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library(pcev)

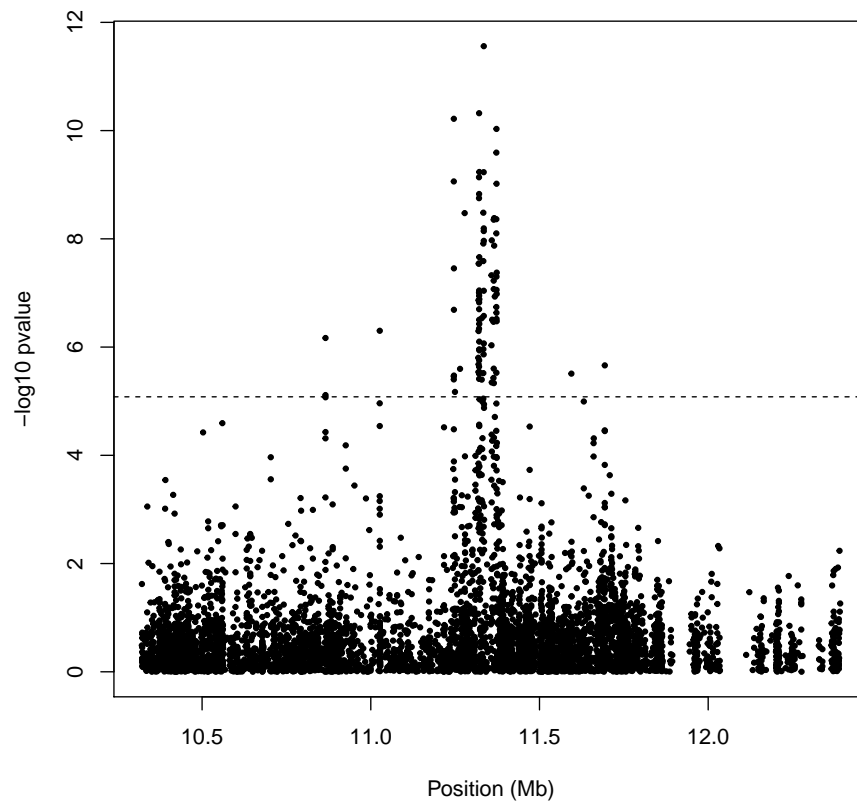
## PCEV: Principal components of explained variance

data(methylation)
data(pheno)
data(position)


# Compute nominal pvalues
fit <- lm(methylation ~ pheno)
pval <- vapply(summary(fit), function(sum) {
  pvalue <- sum$coef[2,4]
  return(pvalue)
}, numeric(1))

# Manhattan plot univariate
plot(position$Pos/1e6, -log10(pval), xlab="Position (Mb)",
      ylab="-log10 pvalue", pch=19, cex=0.5)
abline(h=-log10(8.3*10^-6), lty=2)

```



```
# Break the region into sub-regions
cl <- bumphunter::clusterMaker(chr=position$Chr,
                               pos=position$Pos,
                               assumeSorted=TRUE,
                               maxGap = 500)

## Creating a generic function for 'nchar' from package 'base' in package
'S4Vectors'

# Some blocks are too big... put limit at 30
index <- cl
maxInd <- max(index) + 1

blockLengths <- table(index)
while(sum(blockLengths > 30) > 0) {
```

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for (j in unique(index)) {
  p <- length(index[index == j])
  if (p > 30) {
    q <- floor(p/2); r <- p - q
    index[index == j] <- c(rep_len(maxInd, q),
                          rep_len(maxInd + 1, r))
    maxInd <- maxInd + 2
  }
}
blockLengths <- table(index)
}

cl <- index
index <- cl
counter <- 0
for(j in sort(unique(cl))) {
  counter <- counter + 1
  index[index == j] <- counter
}

table(table(index))

##
##   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18
## 303 160  72  68  56  31  28  30  17  18  13   9  15   6  17  24  14  15
##  19  20  21  22  23  24  25  26  27  28  29  30
##  13  13   8   9   4   9   4   4   3   4   5   8

pcev_out <- computePCEV(methylation, covariate = pheno,
                        estimation = "block",
                        inference = "permutation",
                        index = index, nperm=10)

# Manhattan plot VIMP
BLK_boundaries <- c(11235000, 11385000)
plot(position$Pos/1e6, pcev_out$VIMP, xlab="Position (Mb)",
      ylab="Variable Importance", pch=19, cex=0.5, ylim=c(0,1))
lines(x=BLK_boundaries/1e6, y=rep_len(0.9,2),lwd=3, col='red')

```

