ddsPLS Exploration

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```
library(ddsPLS2)
```

```
ddsPLS2::ddsPLS2_App()
```

This code chunk opens an applet that can be used to build models using ddsPLS. Note that it requires the X and Y variables as separate csv files.

Code copied from the simulation_ssdpls2 repository created by Hadrien Lorenzo.

```
# Creates a toy data set for the ddsPLS function
toy_ex <- get_toy_example()
```

```
# Creates model from the toy data
toy_mod <- ddsPLS(toy_ex$X, toy_ex$Y)

toy_results <- toy_mod$results
```

Recreate Toy Example

This is a recreation of the toy example created by Hadrien Lorenzo, the original example can be found here.

```
# Creates toy data set to be used
simu_toy <- get_toy_example(n=50,sqrt_1_minus_sig2 = 0.9025,p = 1000)

# Creates vector of lambda values to be used
lambdas <- seq(0,1,length.out = 30)

# Sets number of bootstrap samples to run
n_B <- 100

# Creates model using ddsPLS algorithm
model_toy <- ddsPLS(simu_toy$X,simu_toy$Y,
                    doBoot = FALSE,
                    lambdas = lambdas,
                    n_B = n_B,
                    verbose = T # whether trace during process
                    )
```

```
model_toy_2 <- ddsPLS(simu_toy$X,simu_toy$Y,
                      doBoot = FALSE,
                    criterion = "Q2",
                     lambdas = lambdas,
                     n_B = n_B,
                     verbose = T # whether trace during process
                     )
```

Design 1

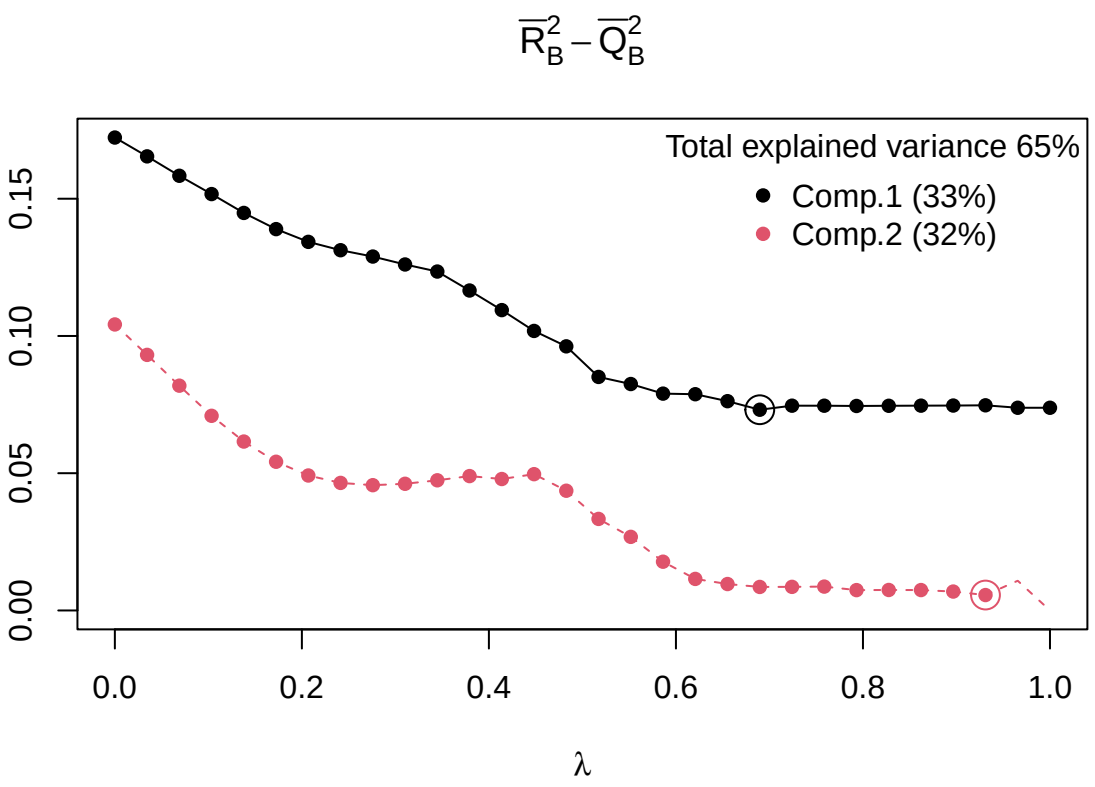
```
simu_1 <- get_design_1(n=50,sqrt_1_minus_sig2 = 0.99,p = 1000,q = 3)
```

What does the NCORES argument do? Setting it to integers greater than 1 gives an error.

Is there a way to include more components in the model?

```
model_1 <- ddsPLS(simu_1$X,simu_1$Y,
                  lambdas = lambdas,
                  n_B=n_B,
                  verbose=T)
```

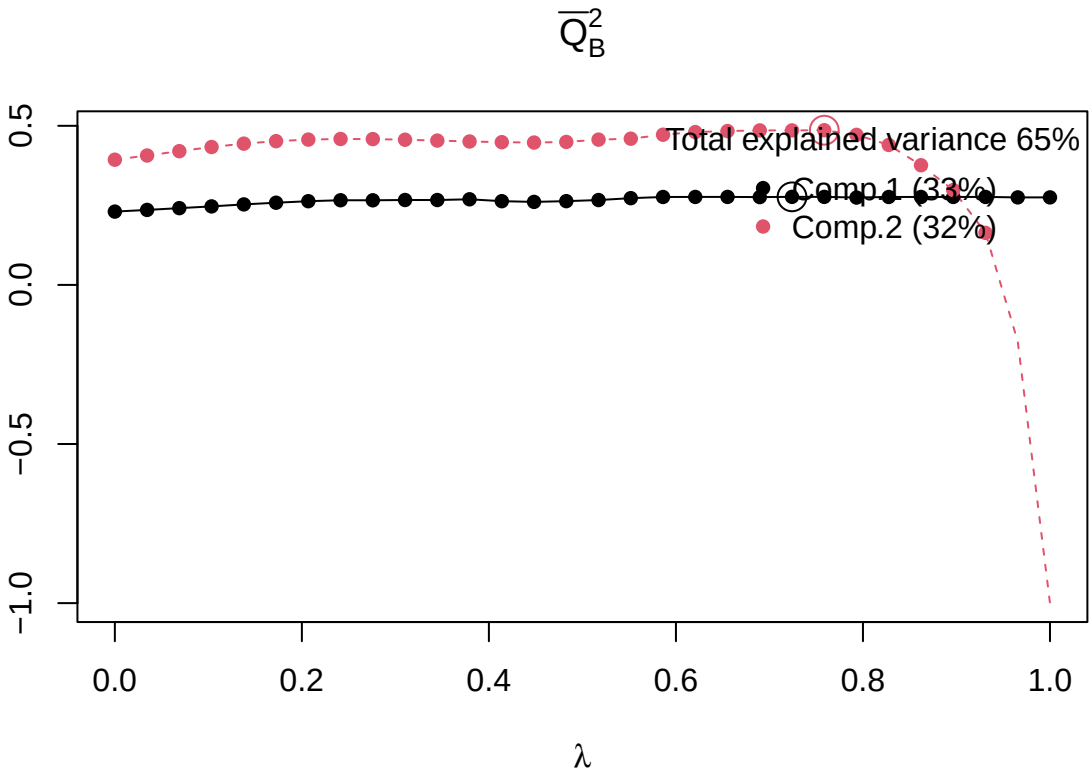
```
##                       --------------
##                      |    ddsPLS    |
## =====================|--------------|=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.69 0.35 0.35 0.28 0.28     33%         33%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.93 0.32 0.04 0.32 0.19     32%         65%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                   ...component 3 not built!
## ====================               ====================
##                      ================
```




```
model_1_Q2 <- ddsPLS(simu_1$X,simu_1$Y,
                  criterion = "Q2",
```

```
                  lambdas = lambdas,
                  n_B=n_B,
                  verbose=T)
```

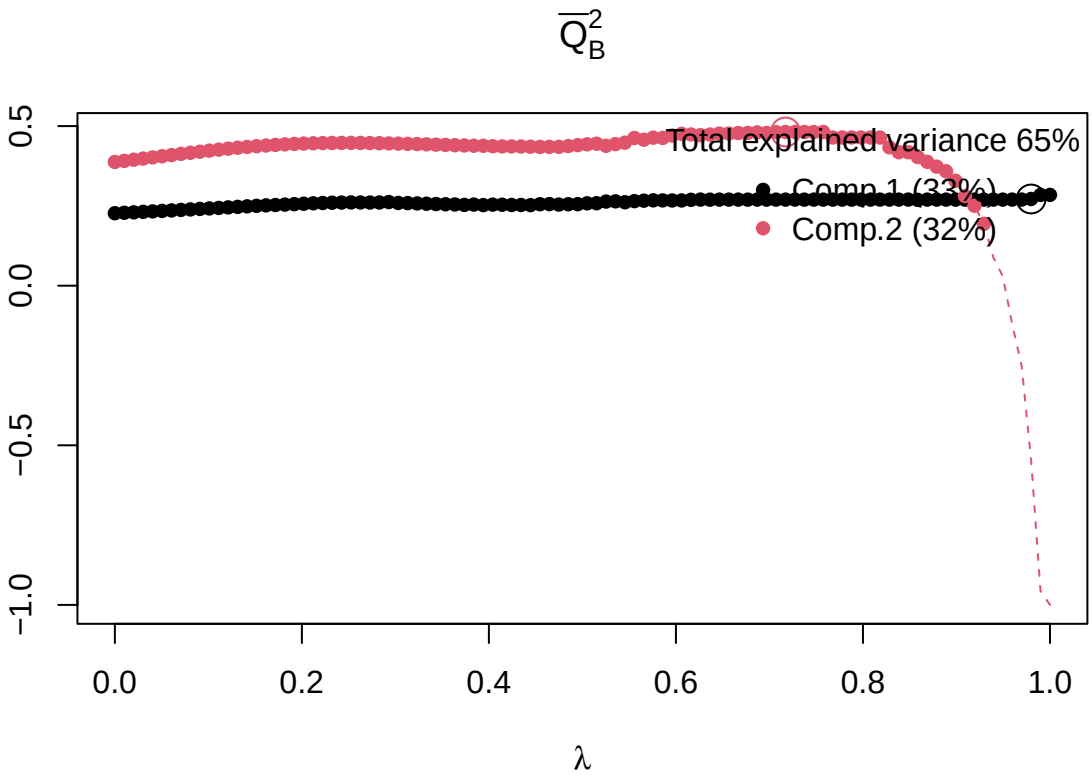
```
##                       --------------
##                      |    ddsPLS    |
## =====================--------------=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.72 0.35 0.35 0.28 0.28     33%         33%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.76 0.63 0.27 0.62 0.49     32%         65%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                    ...component 3 not built!
## =====================                ======================
##                       ================
```




```
model_1_lambda <- ddsPLS(simu_1$X, simu_1$Y,
                         criterion = "Q2",
                         lambdas = seq(0,1,length.out = 100),
                         n_B = n_B,
                         verbose = T)
```

```
##                       --------------
##                      |    ddsPLS    |
## =====================--------------=====================
## Should we build component 1 ? Bootstrap pending...
```

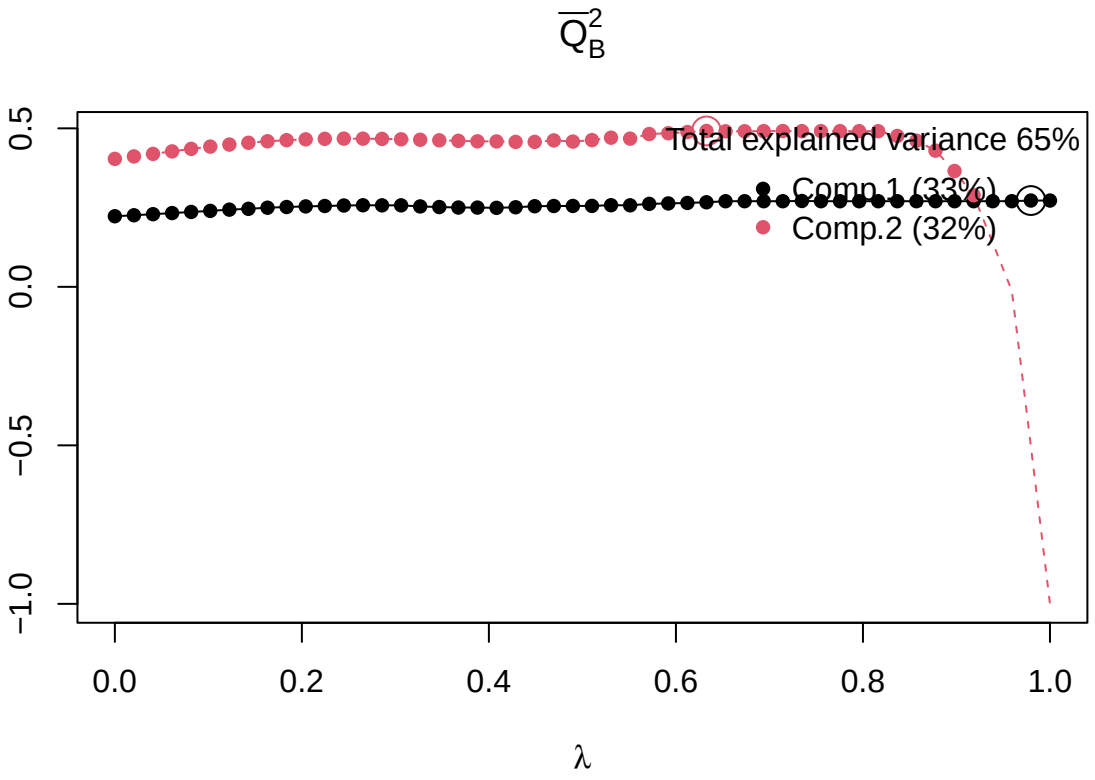
```
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.98 0.35 0.35 0.27 0.27     33%         33%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.72 0.64 0.28 0.62 0.48     32%         65%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                   ...component 3 not built!
## ====================                 ====================
##                       ================
```




```
model_1_lambda_2 <- ddsPLS(simu_1$X, simu_1$Y,
                           criterion = "Q2",
                           lambdas = seq(0,1,length.out = 50),
                           n_B = n_B,
                           verbose = T)
```

```
##                           --------------
##                          |    ddsPLS    |
## ====================-----------------====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.98 0.35 0.35 0.27 0.27     33%         33%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.63 0.62 0.27 0.63 0.49     32%         65%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
```

```
##                                  ...component 3 not built!
## ====================                ====================
##                       ================
```



Different Simulations of Design 1 Data

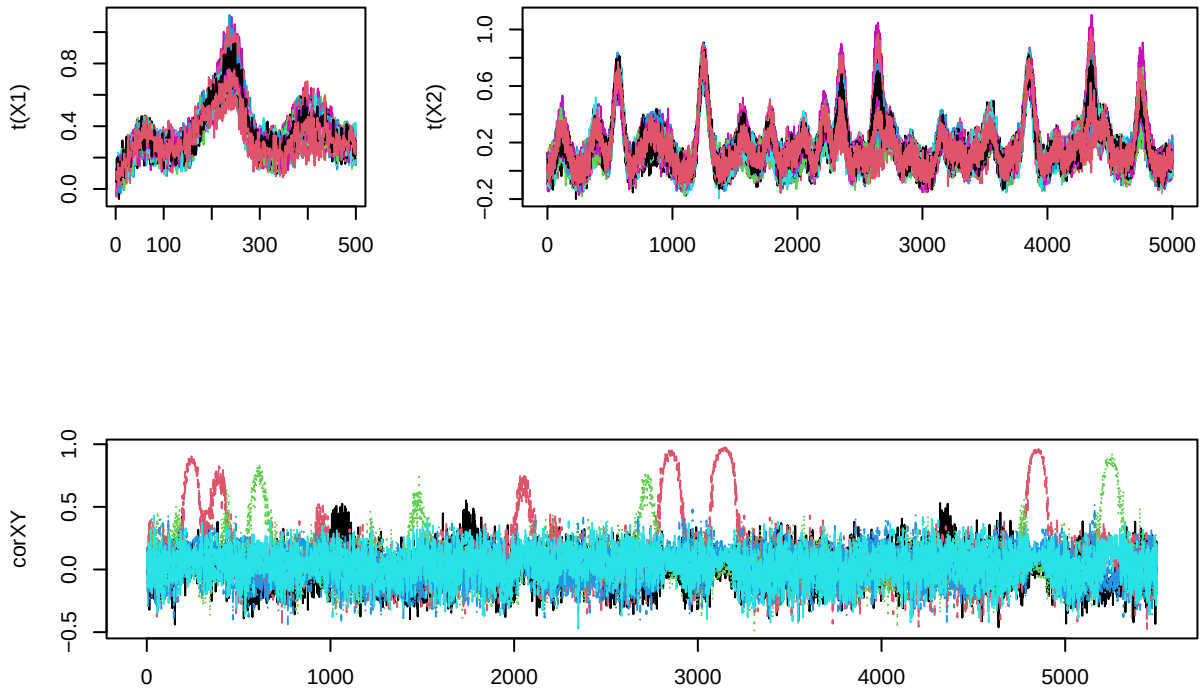
There is a problem with `get_design_1`, `q` cannot take values other than 5.

```
data_1 <- get_design_1(n = 100, p = 1000, q = 5)

ddsPLS(data_1$X,data_1$Y,
                  criterion = "Q2",
                  lambdas = lambdas,
                  n_B=n_B,
                  verbose=T)
```

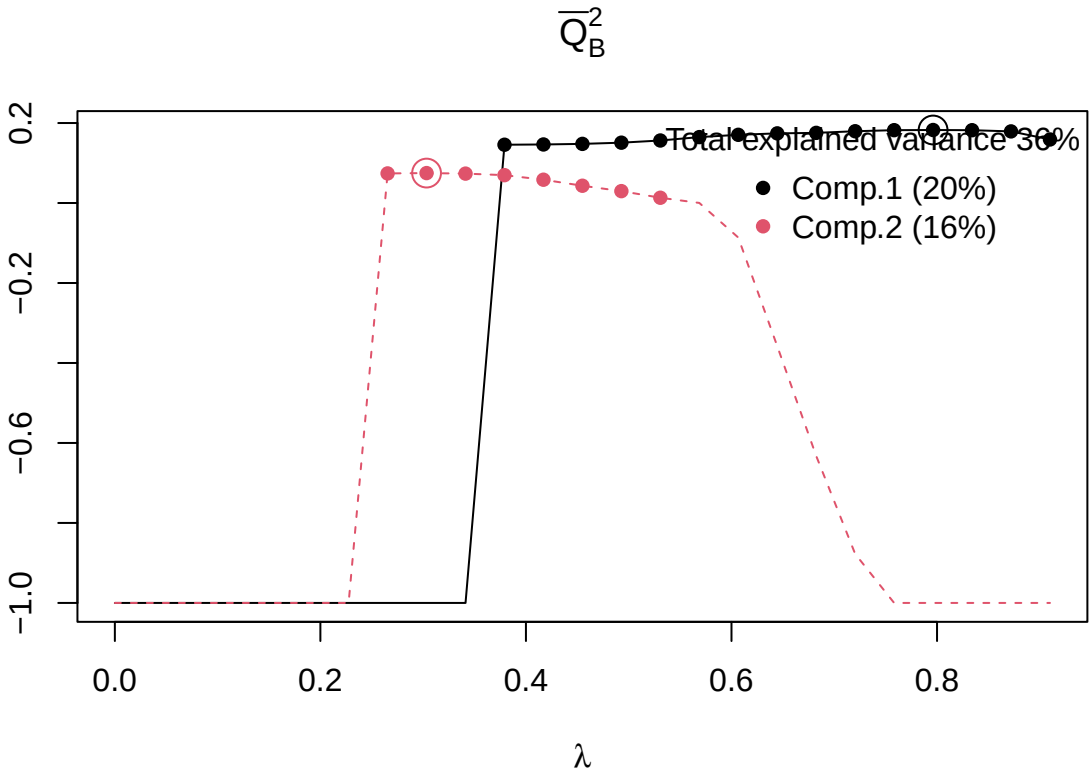
Design 2

```
simu_2.1 <- get_design_2(plot = T)
```



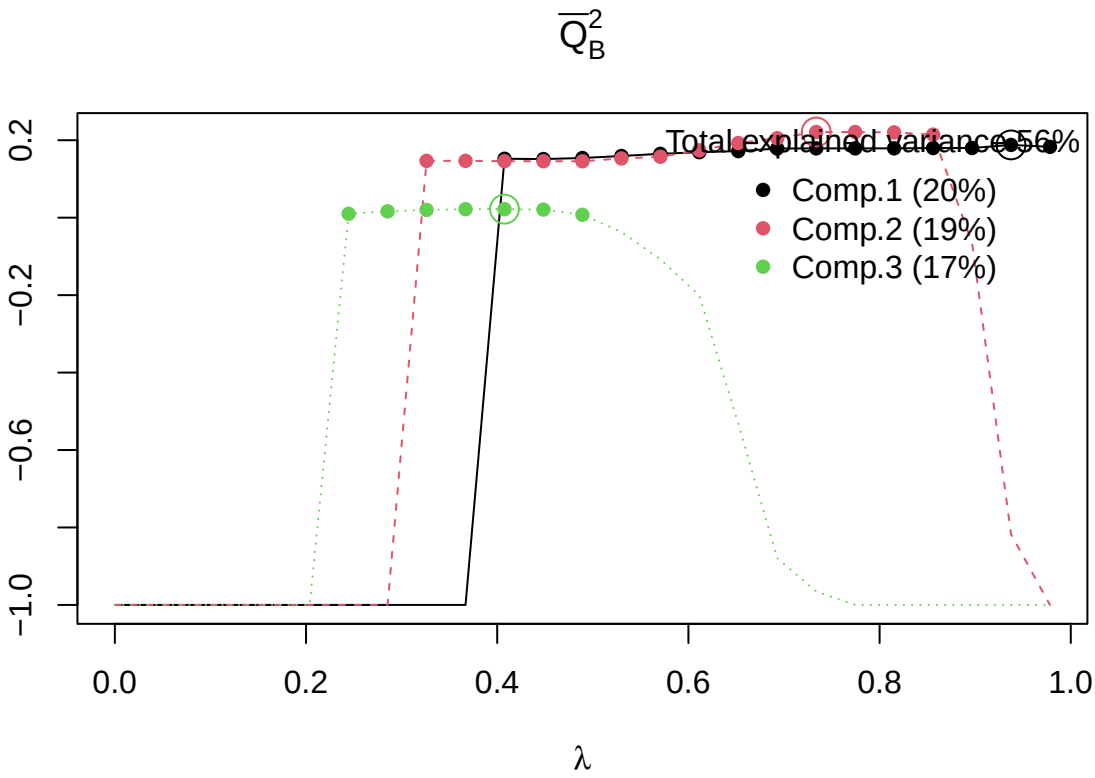

```
model_2.1 <- ddsPLS(simu_2.1$X$X1, simu_2.1$Y,
                    criterion = "Q2",
                    n_lambdas = 25,
                    verbose = TRUE)
```

```
##                       --------------
##                      |    ddsPLS    |
## ====================-----------------====================
## Should we build component 1 ? Bootstrap pending...
##      lambda  R2 R2h   Q2  Q2h VarExpl VarExpl.Tot
##         0.8 0.2 0.2 0.18 0.18     20%         20%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##         0.3 0.39 0.19 0.24 0.07     16%         36%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                    ...component 3 not built!
## ====================                 ====================
##                       ================
```

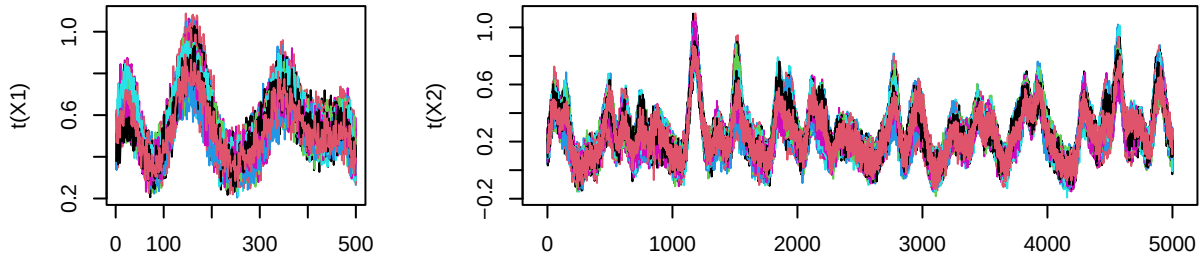


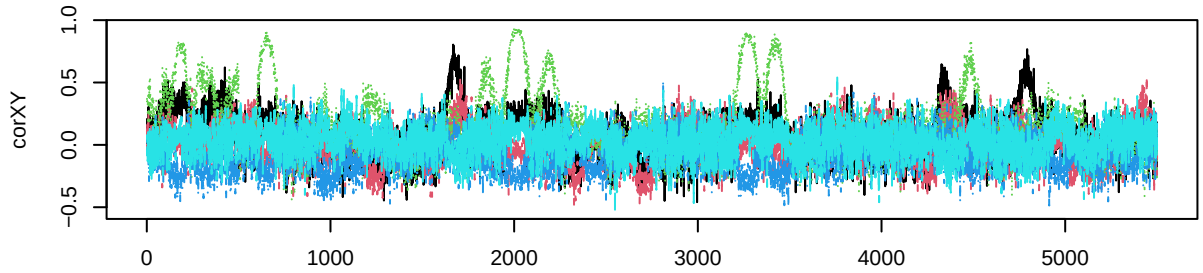

```
model_2.2 <- ddsPLS(simu_2.1$X$X2, simu_2.1$Y,
                    criterion = "Q2",
                    n_lambdas = 25,
                    verbose = TRUE)
```

```
##                       --------------
##                      |    ddsPLS    |
## =====================---------------=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda  R2 R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.94 0.2 0.2 0.19 0.19     20%         20%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.73 0.38 0.18 0.37 0.22     19%         39%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##      lambda   R2 R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.41 0.57 0.2 0.39 0.02     17%         56%
##                                      ...component 3 built!
## Should we build component 4 ? Bootstrap pending...
##                                   ...component 4 not built!
## =====================                ====================
##                       ================
```




```
simu_2.2 <- get_design_2(seed = 2, ncpX = 20, plot = T)
```

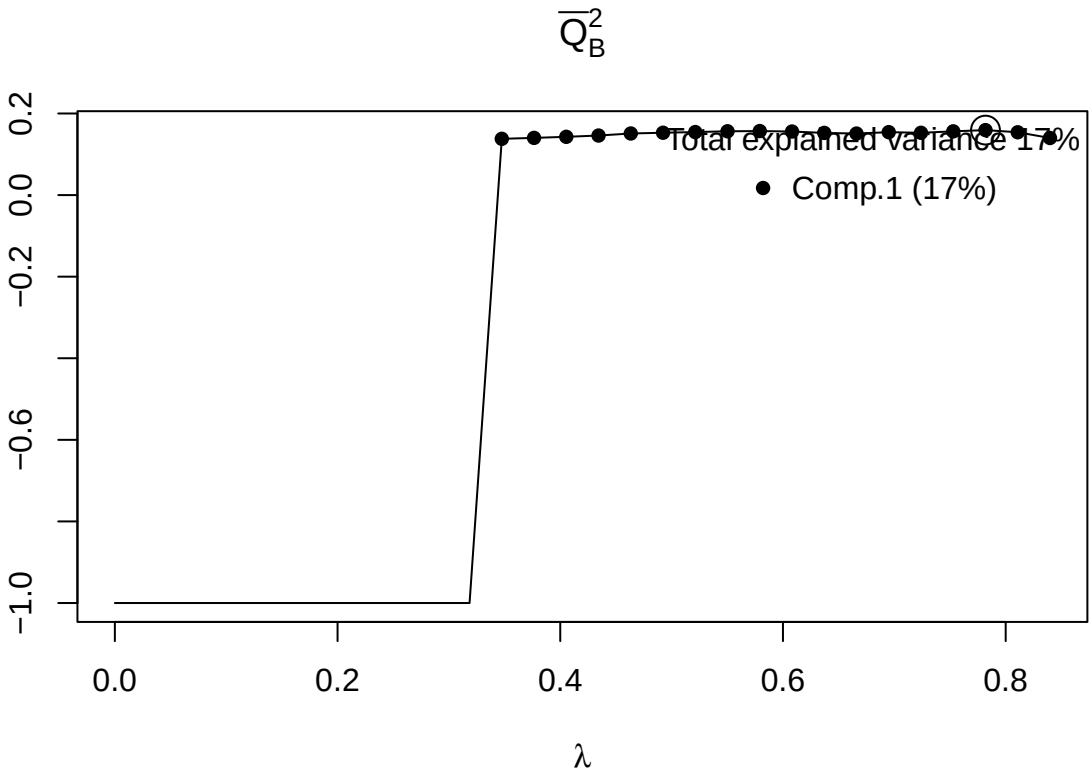





```
model_2.3 <- ddsPLS(simu_2.2$Xs$X1, simu_2.2$Y,
                    criterion = "Q2",
                    n_lambdas = 30,
                    verbose = TRUE)
```

```
##                     --------------
```

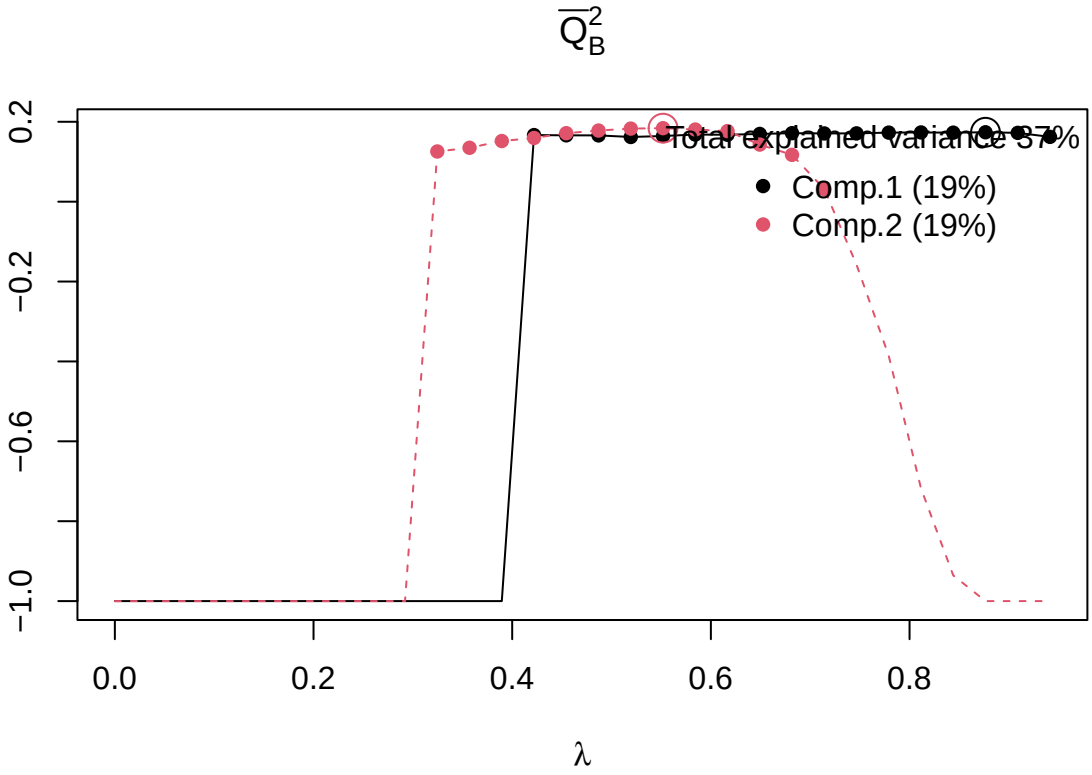
```
##                       |    ddsPLS    |
## ====================-----------=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.78 0.18 0.18 0.16 0.16     17%         17%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##                                   ...component 2 not built!
## ====================               ====================
##                       ================
```




```
model_2.4 <- ddsPLS(simu_2.2$Xs$X2, simu_2.2$Y,
                    criterion = "Q2",
                    n_lambdas = 30,
                    verbose = TRUE)
```

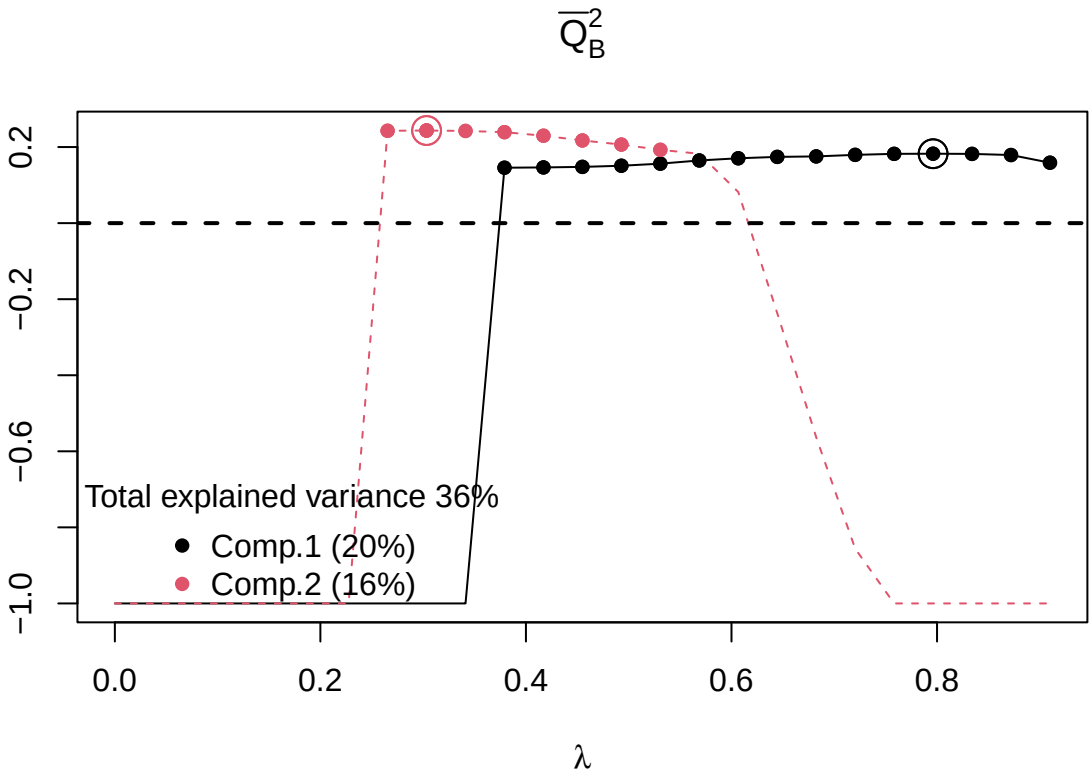
```
##                        --------------
##                       |    ddsPLS    |
## ====================-----------=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.88 0.21 0.21 0.17 0.17     19%         19%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.55 0.39 0.19 0.34 0.18     19%         37%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                   ...component 3 not built!
## ====================               ====================
```

```
##                ===============
```



Model results can also be plotted using the `plot` function.

```
plot(model_2.1,type="Q2",legend.position = "bottomleft")
```



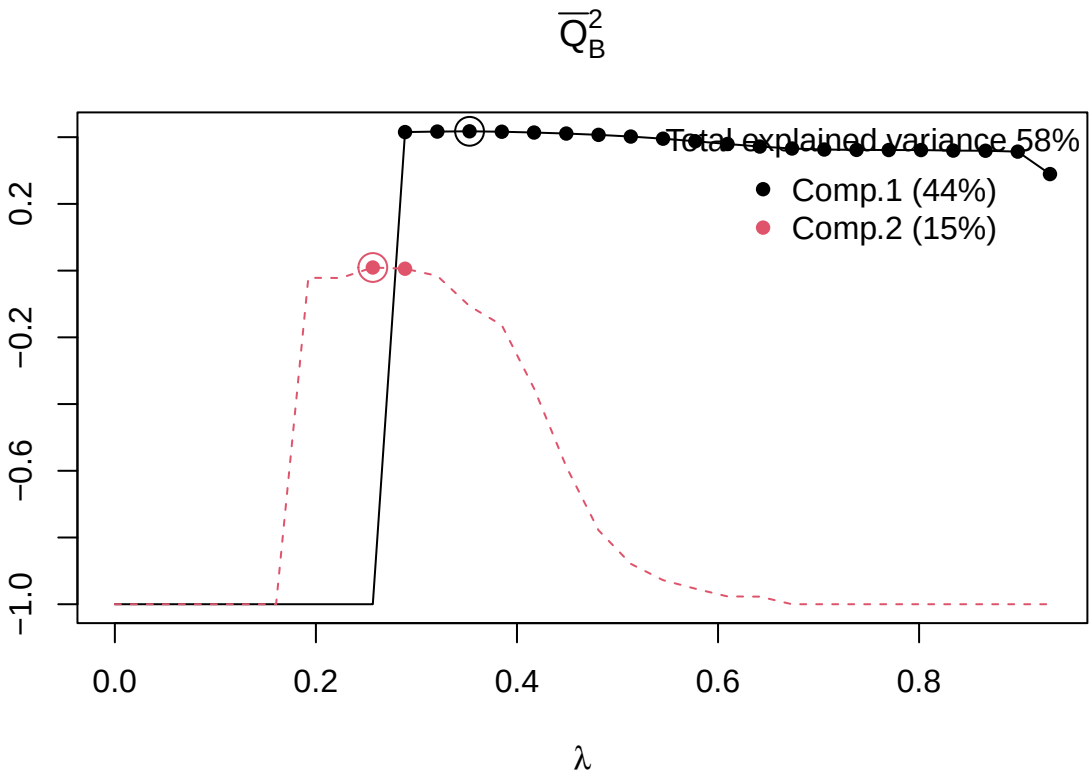
Get Data Simulation

The following `get_data` function is from the vignette for the `ddsPLS` package

```
data_3.1 <- get_data()

model_3.1 <- ddsPLS(data_3.1$X, data_3.1$Y,
                    criterion = "Q2",
                    n_lambdas = 30,
                    verbose = TRUE)
```

```
##                       --------------
##                      |    ddsPLS    |
## =====================|--------------|=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.35 0.45 0.45 0.42 0.42     44%         44%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2 R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.26 0.63 0.2 0.42 0.01     15%         58%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                   ...component 3 not built!
## =====================                ======================
##                       ================
```




```
data_3.2 <- get_data(p1 = 50, p2 = 50, p3 = 50, p = 250)

model_3.2 <- ddsPLS(data_3.2$X, data_3.2$Y,
                    criterion = "Q2",
```

```
                    n_lambdas = 30,
                    verbose = TRUE)
```

```
##                       --------------
##                      |    ddsPLS    |
## =====================|--------------|=====================
## Should we build component 1 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.26 0.39 0.39 0.38 0.38     41%         41%
##                                      ...component 1 built!
## Should we build component 2 ? Bootstrap pending...
##      lambda   R2  R2h   Q2  Q2h VarExpl VarExpl.Tot
##        0.16 0.62 0.21 0.54 0.26     21%         62%
##                                      ...component 2 built!
## Should we build component 3 ? Bootstrap pending...
##                                   ...component 3 not built!
## ====================                 ====================
##                     ================
```