

```

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

## Error in library(swfdr): there is no package called 'swfdr'

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

##don't need doRNG here, but easier to keep it in

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

```

Function to pull out means and variances across simulations:

```

pullMeansVars <- function(pi0EstSim)
{
  ##pull out estimates at lambda=0.8, lambda=0.9, and final estimate
  pi0hat0.8 <- sapply(pi0EstSim, function(x){x[[1]]})
  pi0hat0.9 <- sapply(pi0EstSim, function(x){x[[2]]})
  pi0hatFinal <- sapply(pi0EstSim, function(x){x[[3]]})

  ##get means across simulations
  pi0hatMean0.8 <- rowMeans(pi0hat0.8)
  pi0hatMean0.9 <- rowMeans(pi0hat0.9)
  pi0hatMeanFinal <- rowMeans(pi0hatFinal)
}

```

```

##also get variances across simulations
pi0hatVar0.8 <- apply(pi0hat0.8,1,var)
pi0hatVar0.9 <- apply(pi0hat0.9,1,var)
pi0hatVarFinal <- apply(pi0hatFinal,1,var)

return(list(pi0hatMean0.8=pi0hatMean0.8,
            pi0hatMean0.9=pi0hatMean0.9,
            pi0hatMeanFinal=pi0hatMeanFinal,
            pi0hatVar0.8=pi0hatVar0.8,
            pi0hatVar0.9=pi0hatVar0.9,
            pi0hatVarFinal=pi0hatVarFinal))
}

```

Nothing from alternative distribution, since this is for the global null:

```
folder <- "global_null"
```

1 Probability of being a false positive is 1

Perform estimation and save estimates:

```

load(paste(folder,"simResults_0.RData",sep="/"))

pi0EstSim <- estimate_pi0x_sims(pValuesSims, tme)

##pull out means and variances of estimates at lambda=0.8, lambda=0.9, and final estimate
pi0MeansVars <- pullMeansVars(pi0EstSim)

##save full results
save(file=paste(folder,"simResults_pi0x_thresh_0_full.RData",sep="/"),
      list=c("pi0EstSim"))

##save summary results
save(file=paste(folder,"simResults_pi0x_thresh_0.RData",sep="/"),
      list=c("tme", "pi0", "pi0MeansVars"))

```

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      2018-09-17

## Packages -----
## package   * version date      source
## codetools  0.2-14  2015-07-15 CRAN (R 3.3.1)
## devtools   1.12.0  2016-06-24 CRAN (R 3.3.3)
## digest     0.6.12  2017-01-27 CRAN (R 3.3.3)
## doParallel * 1.0.10  2015-10-14 CRAN (R 3.3.1)
## doRNG       * 1.6     2014-03-07 CRAN (R 3.3.1)
## evaluate   0.10     2016-10-11 CRAN (R 3.3.1)
## foreach    * 1.4.3   2015-10-13 CRAN (R 3.3.1)
## highr      0.6      2016-05-09 CRAN (R 3.3.1)
## iterators  * 1.0.8   2015-10-13 CRAN (R 3.3.0)
## knitr       * 1.17    2017-08-10 CRAN (R 3.3.3)
## 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)
## pkgmaker    * 0.22    2014-05-14 CRAN (R 3.3.2)
## registry    * 0.3     2015-07-08 CRAN (R 3.3.2)
## rngtools    * 1.2.4   2014-03-06 CRAN (R 3.3.2)
## stringi     1.1.1    2016-05-27 CRAN (R 3.3.0)
## stringr     1.2.0    2017-02-18 CRAN (R 3.3.3)
## withr       1.0.2    2016-06-20 CRAN (R 3.3.1)
## xtable      1.8-2    2016-02-05 CRAN (R 3.3.1)
```