

HW6 STAT512 Fall2014

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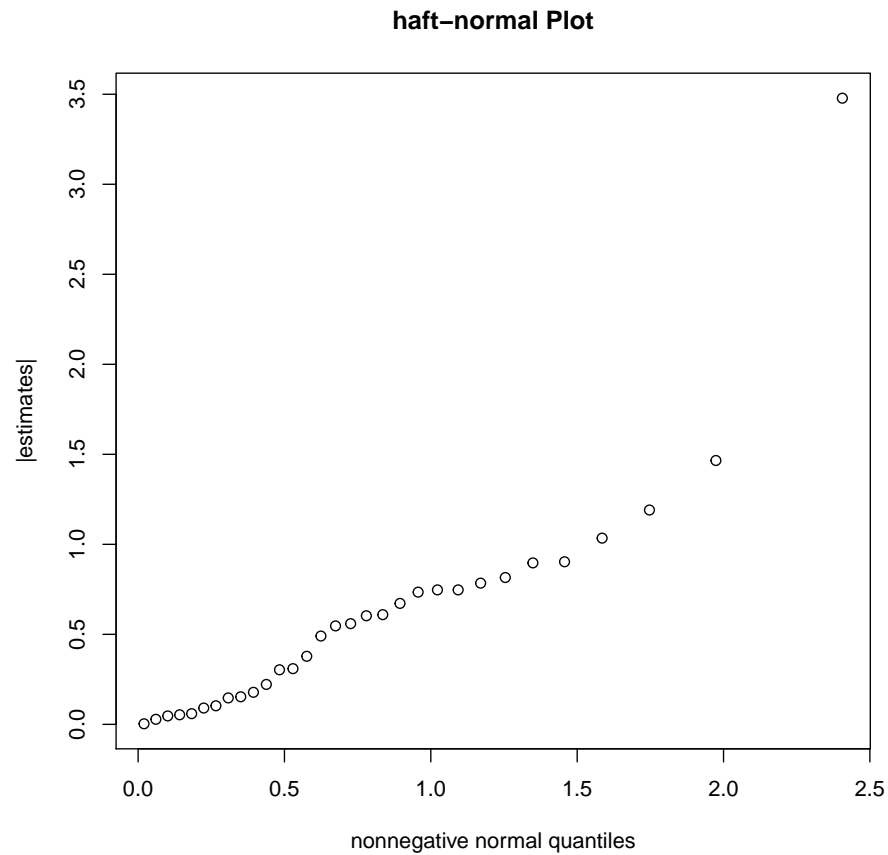
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1.

```
setwd("~/Desktop/tk512/hw6")
dat <- read.table("HW6_data_2014.txt")
dat[,1:5][dat[,1:5]==1] <- -1
dat[,1:5][dat[,1:5]==2] <- 1
coef <- summary(lm(V6~V1*V2*V3*V4*V5, data = dat))$coef[,1]
sort.coef <- abs(coef[order(abs(coef))])
sort.coef
```

##	V3:V4	V2:V3	V1:V2:V5	V1:V4:V5
##	0.003125	0.028125	0.046875	0.053125
##	V4:V5	V2:V3:V4	V1:V4	V1:V2:V4:V5
##	0.059375	0.090625	0.103125	0.146875
##	V1	V2:V5	V2:V4	V2:V4:V5
##	0.153125	0.178125	0.221875	0.303125
##	V3	V1:V2:V3:V4	V2:V3:V5	V4
##	0.309375	0.378125	0.490625	0.546875
##	V1:V3:V4:V5	V1:V3:V4	V1:V3	V1:V2:V3:V4:V5
##	0.559375	0.603125	0.609375	0.671875
##	V1:V2:V4	V1:V5	V3:V4:V5	V1:V2:V3
##	0.734375	0.746875	0.746875	0.784375
##	V1:V2:V3:V5	V2:V3:V4:V5	V1:V3:V5	V5
##	0.815625	0.896875	0.903125	1.034375
##	V1:V2	V3:V5	V2	(Intercept)
##	1.190625	1.465625	3.478125	75.321875

```
n <- 31
p <- 1/2+ (1:n-1/2)/(2*n)
q <- qnorm(p)
plot(q, sort.coef[-32], main = "haft-normal Plot",
     xlab = "nonnegative normal quantiles",
     ylab = "|estimates|")
```



Based on the plot, I think the factorial effects are non-zero are V2, V3:V5.

2.

```
B <- sort.coef[-32]
# initial robust estimate of sigma/N
s0 <- 1.5*median(B)
# Let Bs be the subset of B less than 2.5 * s0
Bs <- B[B<=2.5*s0]
# compute the pseudo standard error
PSE <- 1.5 * median(Bs)
PSE

## [1] 0.7781

# which coefficients greater than t*PSE
```

```
t <- 1.8
which(B>=t*PSE)

## V3:V5    V2
##     30    31
```

3.

If V2 and V3:V5 are included in the model, then

- to satisfy the hierarchy principle, we need to include factors V3, V5.
- to satisfy the heredity principle, we need to include either V3 or V5.