

```

## Load libraries
library(splines)
library(MASS)
library(FDRreg)

## Loading required package: fda
## Warning: package 'fda' was built under R version 3.3.3
## Loading required package: Matrix
##
## Attaching package: 'fda'
## The following object is masked from 'package:graphics':
##
##      matplot
## Loading required package: BayesLogit
## Warning: package 'BayesLogit' was built under R version 3.3.2
## Loading required package: mvtnorm
## Warning: package 'mvtnorm' was built under R version 3.3.2

library(curl)

library(doParallel) ##to make cluster (on Windows)

## Loading required package: foreach
## Loading required package: iterators
## Loading required package: parallel

library(foreach) ##to use foreach function that does the parallel processing
library(doRNG) ##for reproducible seeds when doing parallel processing

## Loading required package: rngtools
## Warning: package 'rngtools' was built under R version 3.3.2
## Loading required package: pkgmaker
## Warning: package 'pkgmaker' was built under R version 3.3.2
## Loading required package: registry
## Warning: package 'registry' was built under R version 3.3.2
##
## Attaching package: 'pkgmaker'
## The following object is masked from 'package:base':
##
##      isNamespaceLoaded

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

options(warn=1)

```

Define nulltype for Scott method:

```
nulltype <- "empirical"
```

Simulations are performed for a variety of alternative distributions:

```
alts <- c("alt_beta", "alt_chisq_large_3_3", "alt_chisq_large",  
         "alt_chisq_small_3_3", "alt_chisq_small",  
         "alt_t_large", "alt_t_small",  
         "alt_z_large",  
         "alt_z_small")
```

## 1 Probability of being a false positive is linear

Perform estimation and save estimates:

```
set.seed(880184)  
  
for(alt in alts[6:9])  
{  
  print(alt)  
  
  load(paste(alt, "simResults_5.RData", sep="/"))  
  ntest <- ncol(zValuesSims)  
  
  pi0hatScottMat_emp <- estimate_Scott_sims(zValuesSims, tme, nulltype)  
  
  pi0hatScottMean_emp <- colMeans(pi0hatScottMat_emp[,1:ntest])  
  pi0hatScottVar_emp <- apply(pi0hatScottMat_emp[,1:ntest], 2, var)  
  
  pi0hat.ScottMat_emp <- pi0hatScottMat_emp[,1:ntest]  
  FDR.ScottMat_emp <- pi0hatScottMat_emp[, (ntest+1):(2*ntest)]  
  
  ##save full results  
  save(file=paste(alt, "simResults_pi0x_Scott_emp_5_full.RData", sep="/"),  
       list=c("pi0hat.ScottMat_emp", "FDR.ScottMat_emp"))  
  
  ##save summary results  
  save(file=paste(alt, "simResults_pi0x_Scott_emp_5.RData", sep="/"),  
       list=c("tme", "pi0",  
             "pi0hatScottMean_emp", "pi0hatScottVar_emp"))  
}  
  
## [1] "alt_t_large"  
## [1] "alt_t_small"  
## [1] "alt_z_large"  
## [1] "alt_z_small"
```

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         2018-09-05

## Packages -----
##   package      * version date
##   assertthat   0.1      2013-12-06
##   BayesLogit    * 0.6      2016-10-20
##   bindr         0.1      2016-11-13
##   bindrcpp     0.2      2017-06-17
##   codetools     0.2-14   2015-07-15
##   colorspace   1.2-6    2015-03-11
##   curl          * 0.9.7    2016-04-10
##   devtools     1.12.0   2016-06-24
##   digest        0.6.12   2017-01-27
##   doParallel    * 1.0.10   2015-10-14
##   doRNG         * 1.6      2014-03-07
##   dplyr         0.7.4    2017-09-28
##   evaluate      0.10     2016-10-11
##   fda           * 2.4.4    2014-12-16
##   FDRreg        * 0.2-1    2017-05-03
##   foreach       * 1.4.3    2015-10-13
##   ggdendro      0.1-20   2016-04-27
##   ggplot2       2.2.1    2016-12-30
##   glue          1.1.1    2017-06-21
##   gridExtra     2.2.1    2016-02-29
##   gtable        0.2.0    2016-02-26
##   highr         0.6      2016-05-09
##   iterators     * 1.0.8    2015-10-13
##   knitr         * 1.17     2017-08-10
##   lattice       0.20-33  2015-07-14
##   lazyeval      0.2.0    2016-06-12
##   magrittr      1.5      2014-11-22
##   MASS          * 7.3-45   2016-04-21
##   Matrix        * 1.2-6    2016-05-02
```

```

## memoise      1.0.0    2016-01-29
## mosaic       0.14.4   2016-07-29
## mosaicData   0.14.0   2016-06-17
## munsell      0.4.3    2016-02-13
## mvtnorm      * 1.0-6   2017-03-02
## pkgconfig    2.0.1    2017-03-21
## pkgmaker     * 0.22    2014-05-14
## plyr         1.8.4    2016-06-08
## purrr        0.2.4    2017-10-18
## R6           2.1.2    2016-01-26
## Rcpp         0.12.13  2017-09-28
## registry     * 0.3     2015-07-08
## rlang        0.1.4    2017-11-05
## rngtools     * 1.2.4   2014-03-06
## scales       0.4.1    2016-11-09
## stringi      1.1.1    2016-05-27
## stringr      1.2.0    2017-02-18
## tibble       1.3.3    2017-05-28
## tidyr        0.7.2    2017-10-16
## withr        1.0.2    2016-06-20
## xtable       1.8-2    2016-02-05
## source
## CRAN (R 3.3.1)
## CRAN (R 3.3.2)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## Github (jgscott/FDRreg@8025d1a)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.0)

```

```
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.2)
## CRAN (R 3.3.3)
## CRAN (R 3.3.2)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.3)
## CRAN (R 3.3.2)
## CRAN (R 3.3.3)
## CRAN (R 3.3.2)
## CRAN (R 3.3.3)
## CRAN (R 3.3.2)
## CRAN (R 3.3.3)
## CRAN (R 3.3.0)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.3)
## CRAN (R 3.3.1)
## CRAN (R 3.3.1)
```