BUAN 6357.sw1 (Spring 2023) Johnston
Exam 2: Cross Validation

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> ###
> #
> # BUAN 6357 Spring 2023 (Johnston) - Exam 2: Cross Validation
> #
> ###
> options(scipen=10, width=70)
>
> require(data.table)
Loading required package: data.table
data.table 1.14.6 using 4 threads (see ?getDTthreads).  Latest news:
r-datatable.com
>
> wd  <- "c:/data/BUAN6357/exams/exam2" # change as needed
> setwd(wd)
> raw <- read.csv("olsData.csv")
> raw <- raw[complete.cases(raw),]
>
> s   <- 171057756
> n   <- nrow(raw)
> mdl <- V13~.
>
> r0  <- lm(mdl,data=raw)
>
> uF1 <- function(df,i) {
+       m  <- lm(mdl,data=df[-i,])
+       t  <- df$V13[i]-predict(m,df[i,])
+       return(list(loc=i, diff=t) )
+       }
>
> t   <- data.table(grp=1:n, i=1:n)
> r1  <- t[,uF1(raw,i), by=.(grp)]
>
> set.seed(s)
> k   <- 10
>
> uF2 <- function(df, grps, tst) {
+       m  <- lm(mdl,data=df[-tst,])
+       t  <- df$V13[tst]-predict(m,df[tst,])
+       return(list(k=grps, loc=tst, diff=t) )
+       }
>
> g   <- rep(1:k,ceiling(n/k))[1:n]
> t   <- data.table(idx=g, k=g, i=sample(1:n))
> r2  <- t[,uF2(raw, k, i), by=.(idx)]
>
```

```
49  > uF3 <- function (lbl,v,alpha=0.05) {
50  +    z      <- qnorm(1-(alpha/2));  m   <- mean(v);    s   <- sd(v)
51  +    lbP  <- m-z*s;        ubP <- m+z*s
52  +    lo   <- alpha/2;    hi   <- 1-lo
53  +    ci   <- quantile(v, c(lo,hi)); mu   <- mean((v-m)^2)
54  +    tnm  <- quantile(v, c(.25, .5, .75))
55  +    return (data.table(lbl=lbl, m=m, s=s, z=z, lbP=lbP, ubP=ubP,
56  +                        lbNP=ci[1], ubNP=ci[2],
57  +                        q1= tnm[1], q2=tnm[2], q3=tnm[3],
58  +                        mse=mu, rmse=sqrt(mu)))
59  +    }
60  >
61  > t0   <- uF3("0",r0$residuals)
62  > t1   <- uF3("1",r1$diff)
63  > t2   <- uF3("2",r2$diff)
64  >
65  > (resids.ci <- rbindlist(list(t0, t1, t2)))
66     lbl            m          s          z      lbP      ubP      lbNP
67  1:    0 -2.732295e-16 4.891113 1.959964 -9.586404 9.586404 -9.660709
68  2:    1 -5.431191e-05 4.956323 1.959964 -9.714269 9.714161 -9.834232
69  3:    2  8.951424e-03 4.949477 1.959964 -9.691845 9.709747 -9.768754
70       ubNP         q1          q2         q3       mse      rmse
71  1: 8.948130 -3.346195 0.05551644 3.544653 23.89906 4.888666
72  2: 9.056907 -3.386978 0.05598183 3.582052 24.54057 4.953844
73  3: 9.035419 -3.353667 0.09650407 3.562481 24.47282 4.947001
74  >
75  >
76  >
```