

# YK\_Final\_P4

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```
rm(list=ls())  
df.4 <- read.csv("/cloud/project/Question 4.csv")
```

## Fit Model

```
require(lmtest)
```

```
## Loading required package: lmtest  
## Loading required package: zoo  
##  
## Attaching package: 'zoo'  
## The following objects are masked from 'package:base':  
##  
##   as.Date, as.Date.numeric
```

```
require(Hmisc)
```

```
## Loading required package: Hmisc  
## Loading required package: lattice  
## Loading required package: survival  
## Loading required package: Formula  
## Loading required package: ggplot2  
## Registered S3 methods overwritten by 'ggplot2':  
##   method      from  
##   [.quosures  rlang  
##   c.quosures  rlang  
##   print.quosures rlang  
##  
## Attaching package: 'Hmisc'  
## The following objects are masked from 'package:base':  
##  
##   format.pval, units
```

```
model.4 <- lm(Y~., data=df.4)  
dwtest(model.4)
```

```
##  
## Durbin-Watson test  
##  
## data: model.4  
## DW = 1.9618, p-value = 0.2903  
## alternative hypothesis: true autocorrelation is greater than 0
```

*Using Durbin Watson test, we find that there is no autocorrelation present*

## Using Cochrane-Orcutt Procedure

```
et <- model.4$residuals
et1 <- Lag(et,shift=1)

d1 <- sum(na.omit((et1)*et))
d2 <- sum(na.omit(et1)^2)
rho <- d1/d2

Ytnew <- df.4$Y - rho*Lag(df.4$Y,shift=1)
X1tnew <- df.4$X1 - rho*Lag(df.4$X1,shift=1)
X2tnew <- df.4$X2 - rho*Lag(df.4$X2,shift=1)
X3tnew <- df.4$X3 - rho*Lag(df.4$X3,shift=1)
X4tnew <- df.4$X4 - rho*Lag(df.4$X4,shift=1)
X5tnew <- df.4$X5 - rho*Lag(df.4$X5,shift=1)
X6tnew <- df.4$X6 - rho*Lag(df.4$X6,shift=1)

model.new <- lm(Ytnew ~ X1tnew + X2tnew + X3tnew + X4tnew + X5tnew + X6tnew)

dwtest(model.new)

##
## Durbin-Watson test
##
## data: model.new
## DW = 1.9668, p-value = 0.2931
## alternative hypothesis: true autocorrelation is greater than 0
```