KDExp: Kernel Density Estimation Prior Distribution for Exposure Uncertainty Propagation

KDExp_Example

[1] Load the simulated data: See Table 1 of the Manuscript

- Associated: Yes
- Correlated: Yes
- Skewed: No
- δ_i Variance: Low

```
set.seed(8453)

library(KDExp)
library(kernelboot)
```

```
## Warning: package 'kernelboot' was built under R version 4.2.3
```

```
load("C:\\Users\\jlw98\\Desktop\\Yale Research\\Created R Packages\\KDExp\\KDExp_Example\\simulated_data

y<-sim_data[[1]]
x<-matrix(1,
          nrow = length(y),
          ncol = 1)
z_ppd<-sim_data[[2]]
dim(z_ppd)
```

```
## [1]  250 1000
```

[2] Fit the Models:

```
############################
#UKDE Bandwidth Estimation
############################
h<-rep(0.00,
       times = length(y))
for(k in 1:length(y)){
   h[k]<-bw.SJ(z_ppd[k,])
   }

############################
#MKDE Bandwidth Estimation
############################
H<-bw.scott(t(z_ppd))

################################################
#Model Fitting
################################################
burnin<-1000
mcmc_samples<-6000
thin<-10
keep_set<-seq((burnin + 1),
              mcmc_samples,
              thin)
```

```
results_ukde<-UKDE(mcmc_samples = mcmc_samples,
                   y = y,
                   x = x,
                   z_ppd = z_ppd,
                   h = h,
                   likelihood_indicator = 1)
```

```
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## Progress: 20%
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## Progress: 40%
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## Progress: 50%
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## Progress: 70%
## **************
## Progress: 80%
## **************
## Progress: 90%
## **************
## Progress: 100%
## **************
```

```
results_mkde<-MKDE(mcmc_samples = mcmc_samples,
                   y = y,
                   x = x,
                   z_ppd = z_ppd,
                   H = H,
                   likelihood_indicator = 1)
```

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```

```
## **************
```

[3] Analyzing Output:

```
plot(results_ukde$theta[keep_set,1], type="l")
lines(results_mkde$theta[keep_set,1], col = "red")
abline(h = 1.00,  #Truth
       col = "blue",
       lwd = 2)
```