

```

## 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))
}

```

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:

```

for(alt in alts)
{
  load(paste(alt,"simResults_5.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(alt,"simResults_pi0x_thresh_5_full.RData",sep="/"),
        list=c("pi0EstSim"))

  ##save summary results
  save(file=paste(alt,"simResults_pi0x_thresh_5.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         2018-08-31

## 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)

```