GPCW: Gaussian Process for Estimating Crtical Windows of Susceptibility

GPCW_Example

[1] Simulate data from the proposed model:

- Setting the reproducability seed and initializing packages for data simulation:

```
set.seed(78453)

library(GPCW)
library(mnormt)
library(boot)
```

- Setting the global data values

```
n<-10000  #Sample size
m<-36  #Number of exposure time periods
x<-matrix(1,
          nrow=n,
          ncol=1)  #Covariate design matrix
z<-matrix(rnorm(n=(n*m)),
          nrow=n,
          ncol=m)  #Exposure design matrix

for(j in 1:m){
   z[,j]<-(z[,j] - median(z[,j]))/IQR(z[,j])  #Data standardization (interquartile range)
   }
```

- Setting the values for the statistical model parameters

```
beta_true<- -0.30
sigma2_theta_true<-0.50
phi_true<-0.001
Sigma<-sigma2_theta_true*temporal_corr_fun(m,
                                           phi_true)[[1]]
theta_true<-c(rmnorm(n=1,
                     mean=rep(0, times=m),
                     varcov=Sigma))
logit_p<-x%*%beta_true +
         z%*%theta_true
probs<-inv.logit(logit_p)
```

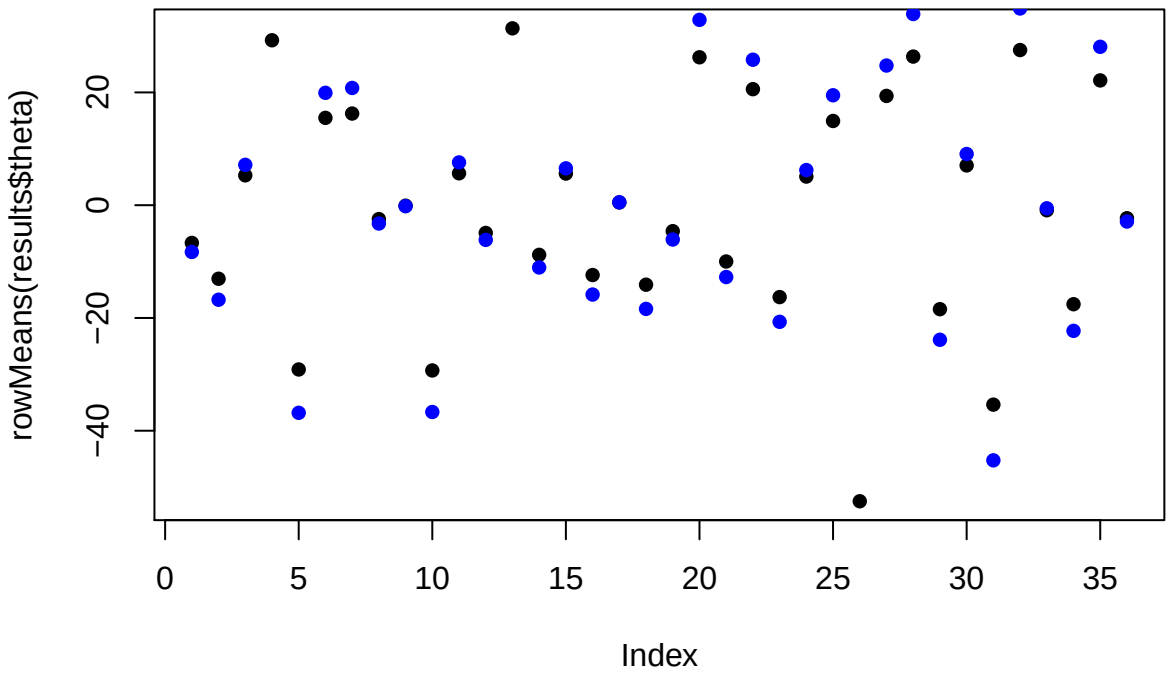
- Simulating the analysis dataset

```
y<-rbinom(n=n,
          size=1,
          prob=probs)
```

[2] Fit GPCW to Estimate Critical Windows of Susceptibility:

[3] Analyzing Output:

```
plot(rowMeans(results$theta), pch=16)
points(theta_true, pch=16, col="blue")
```


rowMeans(results$theta)
20
0
−20
−40
0
5
10
15
20
25
30
35
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