

Assignment 2:

1. The logarithm rate is y_t , then the fitted model is:

$$(1 - B)y_t = (1 + 0.5269B - 0.0049B^2 - 0.1362B^3)a_t, \sigma^2 = 0.00069.$$

The ARIMA(0,1,3) Model fits well. Residual Analysis comes at $Q(12)=9.652$, P-Value comes at $p=0.645$, And the forecasted variables come out as 1.804799 1.805716 1.808650 1.808650.

2. The fitted model is :

$$(1 - B^{12})(r_t - 0.0179) = (1 + 0.2409B)(1 - 0.9830B^{12})a_t, \sigma^2 = 0.0041,$$

When Model checking was done, $Q(24)=23.922$, which is adequate and $p\text{-value}=0.466$.

3. x_t be the quarterly earnings of the AA Stock, Based on the acf and pacf plots, only pacf got the lag cut off at lag=1, which we have entertained in the model(Seasonal). The fitted model is:

$$(1 - 0.7206B)(1 - 0.6992B^4)(x_t - 0.3204) = a_t, \sigma^2 = 0.01005.$$

$Q(12)$ of residuals=6.8164, which suggests that it's insignificant, The forecasts of next earnings are ($n=4$) are 0.5521602 0.7379300 0.8352861 0.6088761, which is for the next 4 quarters, below is the acf and pacf plot of the problem.

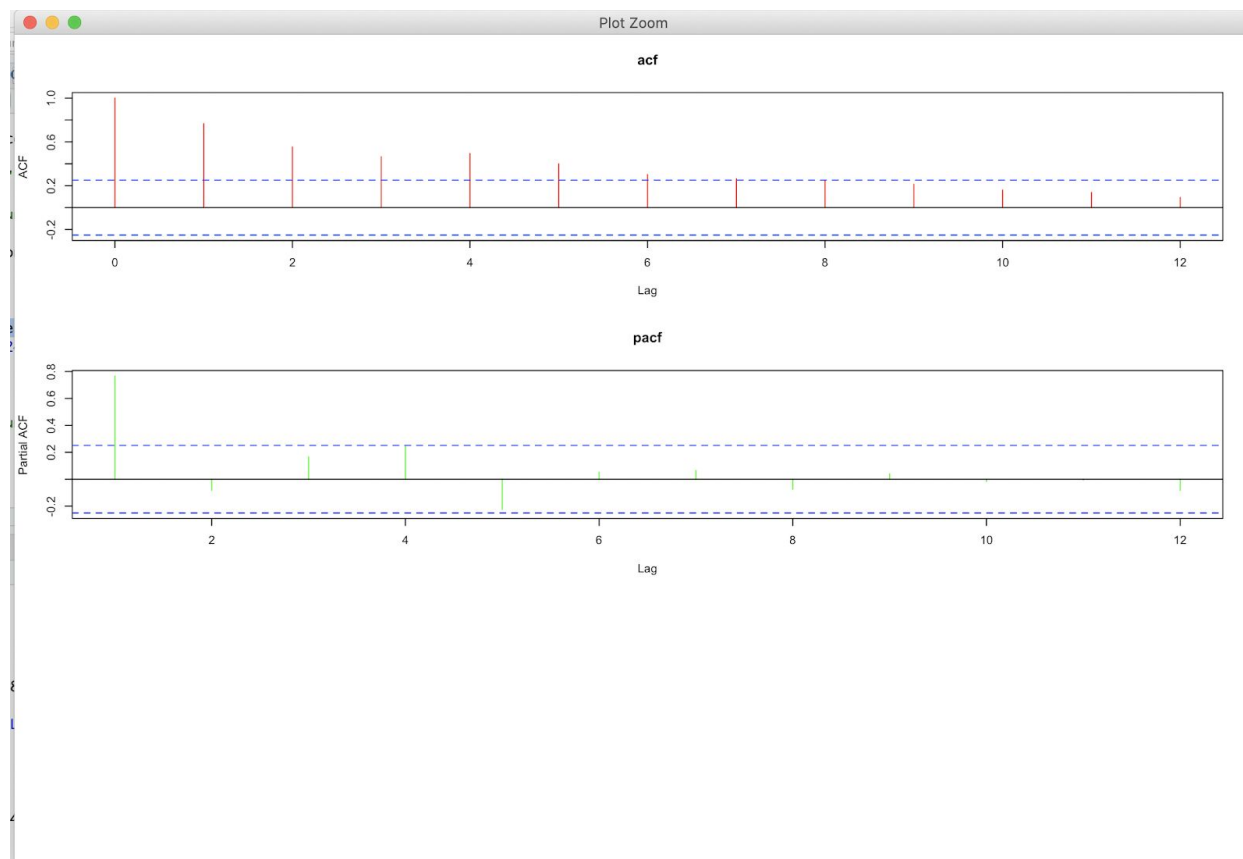


Fig of ACF and PACF(Quarterly Earnings)

R-Output:

```

Note-1.R x 1st-Q.R x 2ndAs.R x Homework2.R x non-sta-simulation.R x
Source on Save Run Source
22 arla
23 predict(arla,n.ahead = 4)
24 tdiag(arla)
25 Box.test(arla$residuals,lag = 12,type = "Ljung" )
26
27
28 #2nd Question:
29 tb=read.table("/Users/gardasnagarjun/Documents/2019FTS/assignment/m-dec1-8006.txt",header =FALSE,sep="")
30 t3=tb$V2
31 tc=acf(t3,lag.max = 12,main="acf",col="black")
32 tc
33 tp=pacf(t3,lag.max = 12,main="pacf",col="purple")
34 tp
35 Box.test(tb$V2,lag = 24,type = "Ljung" )
36
37 mm=arima(tb$V2,order=c(0,0,1),seasonal=list(order=c(1,0,1),period=12))
38 mm
39 tdiag(mm)
40
41 Box.test(mm$residuals,lag = 24,type = "Ljung" )

```

```

Note-1.R x 1st-Q.R x 2ndAs.R* x Homework2.R x non-sta-simulation.R x
Source on Save Run Source
22 arla
23 predict(arla,n.ahead = 4)
24 tsdiag(arla)
25 Box.test(arla$residuals,lag = 12,type = "Ljung" )
26
27
28 #2nd Question:
29 tb=read.table("/Users/gardasnagarjun/Documents/2019FTS/assignment/m-dec1-8006.txt",header =FALSE,sep="")
30 t3=tb$V2
31 tc=acf(t3,lag.max = 12,main="acf",col="black")
32 tc
33 tp=pacf(t3,lag.max = 12,main="pacf",col="purple")
34 tp
35 Box.test(tb$V2,lag = 24,type = "Ljung" )
36
37 mm=arima(tb$V2,order=c(0,0,1),seasonal=list(order=c(1,0,1),period=12))
38 mm
39 tsdiag(mm)
40
41 Box.test(mm$residuals,lag = 24,type = "Ljung" )

```

```

41 Box.test(mm$residuals,lag = 24,type = "Ljung" )
42 chk1=checkresiduals(t3,lag=24,df=24,test="LB",plot = TRUE)
43
44
45 #3rd Question:
46 tc=read.table("/Users/gardasnagarjun/Documents/2019FTS/assignment/q-aa-earn.txt",header =FALSE,sep="")
47 tc
48 tc$V4
49 #t4=log(tc$V4)
50 #t5=diff(t4)
51 ac=acf(tc$V4,lag.max = 12,main="acf",col="red")
52 ac
53 pa=pacf(tc$V4,lag.max=12,main="pacf",col="green")
54 pa
55 Box.test(t,lag =12,type = "Ljung" )
56 #auto_1=arima(tc$V4,order = c(5,0,0))
57 auto=arima(tc$V4,order=c(1,0,0),seasonal=list(order=c(1,0,0),period=4))
58 auto
59 predict(auto,n.ahead = 4)
60 Box.test(auto$residuals,lag = 12,type = "Ljung" )
61

```