

```
## 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  $E\{\pi_0(x)\}$  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,
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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, n

##-----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, n

##-----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)

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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,

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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 Percent used
## BL      0.05355989 0.5156749      100
## Scott    0.07834688 0.5155371      100
## Scott_emp 0.06076209 0.4730177      100
## Storey   0.05129523 0.5124650      100
## BH       0.04427963 0.4988641      100
##           FDR      TPR Percent used
## BL      0.05023165 0.4822208      100
## Scott    0.09334947 0.6304185      100
## Scott_emp 0.08777677 0.5979585      100
## Storey   0.04808959 0.4718826      100
## BH       0.04323806 0.4611360      100
##           FDR      TPR Percent used
## BL      0.05521238 0.4912519      100
## Scott    0.13325123 0.6279189      100

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## Scott_emp 0.11120024 0.5980446      100
## Storey    0.04808959 0.4718826      100
## BH        0.04323806 0.4611360      100
##           FDR        TPR Percent used
## BL        0.05211468 0.4460991      100
## Scott      0.08628730 0.5950804      100
## Scott_emp  0.09849207 0.5638793      100
## Storey     0.04966483 0.4344547      100
## BH         0.04537712 0.4274169      100
##           FDR        TPR Percent used
## BL        0.05780106 0.4515775      100
## Scott      0.14342286 0.5924520      100
## Scott_emp  0.13167972 0.5659644      100
## Storey     0.04966483 0.4344547      100
## BH         0.04537712 0.4274169      100
##           FDR        TPR Percent used
## BL        0.05320482 0.7176369      100
## Scott      0.05699604 0.7183461      100
## Scott_emp  0.02398552 0.6038272      100
## Storey     0.05025280 0.7135057      100
## BH         0.02937152 0.6547508      100
##           FDR        TPR Percent used
## BL        0.05742520 0.7208558      100
## Scott      0.05882192 0.7181213      100
## Scott_emp  0.02487641 0.6046741      100
## Storey     0.05025280 0.7135057      100
## BH         0.02937152 0.6547508      100
## [1] ""
## [1] "alt_t_large_10_0.2"
##           FDR        TPR Percent used
## BL        0.017708315 0.08291195      100
## Scott      0.099488837 0.51344831      100
## Scott_emp  0.077544441 0.57219703      100
## Storey     0.016369051 0.07961507      100
## BH         0.008203974 0.05875763      100
##           FDR        TPR Percent used
## BL        0.03394387 0.0728598      100
## Scott      0.15036324 0.6314602      100
## Scott_emp  0.08111338 0.6132335      100
## Storey     0.03380206 0.0640629      100
## BH         0.01519505 0.0427090      100
##           FDR        TPR Percent used
## BL        0.04003707 0.08593269      100
## Scott      0.16693211 0.63236995      100
## Scott_emp  0.09914180 0.61472509      100

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## Storey      0.03380206 0.06406290      100
## BH          0.01519505 0.04270900      100
##              FDR          TPR Percent used
## BL          0.02195972 0.03721674      100
## Scott       0.15185345 0.58677461      100
## Scott_emp   0.09468046 0.59425013      100
## Storey      0.01642586 0.02972172      100
## BH          0.01190227 0.01944693      100
##              FDR          TPR Percent used
## BL          0.02672109 0.04240092      100
## Scott       0.18022232 0.58461646      100
## Scott_emp   0.12692979 0.59687213      100
## Storey      0.01642586 0.02972172      100
## BH          0.01190227 0.01944693      100
##              FDR          TPR Percent used
## BL          0.02605760 0.5484342      100
## Scott       0.05521727 0.7149496      100
## Scott_emp   0.02756896 0.6455823      100
## Storey      0.02364359 0.5389964      100
## BH          0.01031425 0.4394924      100
##              FDR          TPR Percent used
## BL          0.03034103 0.5541065      100
## Scott       0.05611583 0.7153062      100
## Scott_emp   0.02820071 0.6467158      100
## Storey      0.02364359 0.5389964      100
## BH          0.01031425 0.4394924      100
## [1] ""
## [1] "alt_z_large_20_0.2"
##              FDR          TPR Percent used
## BL          0.05276469 0.5149518      100
## Scott       0.06237882 0.5142504      100
## Scott_emp   0.06800646 0.4842772      100
## Storey      0.04985602 0.5130473      100
## BH          0.04370583 0.5014886      100
##              FDR          TPR Percent used
## BL          0.05164006 0.4856349      100
## Scott       0.06876304 0.6341434      100
## Scott_emp   0.07990103 0.5931462      100
## Storey      0.05078305 0.4756711      100
## BH          0.04647166 0.4652839      100
##              FDR          TPR Percent used
## BL          0.05710163 0.4919371      100
## Scott       0.08330818 0.6327476      100
## Scott_emp   0.09222928 0.5958408      100
## Storey      0.05078305 0.4756711      100

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## BH      0.04647166 0.4652839      100
##          FDR      TPR Percent used
## BL      0.05462447 0.4512105      100
## Scott   0.07649123 0.5996476      100
## Scott_emp 0.09291504 0.5597685      100
## Storey  0.05237612 0.4400023      100
## BH      0.04766079 0.4315387      100
##          FDR      TPR Percent used
## BL      0.05718352 0.4586166      100
## Scott   0.09621693 0.6015333      100
## Scott_emp 0.10597336 0.5632163      100
## Storey  0.05237612 0.4400023      100
## BH      0.04766079 0.4315387      100
##          FDR      TPR Percent used
## BL      0.05305587 0.7176070      100
## Scott   0.05338662 0.7185959      100
## Scott_emp 0.02473186 0.6100018      100
## Storey  0.04914738 0.7138663      100
## BH      0.02884830 0.6556764      100
##          FDR      TPR Percent used
## BL      0.05551952 0.7201748      100
## Scott   0.05455776 0.7187206      100
## Scott_emp 0.02490346 0.6106701      100
## Storey  0.04914738 0.7138663      100
## BH      0.02884830 0.6556764      100
## [1] ""
## [1] "alt_t_large_20_0.2"
##          FDR      TPR Percent used
## BL      0.016660899 0.08025413      100
## Scott   0.091391598 0.51604992      100
## Scott_emp 0.074224319 0.57835132      100
## Storey  0.015238867 0.07646558      100
## BH      0.008798305 0.05730164      100
##          FDR      TPR Percent used
## BL      0.03232553 0.08040807      100
## Scott   0.13889284 0.63822254      100
## Scott_emp 0.07331274 0.60966730      100
## Storey  0.03180666 0.06766318      100
## BH      0.01752752 0.04490296      100
##          FDR      TPR Percent used
## BL      0.03740305 0.09214760      100
## Scott   0.14710494 0.63914918      100
## Scott_emp 0.08492604 0.61340168      100
## Storey  0.03180666 0.06766318      100
## BH      0.01752752 0.04490296      100

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##          FDR          TPR Percent used
## BL          0.02590214 0.04303103          100
## Scott        0.13805980 0.59445642          100
## Scott_emp     0.09634005 0.60121180          100
## Storey        0.02078485 0.03411238          100
## BH           0.01280078 0.02290597          100
##          FDR          TPR Percent used
## BL          0.03582164 0.05190514          100
## Scott        0.15127096 0.59680333          100
## Scott_emp     0.11008205 0.60331368          100
## Storey        0.02078485 0.03411238          100
## BH           0.01280078 0.02290597          100
##          FDR          TPR Percent used
## BL          0.02663979 0.5543117           100
## Scott        0.05358348 0.7182754           100
## Scott_emp     0.02905014 0.6505893           100
## Storey        0.02360131 0.5443722           100
## BH           0.01024094 0.4428448           100
##          FDR          TPR Percent used
## BL          0.02979183 0.5597480           100
## Scott        0.05409868 0.7187626           100
## Scott_emp     0.02830247 0.6514593           100
## Storey        0.02360131 0.5443722           100
## BH           0.01024094 0.4428448           100
## [1] ""
## [1] "alt_z_large_10_0.5"
##          FDR          TPR Percent used
## BL          0.07253661 0.5188830           100
## Scott        0.17118929 0.5181463           100
## Scott_emp     0.15907541 0.4875517            99
## Storey        0.06454066 0.5170876           100
## BH           0.05388249 0.5000167           100
##          FDR          TPR Percent used
## BL          0.05852886 0.4828340           100.0
## Scott        0.20310420 0.6257512           100.0
## Scott_emp     0.19854314 0.6097132            99.5
## Storey        0.05279155 0.4676279           100.0
## BH           0.04515695 0.4558373           100.0
##          FDR          TPR Percent used
## BL          0.08574940 0.4916928           100.0
## Scott        0.32503841 0.6331887           100.0
## Scott_emp     0.27694683 0.6140412            99.5
## Storey        0.05279155 0.4676279           100.0
## BH           0.04515695 0.4558373           100.0
##          FDR          TPR Percent used

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## BL      0.05829232 0.4424395      100.0
## Scott   0.17436031 0.5806585      100.0
## Scott_emp 0.17661516 0.5434183      99.5
## Storey   0.04893477 0.4295006      100.0
## BH       0.04213535 0.4197150      100.0
##          FDR      TPR Percent used
## BL      0.08581922 0.4498013      100.0
## Scott   0.32705906 0.5809821      100.0
## Scott_emp 0.30174725 0.5564543      99.5
## Storey   0.04893477 0.4295006      100.0
## BH       0.04213535 0.4197150      100.0
##          FDR      TPR Percent used
## BL      0.06276439 0.7237369      100.0
## Scott   0.07464356 0.7243350      100.0
## Scott_emp 0.03258800 0.5902770      99.5
## Storey   0.05526517 0.7190344      100.0
## BH       0.03188789 0.6577580      100.0
##          FDR      TPR Percent used
## BL      0.07636794 0.7266568      100.0
## Scott   0.08336709 0.7214180      100.0
## Scott_emp 0.03825587 0.5932577      99.5
## Storey   0.05526517 0.7190344      100.0
## BH       0.03188789 0.6577580      100.0
## [1] ""
## [1] "alt_t_large_10_0.5"
##          FDR      TPR Percent used
## BL      0.02170291 0.09318462      100
## Scott   0.13460746 0.50829617      100
## Scott_emp 0.14208217 0.57364847      100
## Storey   0.01582585 0.08524978      100
## BH       0.00902167 0.06147073      100
##          FDR      TPR Percent used
## BL      0.03326040 0.07854136      100.0
## Scott   0.19247684 0.63059001      100.0
## Scott_emp 0.13594148 0.61184465      99.5
## Storey   0.03400396 0.06973630      100.0
## BH       0.01650183 0.04446926      100.0
##          FDR      TPR Percent used
## BL      0.06192962 0.09902712      100.0
## Scott   0.27584630 0.63501590      100.0
## Scott_emp 0.21287180 0.61319772      99.5
## Storey   0.03400396 0.06973630      100.0
## BH       0.01650183 0.04446926      100.0
##          FDR      TPR Percent used
## BL      0.022745790 0.04373291      100

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## Scott      0.233956403 0.57987162      100
## Scott_emp  0.215002919 0.59483975      99
## Storey     0.013425970 0.03001752      100
## BH         0.006858308 0.02106027      100
##           FDR          TPR Percent used
## BL         0.038010404 0.05572533      100
## Scott      0.359303065 0.58076115      100
## Scott_emp  0.314335705 0.60118621      99
## Storey     0.013425970 0.03001752      100
## BH         0.006858308 0.02106027      100
##           FDR          TPR Percent used
## BL         0.03106743 0.5443862      100
## Scott      0.06095579 0.7137559      100
## Scott_emp  0.03366738 0.6352732      100
## Storey     0.02519775 0.5338275      100
## BH         0.01008121 0.4318904      100
##           FDR          TPR Percent used
## BL         0.04289746 0.5530007      100
## Scott      0.06610054 0.7122268      100
## Scott_emp  0.03844901 0.6399110      100
## Storey     0.02519775 0.5338275      100
## BH         0.01008121 0.4318904      100
## [1] ""
## [1] "alt_z_large_20_0.5"
##           FDR          TPR Percent used
## BL         0.06425587 0.5196063      100
## Scott      0.09986521 0.5174112      100
## Scott_emp  0.10669205 0.4758326      100
## Storey     0.06037320 0.5159887      100
## BH         0.05184343 0.5027814      100
##           FDR          TPR Percent used
## BL         0.06086814 0.4841987      100
## Scott      0.12434879 0.6283082      100
## Scott_emp  0.13495365 0.5764808      100
## Storey     0.05728176 0.4727608      100
## BH         0.05138867 0.4616858      100
##           FDR          TPR Percent used
## BL         0.07124063 0.4946679      100
## Scott      0.18672505 0.6262794      100
## Scott_emp  0.20374878 0.5803706      100
## Storey     0.05728176 0.4727608      100
## BH         0.05138867 0.4616858      100
##           FDR          TPR Percent used
## BL         0.05609288 0.4535753      100
## Scott      0.11477691 0.5958328      100

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## Scott_emp 0.15885120 0.5661230      99
## Storey    0.05153806 0.4395462     100
## BH        0.04630077 0.4320014     100
##           FDR        TPR Percent used
## BL        0.06645575 0.4615212     100
## Scott      0.19876588 0.5902038     100
## Scott_emp  0.23572283 0.5689591     99
## Storey     0.05153806 0.4395462     100
## BH         0.04630077 0.4320014     100
##           FDR        TPR Percent used
## BL        0.05786334 0.7206023     100
## Scott      0.06092475 0.7228116     100
## Scott_emp  0.02839699 0.5940208     100
## Storey     0.05251892 0.7163664     100
## BH         0.03141341 0.6574730     100
##           FDR        TPR Percent used
## BL        0.06453412 0.7236274     100
## Scott      0.06434146 0.7216943     100
## Scott_emp  0.03018151 0.5958286     100
## Storey     0.05251892 0.7163664     100
## BH         0.03141341 0.6574730     100
## [1] ""
## [1] "alt_t_large_20_0.5"
##           FDR        TPR Percent used
## BL        0.01738822 0.08612478     100
## Scott      0.10346817 0.51624143     100
## Scott_emp  0.11009299 0.57356324     100
## Storey     0.01522689 0.08234120     100
## BH         0.01027653 0.05899870     100
##           FDR        TPR Percent used
## BL        0.03497499 0.07655733     100
## Scott      0.16306738 0.64161807     100
## Scott_emp  0.11936908 0.61703282     100
## Storey     0.03326201 0.06586144     100
## BH         0.02124571 0.04537897     100
##           FDR        TPR Percent used
## BL        0.04662921 0.09115480     100
## Scott      0.19544925 0.63879834     100
## Scott_emp  0.16638337 0.62093291     100
## Storey     0.03326201 0.06586144     100
## BH         0.02124571 0.04537897     100
##           FDR        TPR Percent used
## BL        0.03152529 0.04966123     100
## Scott      0.17603888 0.59309264     100
## Scott_emp  0.12994294 0.59043631     100

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## Storey      0.02274673 0.03565821      100
## BH          0.01512717 0.02563299      100
##              FDR          TPR Percent used
## BL          0.04419165 0.05644166      100
## Scott       0.23437307 0.59598913      100
## Scott_emp   0.20529098 0.59494003      100
## Storey      0.02274673 0.03565821      100
## BH          0.01512717 0.02563299      100
##              FDR          TPR Percent used
## BL          0.026634256 0.5529151      100
## Scott       0.055073319 0.7194641      100
## Scott_emp   0.030364115 0.6468887      100
## Storey      0.022755522 0.5428327      100
## BH          0.009604134 0.4437055      100
##              FDR          TPR Percent used
## BL          0.031751141 0.5584085      100
## Scott       0.057685841 0.7189130      100
## Scott_emp   0.030585569 0.6479218      100
## Storey      0.022755522 0.5428327      100
## BH          0.009604134 0.4437055      100
## [1] ""
## [1] "alt_z_large_10_0.9"
##              FDR          TPR Percent used
## BL          0.14103676 0.5551145      100
## Scott       0.30613608 0.5466846      100
## Scott_emp   0.45625438 0.6559648       77
## Storey      0.06600279 0.5333599      100
## BH          0.04079522 0.5018259      100
##              FDR          TPR Percent used
## BL          0.13316988 0.5112496     100.0
## Scott       0.35483575 0.6650883     100.0
## Scott_emp   0.55869149 0.7582413      80.5
## Storey      0.05887566 0.4900110     100.0
## BH          0.03277907 0.4611720     100.0
##              FDR          TPR Percent used
## BL          0.35142681 0.5609336     100.0
## Scott       0.49900260 0.6737987     100.0
## Scott_emp   0.67533640 0.7759788      80.5
## Storey      0.05887566 0.4900110     100.0
## BH          0.03277907 0.4611720     100.0
##              FDR          TPR Percent used
## BL          0.13272907 0.4561740      100
## Scott       0.33745940 0.5810555      100
## Scott_emp   0.66361991 0.7571640       67
## Storey      0.05350031 0.4338458      100

```

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## BH      0.03317467 0.4065081      100
##          FDR      TPR Percent used
## BL      0.40680526 0.5204811      100
## Scott   0.51524030 0.6156011      100
## Scott_emp 0.73002397 0.7740291      67
## Storey  0.05350031 0.4338458      100
## BH      0.03317467 0.4065081      100
##          FDR      TPR Percent used
## BL      0.11226002 0.7401735      100
## Scott   0.12364716 0.7351101      100
## Scott_emp 0.11991813 0.6394591      89
## Storey  0.07034922 0.7252037      100
## BH      0.03101590 0.6583296      100
##          FDR      TPR Percent used
## BL      0.19206819 0.7616910      100
## Scott   0.15634224 0.7332634      100
## Scott_emp 0.13771289 0.6432430      89
## Storey  0.07034922 0.7252037      100
## BH      0.03101590 0.6583296      100
## [1] ""
## [1] "alt_t_large_10_0.9"
##          FDR      TPR Percent used
## BL      0.07740265 0.14948739      100.0
## Scott   0.23035236 0.51483653      100.0
## Scott_emp 0.38017932 0.70918240      82.5
## Storey  0.01629191 0.11420315      99.5
## BH      0.01014067 0.06731418      100.0
##          FDR      TPR Percent used
## BL      0.10057381 0.12409222      100.0
## Scott   0.31506895 0.65403285      100.0
## Scott_emp 0.50042147 0.76219500      71.5
## Storey  0.04086844 0.11087659      100.0
## BH      0.01683483 0.06011217      100.0
##          FDR      TPR Percent used
## BL      0.41724355 0.22438475      100.0
## Scott   0.43583537 0.68248575      100.0
## Scott_emp 0.60678591 0.78884661      71.5
## Storey  0.04086844 0.11087659      100.0
## BH      0.01683483 0.06011217      100.0
##          FDR      TPR Percent used
## BL      0.12744520 0.10993234      100
## Scott   0.36154200 0.60467044      100
## Scott_emp 0.62864488 0.77195304      72
## Storey  0.02192334 0.05769839      100
## BH      0.01269145 0.02560077      100

```

```

##          FDR          TPR Percent used
## BL          0.43007272 0.19326442          100
## Scott        0.48412940 0.62870766          100
## Scott_emp    0.70974620 0.78699345           72
## Storey       0.02192334 0.05769839          100
## BH           0.01269145 0.02560077          100
##          FDR          TPR Percent used
## BL          0.06164998 0.5632721          100
## Scott        0.09176075 0.7207701          100
## Scott_emp    0.11085885 0.6827372           92
## Storey       0.03175551 0.5421425          100
## BH           0.01011616 0.4239925          100
##          FDR          TPR Percent used
## BL          0.15099174 0.5928684          100
## Scott        0.10815824 0.7175735          100
## Scott_emp    0.11828039 0.6829751           92
## Storey       0.03175551 0.5421425          100
## BH           0.01011616 0.4239925          100
## [1] ""
## [1] "alt_z_large_20_0.9"
##          FDR          TPR Percent used
## BL          0.08984881 0.5378872          100.0
## Scott        0.17564256 0.5325216          100.0
## Scott_emp    0.36216540 0.5789470           93.5
## Storey       0.06927286 0.5264861          100.0
## BH           0.05257449 0.5039001          100.0
##          FDR          TPR Percent used
## BL          0.07795345 0.4956125          100.0
## Scott        0.19999707 0.6384129          100.0
## Scott_emp    0.47501389 0.6801241           83.5
## Storey       0.06430083 0.4803723          100.0
## BH           0.04878075 0.4622284          100.0
##          FDR          TPR Percent used
## BL          0.18196664 0.5217095          100.0
## Scott        0.34546705 0.6437443          100.0
## Scott_emp    0.53583617 0.6977403           83.5
## Storey       0.06430083 0.4803723          100.0
## BH           0.04878075 0.4622284          100.0
##          FDR          TPR Percent used
## BL          0.06354997 0.4734947          100.0
## Scott        0.23088456 0.6047066          100.0
## Scott_emp    0.48827791 0.6794683           83.5
## Storey       0.05111222 0.4607107          100.0
## BH           0.03955934 0.4395782          100.0
##          FDR          TPR Percent used

```

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## BL      0.21510759 0.5097829      100.0
## Scott   0.38447253 0.6088346      100.0
## Scott_emp 0.60478200 0.6973027      83.5
## Storey   0.05111222 0.4607107      100.0
## BH       0.03955934 0.4395782      100.0
##          FDR      TPR Percent used
## BL      0.07741261 0.7305902      100
## Scott   0.08445235 0.7315289      100
## Scott_emp 0.06906999 0.5738515      97
## Storey   0.06111211 0.7219118      100
## BH       0.03133161 0.6590973      100
##          FDR      TPR Percent used
## BL      0.11816173 0.7438123      100
## Scott   0.09974674 0.7275325      100
## Scott_emp 0.08020734 0.5783422      97
## Storey   0.06111211 0.7219118      100
## BH       0.03133161 0.6590973      100
## [1] ""
## [1] "alt_t_large_20_0.9"
##          FDR      TPR Percent used
## BL      0.029928457 0.11482693      100.0
## Scott   0.144884705 0.51693384      100.0
## Scott_emp 0.290153161 0.64126250      91.5
## Storey   0.015068993 0.09899971      100.0
## BH       0.009378001 0.06171996      100.0
##          FDR      TPR Percent used
## BL      0.03768592 0.10184554      100.0
## Scott   0.20899561 0.64859770      100.0
## Scott_emp 0.45700476 0.70607788      82.5
## Storey   0.02340838 0.07698789      100.0
## BH       0.01903922 0.05013662      100.0
##          FDR      TPR Percent used
## BL      0.15846620 0.14177746      100.0
## Scott   0.32138376 0.64720956      100.0
## Scott_emp 0.54632419 0.70503858      82.5
## Storey   0.02340838 0.07698789      100.0
## BH       0.01903922 0.05013662      100.0
##          FDR      TPR Percent used
## BL      0.05172311 0.07346602      100
## Scott   0.23925102 0.60704642      100
## Scott_emp 0.49710942 0.63505389      84
## Storey   0.03195145 0.05600588      100
## BH       0.01410107 0.03051603      100
##          FDR      TPR Percent used
## BL      0.18961765 0.10605340      100

```

```
## Scott      0.35116729 0.61727731      100
## Scott_emp  0.60594038 0.65478395       84
## Storey     0.03195145 0.05600588      100
## BH         0.01410107 0.03051603      100
##           FDR      TPR Percent used
## BL         0.036336550 0.5614771      100
## Scott      0.066324786 0.7219471      100
## Scott_emp  0.075334340 0.6748410       96
## Storey     0.023821091 0.5464265      100
## BH         0.009854302 0.4425526      100
##           FDR      TPR Percent used
## BL         0.086347726 0.5836049      100
## Scott      0.074949671 0.7204753      100
## Scott_emp  0.079591358 0.6723138       96
## Storey     0.023821091 0.5464265      100
## BH         0.009854302 0.4425526      100
```

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 2017-06-22

## 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)