174112
## Scott_emp 0.10669205 0.4758326
## Storey    0.06037320 0.5159887
## BH        0.05184343 0.5027814
##                   FDR       TPR
## BL        0.06086814 0.4841987
## Scott     0.12434879 0.6283082
## Scott_emp 0.13495365 0.5764808
## Storey    0.05728176 0.4727608
## BH        0.05138867 0.4616858
##                   FDR       TPR
## BL        0.07124063 0.4946679
## Scott     0.18672505 0.6262794
## Scott_emp 0.20374878 0.5803706
## Storey    0.05728176 0.4727608
## BH        0.05138867 0.4616858
##                   FDR       TPR
## BL        0.05609288 0.4535753
## Scott     0.11477691 0.5958328
```

```
## Scott_emp 0.15885120 0.5661230
## Storey    0.05153806 0.4395462
## BH        0.04630077 0.4320014
##                  FDR       TPR
## BL        0.06645575 0.4615212
## Scott     0.19876588 0.5902038
## Scott_emp 0.23572283 0.5689591
## Storey    0.05153806 0.4395462
## BH        0.04630077 0.4320014
##                  FDR       TPR
## BL        0.05786334 0.7206023
## Scott     0.06092475 0.7228116
## Scott_emp 0.02839699 0.5940208
## Storey    0.05251892 0.7163664
## BH        0.03141341 0.6574730
##                  FDR       TPR
## BL        0.06453412 0.7236274
## Scott     0.06434146 0.7216943
## Scott_emp 0.03018151 0.5958286
## Storey    0.05251892 0.7163664
## BH        0.03141341 0.6574730
## [1] ""
## [1] "alt_t_large_20_0.5"
##                  FDR        TPR
## BL        0.01738822 0.08612478
## Scott     0.10346817 0.51624143
## Scott_emp 0.11009299 0.57356324
## Storey    0.01522689 0.08234120
## BH        0.01027653 0.05899870
##                  FDR        TPR
## BL        0.03497499 0.07655733
## Scott     0.16306738 0.64161807
## Scott_emp 0.11936908 0.61703282
## Storey    0.03326201 0.06586144
## BH        0.02124571 0.04537897
##                  FDR        TPR
## BL        0.04662921 0.09115480
## Scott     0.19544925 0.63879834
## Scott_emp 0.16638337 0.62093291
## Storey    0.03326201 0.06586144
## BH        0.02124571 0.04537897
##                  FDR        TPR
## BL        0.03152529 0.04966123
## Scott     0.17603888 0.59309264
## Scott_emp 0.12994294 0.59043631
```

```
## Storey    0.02274673 0.03565821
## BH        0.01512717 0.02563299
##                  FDR        TPR
## BL        0.04419165 0.05644166
## Scott     0.23437307 0.59598913
## Scott_emp 0.20529098 0.59494003
## Storey    0.02274673 0.03565821
## BH        0.01512717 0.02563299
##                   FDR       TPR
## BL        0.026634256 0.5529151
## Scott     0.055073319 0.7194641
## Scott_emp 0.030364115 0.6468887
## Storey    0.022755522 0.5428327
## BH        0.009604134 0.4437055
##                   FDR       TPR
## BL        0.031751141 0.5584085
## Scott     0.057685841 0.7189130
## Scott_emp 0.030585569 0.6479218
## Storey    0.022755522 0.5428327
## BH        0.009604134 0.4437055
## [1] ""
## [1] "alt_z_large_10_0.9"
##                  FDR       TPR
## BL        0.14103676 0.5551145
## Scott     0.30613608 0.5466846
## Scott_emp 0.45625438 0.6559648
## Storey    0.06600279 0.5333599
## BH        0.04079522 0.5018259
##                  FDR       TPR
## BL        0.13316988 0.5112496
## Scott     0.35483575 0.6650883
## Scott_emp 0.55869149 0.7582413
## Storey    0.05887566 0.4900110
## BH        0.03277907 0.4611720
##                  FDR       TPR
## BL        0.35142681 0.5609336
## Scott     0.49900260 0.6737987
## Scott_emp 0.67533640 0.7759788
## Storey    0.05887566 0.4900110
## BH        0.03277907 0.4611720
##                  FDR       TPR
## BL        0.13272907 0.4561740
## Scott     0.33745940 0.5810555
## Scott_emp 0.66361991 0.7571640
## Storey    0.05350031 0.4338458
```

```
## BH        0.03317467 0.4065081
##                  FDR       TPR
## BL        0.40680526 0.5204811
## Scott     0.51524030 0.6156011
## Scott_emp 0.73002397 0.7740291
## Storey    0.05350031 0.4338458
## BH        0.03317467 0.4065081
##                  FDR       TPR
## BL        0.11226002 0.7401735
## Scott     0.12364716 0.7351101
## Scott_emp 0.11991813 0.6394591
## Storey    0.07034922 0.7252037
## BH        0.03101590 0.6583296
##                  FDR       TPR
## BL        0.19206819 0.7616910
## Scott     0.15634224 0.7332634
## Scott_emp 0.13771289 0.6432430
## Storey    0.07034922 0.7252037
## BH        0.03101590 0.6583296
## [1] ""
## [1] "alt_t_large_10_0.9"
##                  FDR        TPR
## BL        0.07740265 0.14948739
## Scott     0.23035236 0.51483653
## Scott_emp 0.38017932 0.70918240
## Storey    0.01629191 0.11420315
## BH        0.01014067 0.06731418
##                  FDR        TPR
## BL        0.10057381 0.12409222
## Scott     0.31506895 0.65403285
## Scott_emp 0.50042147 0.76219500
## Storey    0.04086844 0.11087659
## BH        0.01683483 0.06011217
##                  FDR        TPR
## BL        0.41724355 0.22438475
## Scott     0.43583537 0.68248575
## Scott_emp 0.60678591 0.78884661
## Storey    0.04086844 0.11087659
## BH        0.01683483 0.06011217
##                  FDR        TPR
## BL        0.12744520 0.10993234
## Scott     0.36154200 0.60467044
## Scott_emp 0.62864488 0.77195304
## Storey    0.02192334 0.05769839
## BH        0.01269145 0.02560077
```

```
##                  FDR        TPR
## BL         0.43007272 0.19326442
## Scott      0.48412940 0.62870766
## Scott_emp  0.70974620 0.78699345
## Storey     0.02192334 0.05769839
## BH         0.01269145 0.02560077
##                  FDR       TPR
## BL         0.06164998 0.5632721
## Scott      0.09176075 0.7207701
## Scott_emp  0.11085885 0.6827372
## Storey     0.03175551 0.5421425
## BH         0.01011616 0.4239925
##                  FDR       TPR
## BL         0.15099174 0.5928684
## Scott      0.10815824 0.7175735
## Scott_emp  0.11828039 0.6829751
## Storey     0.03175551 0.5421425
## BH         0.01011616 0.4239925
## [1] ""
## [1] "alt_z_large_20_0.9"
##                  FDR       TPR
## BL         0.08984881 0.5378872
## Scott      0.17564256 0.5325216
## Scott_emp  0.36216540 0.5789470
## Storey     0.06927286 0.5264861
## BH         0.05257449 0.5039001
##                  FDR       TPR
## BL         0.07795345 0.4956125
## Scott      0.19999707 0.6384129
## Scott_emp  0.47501389 0.6801241
## Storey     0.06430083 0.4803723
## BH         0.04878075 0.4622284
##                  FDR       TPR
## BL         0.18196664 0.5217095
## Scott      0.34546705 0.6437443
## Scott_emp  0.53583617 0.6977403
## Storey     0.06430083 0.4803723
## BH         0.04878075 0.4622284
##                  FDR       TPR
## BL         0.06354997 0.4734947
## Scott      0.23088456 0.6047066
## Scott_emp  0.48827791 0.6794683
## Storey     0.05111222 0.4607107
## BH         0.03955934 0.4395782
##                  FDR       TPR
```

```
## BL        0.21510759 0.5097829
## Scott     0.38447253 0.6088346
## Scott_emp 0.60478200 0.6973027
## Storey    0.05111222 0.4607107
## BH        0.03955934 0.4395782
##                 FDR       TPR
## BL        0.07741261 0.7305902
## Scott     0.08445235 0.7315289
## Scott_emp 0.06906999 0.5738515
## Storey    0.06111211 0.7219118
## BH        0.03133161 0.6590973
##                 FDR       TPR
## BL        0.11816173 0.7438123
## Scott     0.09974674 0.7275325
## Scott_emp 0.08020734 0.5783422
## Storey    0.06111211 0.7219118
## BH        0.03133161 0.6590973
## [1] ""
## [1] "alt_t_large_20_0.9"
##                  FDR        TPR
## BL        0.029928457 0.11482693
## Scott     0.144884705 0.51693384
## Scott_emp 0.290153161 0.64126250
## Storey    0.015068993 0.09899971
## BH        0.009378001 0.06171996
##                 FDR        TPR
## BL        0.03768592 0.10184554
## Scott     0.20899561 0.64859770
## Scott_emp 0.45700476 0.70607788
## Storey    0.02340838 0.07698789
## BH        0.01903922 0.05013662
##                 FDR        TPR
## BL        0.15846620 0.14177746
## Scott     0.32138376 0.64720956
## Scott_emp 0.54632419 0.70503858
## Storey    0.02340838 0.07698789
## BH        0.01903922 0.05013662
##                 FDR        TPR
## BL        0.05172311 0.07346602
## Scott     0.23925102 0.60704642
## Scott_emp 0.49710942 0.63505389
## Storey    0.03195145 0.05600588
## BH        0.01410107 0.03051603
##                 FDR        TPR
## BL        0.18961765 0.10605340
```

```
## Scott     0.35116729 0.61727731
## Scott_emp 0.60594038 0.65478395
## Storey    0.03195145 0.05600588
## BH        0.01410107 0.03051603
##                  FDR       TPR
## BL        0.036336550 0.5614771
## Scott     0.066324786 0.7219471
## Scott_emp 0.075334340 0.6748410
## Storey    0.023821091 0.5464265
## BH        0.009854302 0.4425526
##                  FDR       TPR
## BL        0.086347726 0.5836049
## Scott     0.074949671 0.7204753
## Scott_emp 0.079591358 0.6723138
## Storey    0.023821091 0.5464265
## BH        0.009854302 0.4425526
```

Session info:

```
devtools::session_info()

## Session info -------------------------------------------------

##  setting  value
##  version  R version 3.3.1 (2016-06-21)
##  system   x86_64, mingw32
##  ui       RTerm
##  language (EN)
##  collate  English_United States.1252
##  tz       America/New_York
##  date     2017-06-15

## Packages -----------------------------------------------------

##  package    * version date       source
##  assertthat   0.1     2013-12-06 CRAN (R 3.3.1)
##  colorspace   1.2-6   2015-03-11 CRAN (R 3.3.1)
##  devtools     1.12.0  2016-06-24 CRAN (R 3.3.3)
##  digest       0.6.9   2016-01-08 CRAN (R 3.3.1)
##  evaluate     0.10    2016-10-11 CRAN (R 3.3.1)
##  ggplot2      2.2.1   2016-12-30 CRAN (R 3.3.3)
##  gtable       0.2.0   2016-02-26 CRAN (R 3.3.1)
##  highr        0.6     2016-05-09 CRAN (R 3.3.1)
##  knitr      * 1.15.1  2016-11-22 CRAN (R 3.3.1)
##  lazyeval     0.2.0   2016-06-12 CRAN (R 3.3.1)
##  magrittr     1.5     2014-11-22 CRAN (R 3.3.1)
##  MASS       * 7.3-45  2016-04-21 CRAN (R 3.3.1)
```

```
##  memoise      1.0.0   2016-01-29 CRAN (R 3.3.1)
##  munsell      0.4.3   2016-02-13 CRAN (R 3.3.1)
##  plyr         1.8.4   2016-06-08 CRAN (R 3.3.1)
##  qvalue     * 2.4.2   2016-05-16 Bioconductor
##  Rcpp         0.12.10 2017-03-19 CRAN (R 3.3.3)
##  reshape2     1.4.1   2014-12-06 CRAN (R 3.3.1)
##  scales       0.4.1   2016-11-09 CRAN (R 3.3.3)
##  stringi      1.1.1   2016-05-27 CRAN (R 3.3.0)
##  stringr      1.0.0   2015-04-30 CRAN (R 3.3.1)
##  tibble       1.2     2016-08-26 CRAN (R 3.3.2)
##  withr        1.0.2   2016-06-20 CRAN (R 3.3.1)
##  xtable     * 1.8-2   2016-02-05 CRAN (R 3.3.1)
```