Regularization and Variable Selection for Parametric Models (4)

February 8, 2012

```
> library(lpSolve)
> library(lqa)
> source("gdscode.txt")

> library(catdata)
> data(heart, package="catdata")
> X<-heart[,-1]
> y<-heart[,1]
> X.std<-scale(X)
> p<-ncol(X)
> n<-length(y)
> family <- binomial()
> n.fold<-10
> ylab.text<-""
> xlab.text<-""
> Width = 6
> Height = 6
> oma.vec<-c(1,1,1,3)
> size.axis=1.4
> size.lab=1.4
> size.main=1.4
> size.right=1.2
> size.width=2.0
> colour=1
```

    SCAD
    Fixed Tuning parameter

```
> s <- 3
> ### COEF BUILD-UPS
>
> main.text<-"SCAD"
> penalty.family<-scad
> Plot.mat<-plot.lqa (y = y, x = X, family=family, penalty.family=penalty.family,
+ offset.values = c (NA, s),add.MLE = FALSE, ret.true=TRUE,really.plot = FALSE,
+ show.standardized=TRUE,gamma=0.01)
```

```
> par(oma=oma.vec,cex.axis=size.axis,cex.lab=size.axis,cex.main=size.main)
> matplot(Plot.mat$s1,Plot.mat$beta.mat,type="l",ylab=ylab.text,xlab=xlab.text,
+ main=main.text,lwd=size.width, col=colour)
> axis(4, at = Plot.mat$beta.mat[1, ], labels = colnames(X), adj = 0, las = 1,
+ cex.axis=size.right)
>
```

SCAD
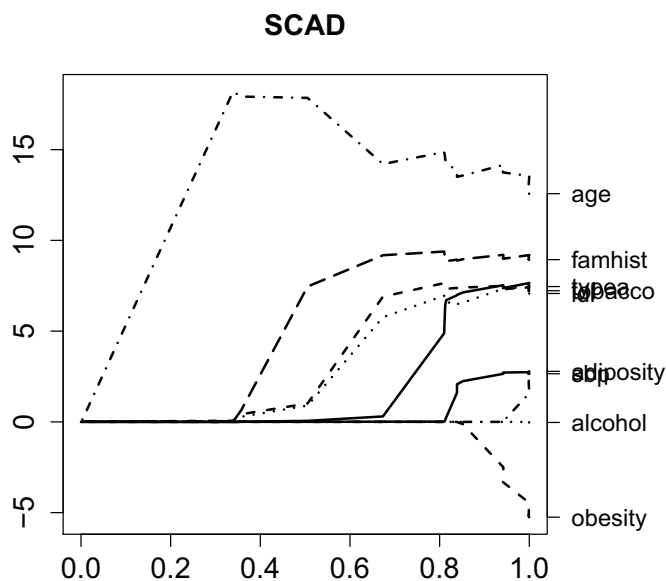
Dantzig Selector

```
> Path<-matrix(0,60,p)
> lambda1<-exp(seq(-6, 1, length = 60))
> for(i in 60:1)
+ {
+ Path[i,]<-dd(y,X.std,lambda=lambda1[i],family=binomial)$gds.beta[-1]*sqrt(n)
+ }

> par(oma=oma.vec,cex.axis=size.axis,cex.lab=size.axis,cex.main=size.main)
> matplot(rowSums(abs(Path))/max(rowSums(abs(Path))),Path,type="l",ylab=ylab.text,
+ xlab=xlab.text,main="Dantzig Selector",lwd=size.width, col=colour)
> axis(4, at = Path[1, ], labels = colnames(X), adj = 0, las = 1,cex.axis=size.right)
```

Dantzig Selector