Coursework 5

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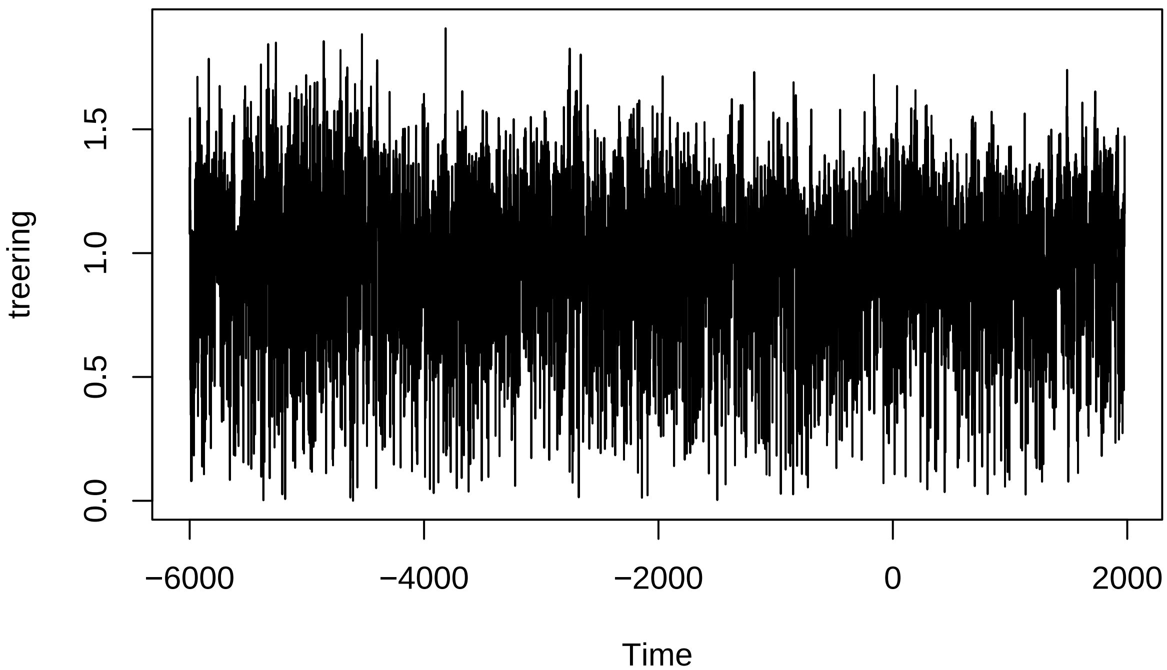
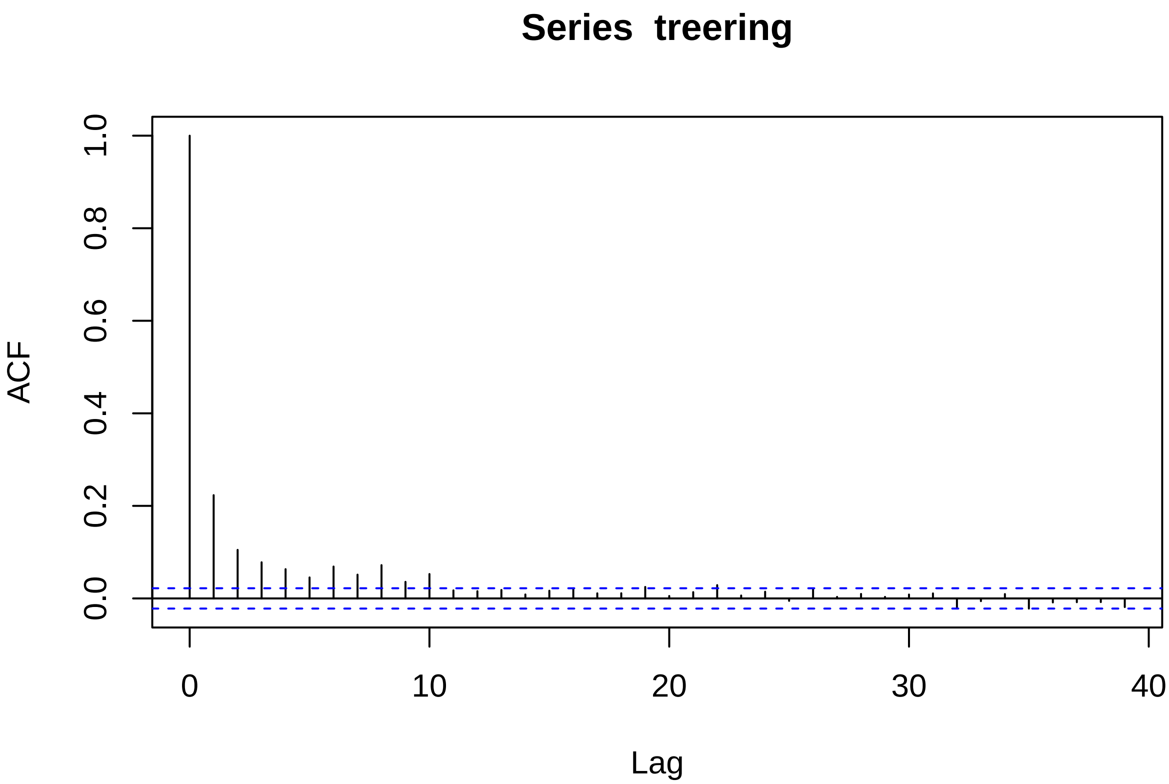
```
data(treering)
ts.plot(treering)
```

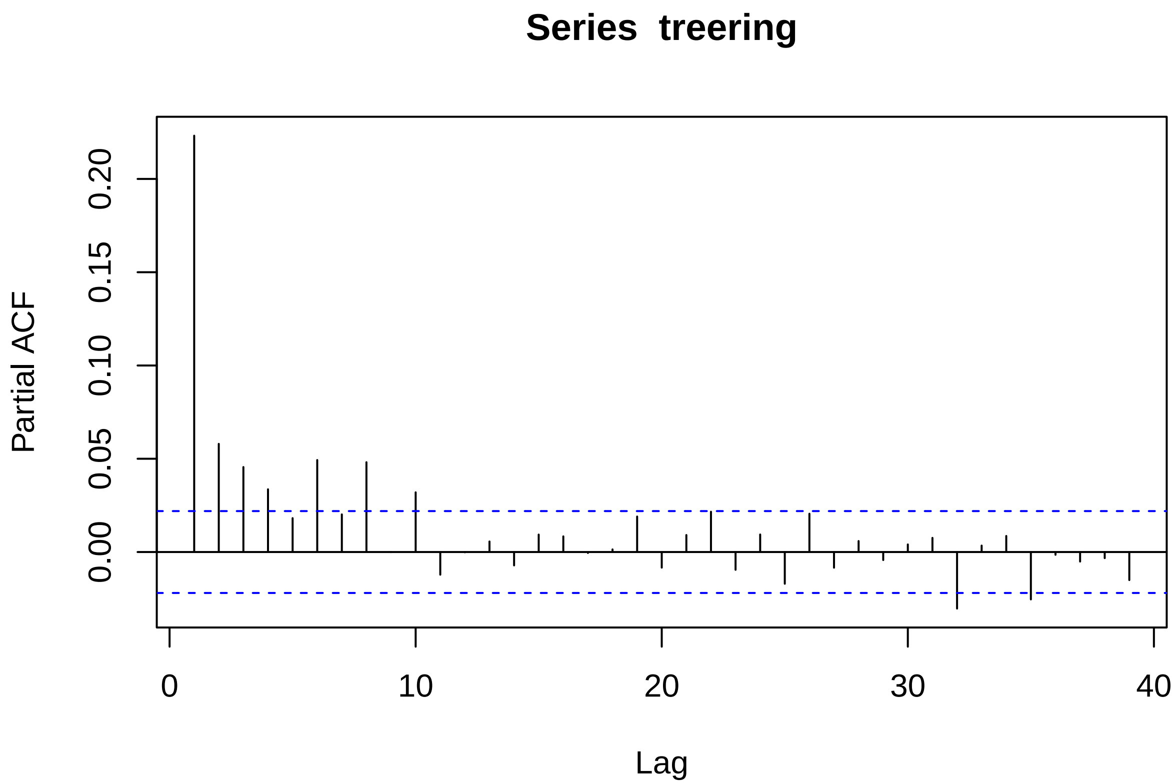



```
acf(treering)
```

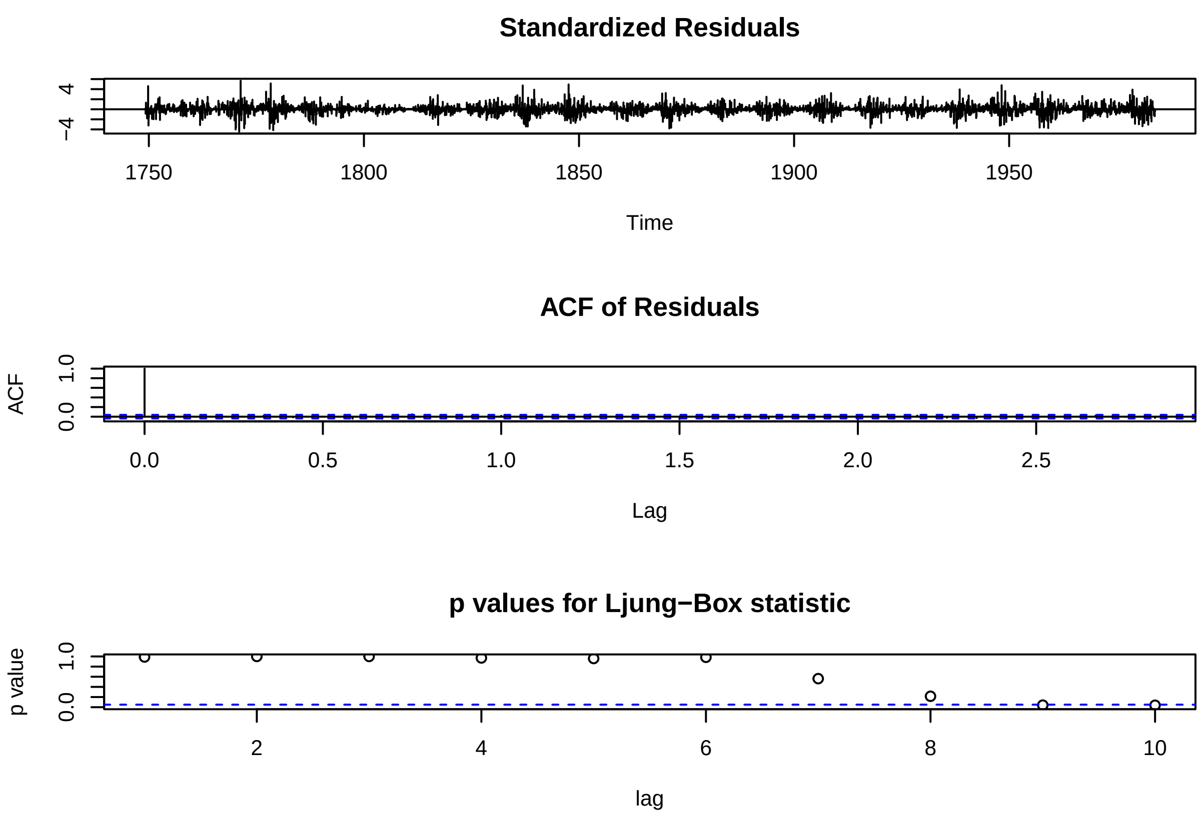



```
pacf(treering)
library(forecast)
```

```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

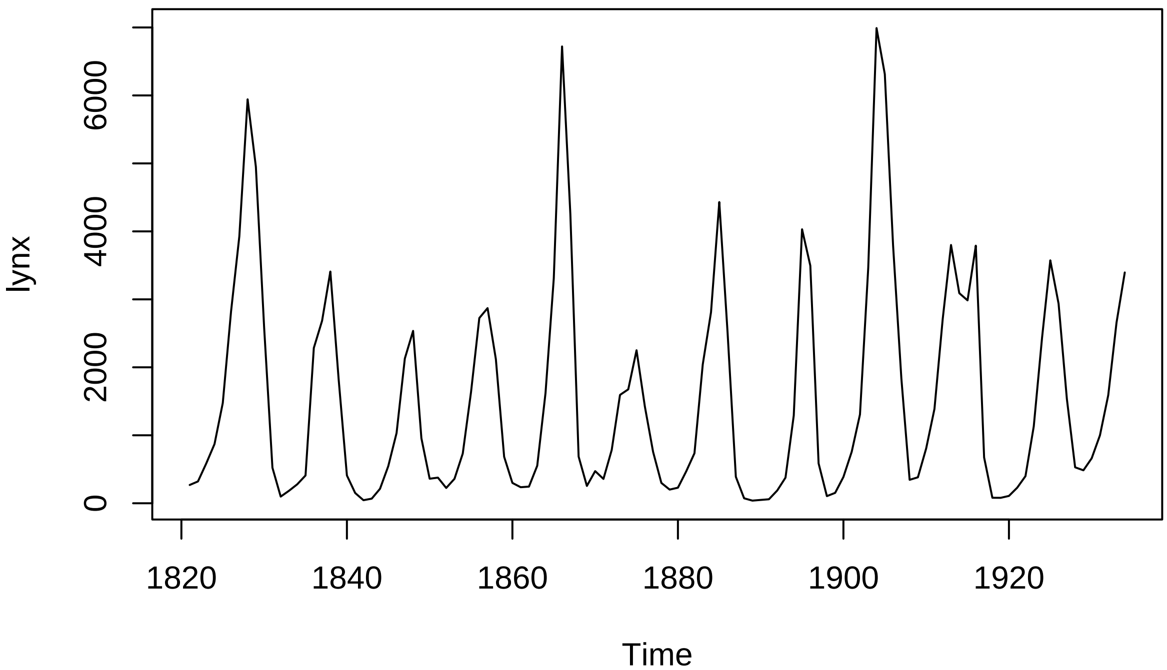



```
fit2 <- arima(sunspots, order = c(2,2,2))
tsdiag(fit2)
```

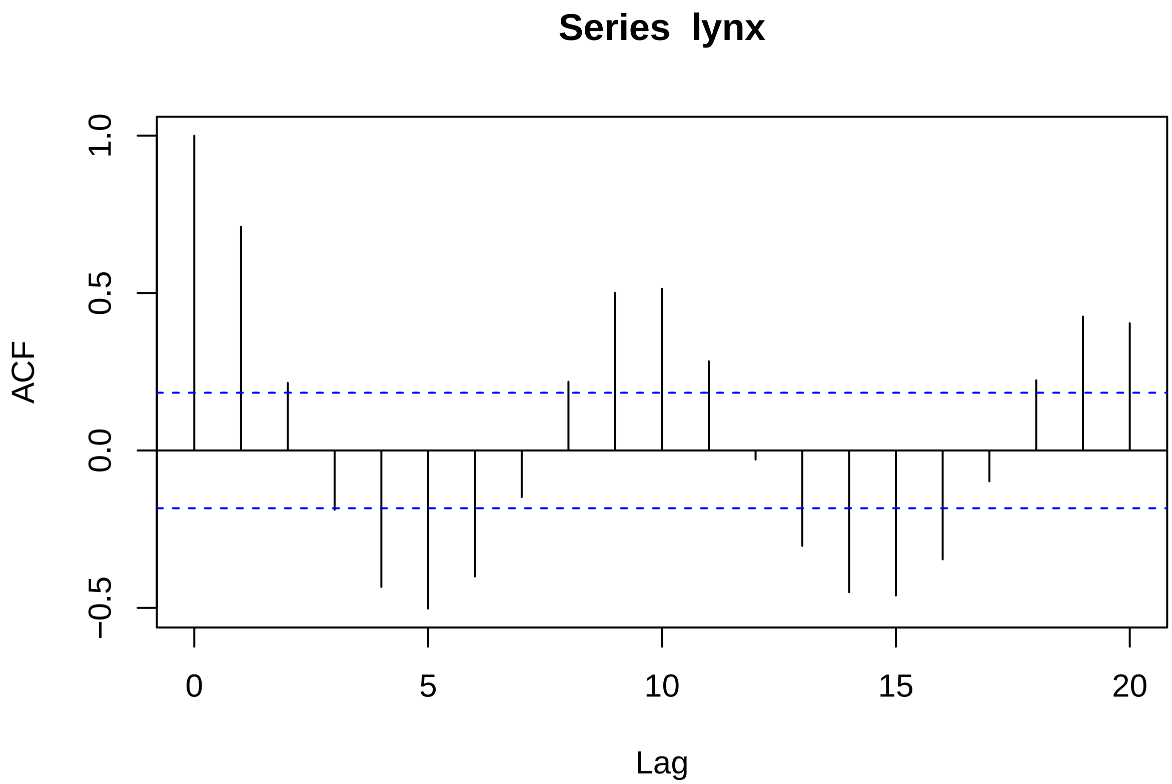


```r
#fit3<-auto.arima(sunspots,ic="bic")
#fit3<-auto.arima(sunspots,ic="aic")
#fit3<-auto.arima(sunspots,ic="aicc")
# Process: I guessed ARMA(1,1) from ACF
#and #PACF(since there was a lag after 0
#in ACF and PACF was decaying).
#It didn't #work in the Ljung-Box test,
#so I tried ARIMA(1,1,1), which was better.
#It is hard to tell what is white noise so
#I tried ARIMA(2,2,2,) as well and it turned
#out better.I tried aic,bic, and aicc tests
#but none were conclusive.
```

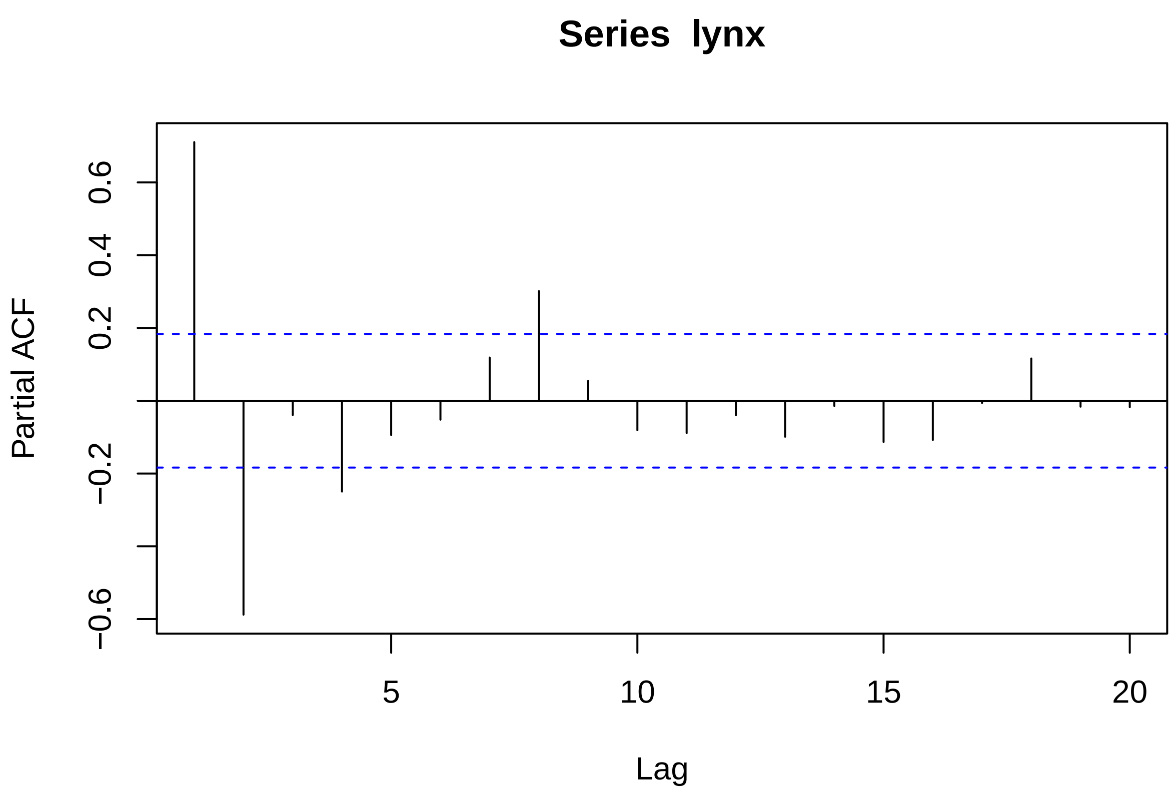
```r
data(lynx)
ts.plot(lynx)
```




```r
acf(lynx)
```

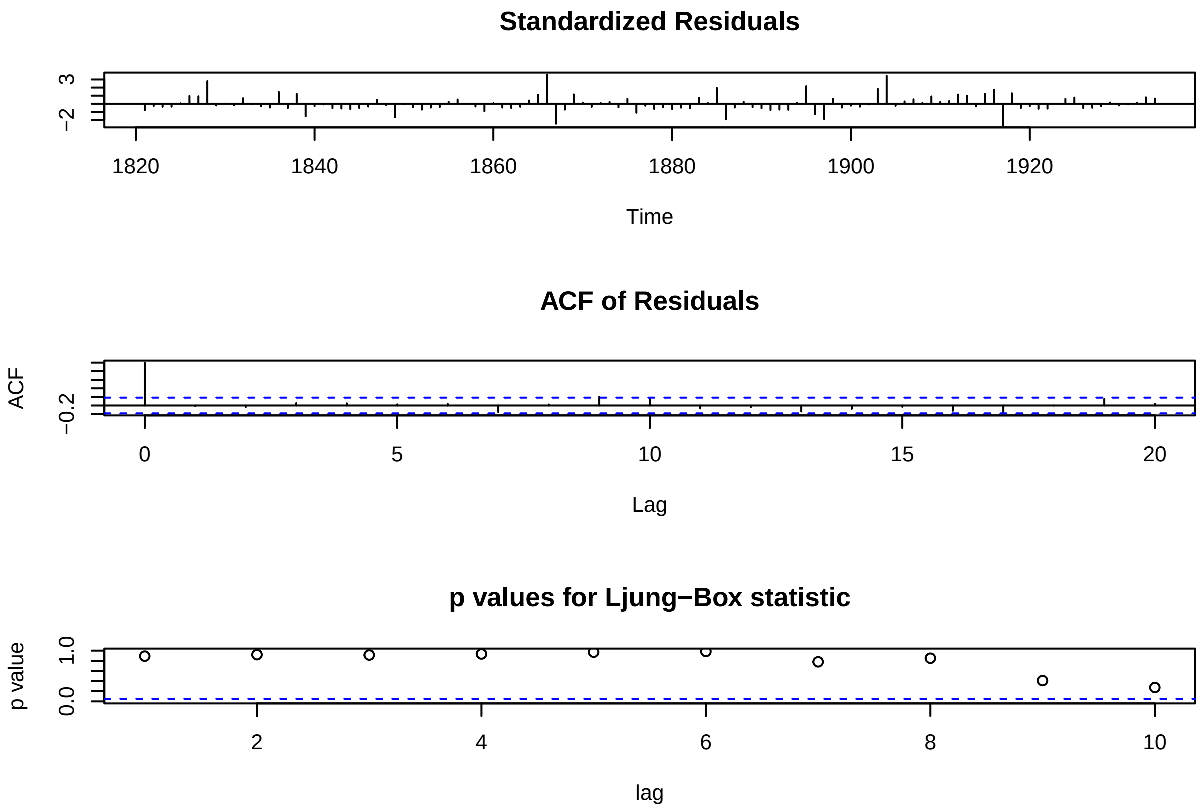



```
pacf(lynx)
```



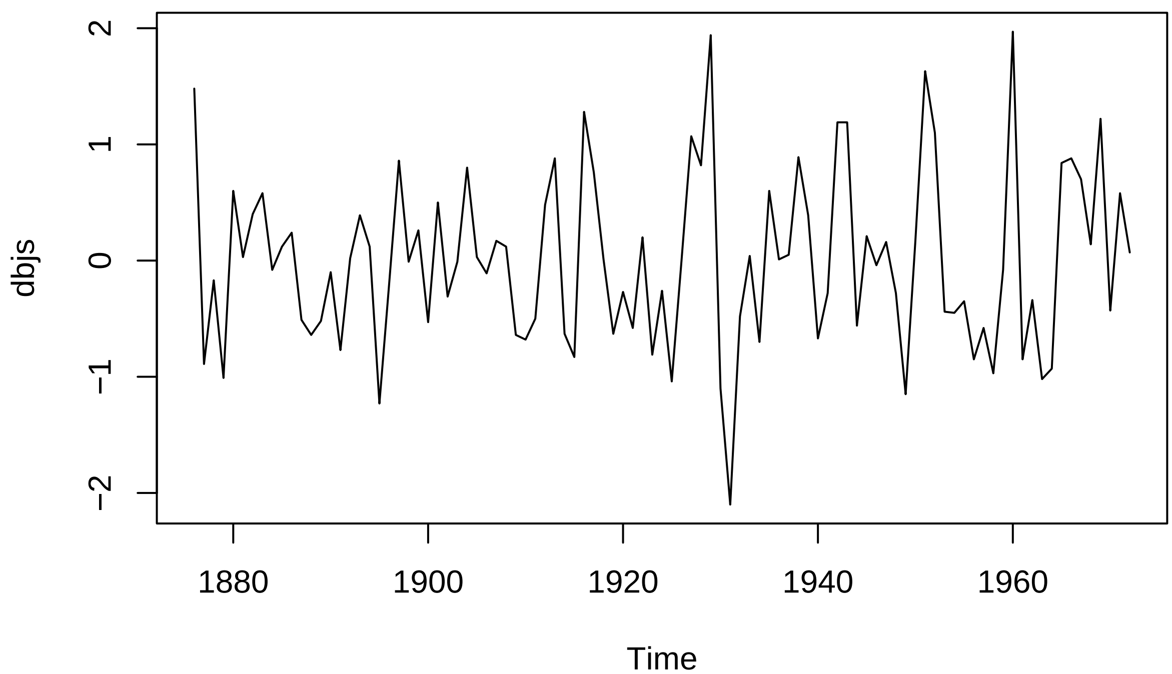

```
#clearly, this looks seasonal.
#Let's try something.
#I tried something seasonal and it
```

```
#didn't fit. I'm trying various tests.


 fit3<-auto.arima(lynx,ic="aicc")
 #This returns ARMA(2,0,2)
 tsdiag(fit3)
```

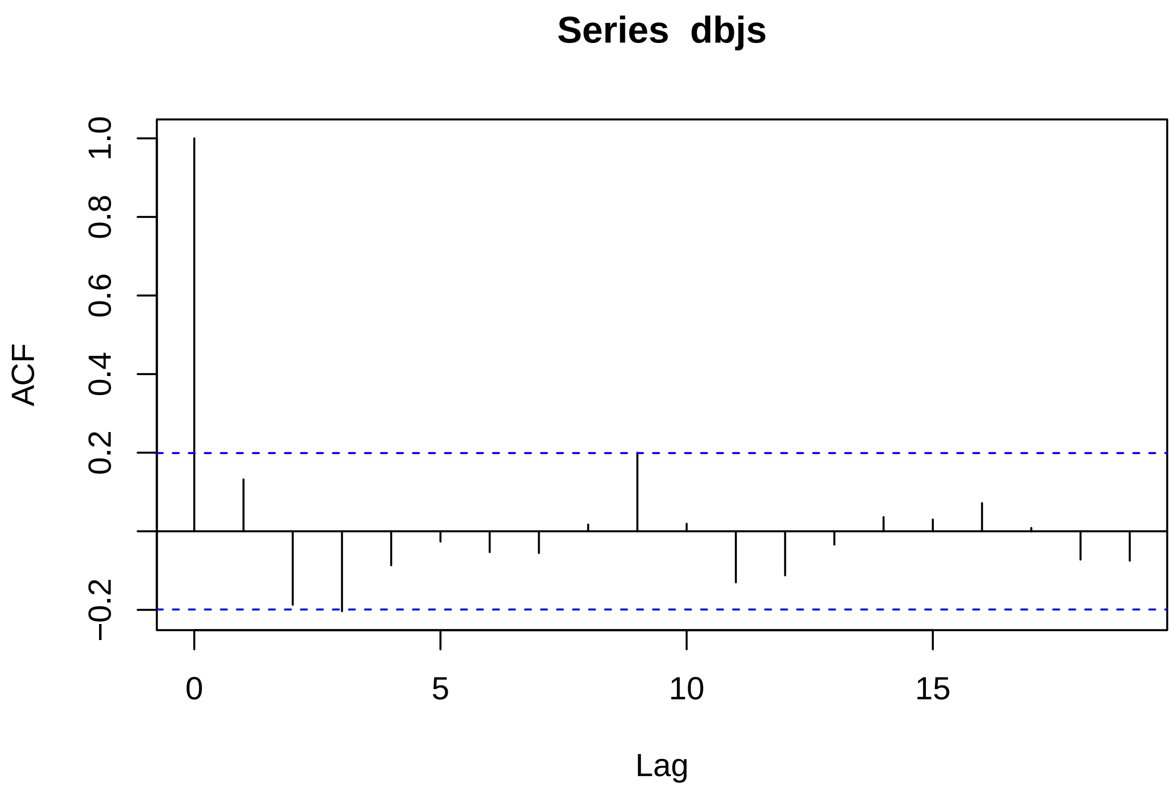



```
# OK. ARMA(2,0,2) fits so I'm going
 #with this.All the aicc,aic, and bic
 #tests return this as well.
```

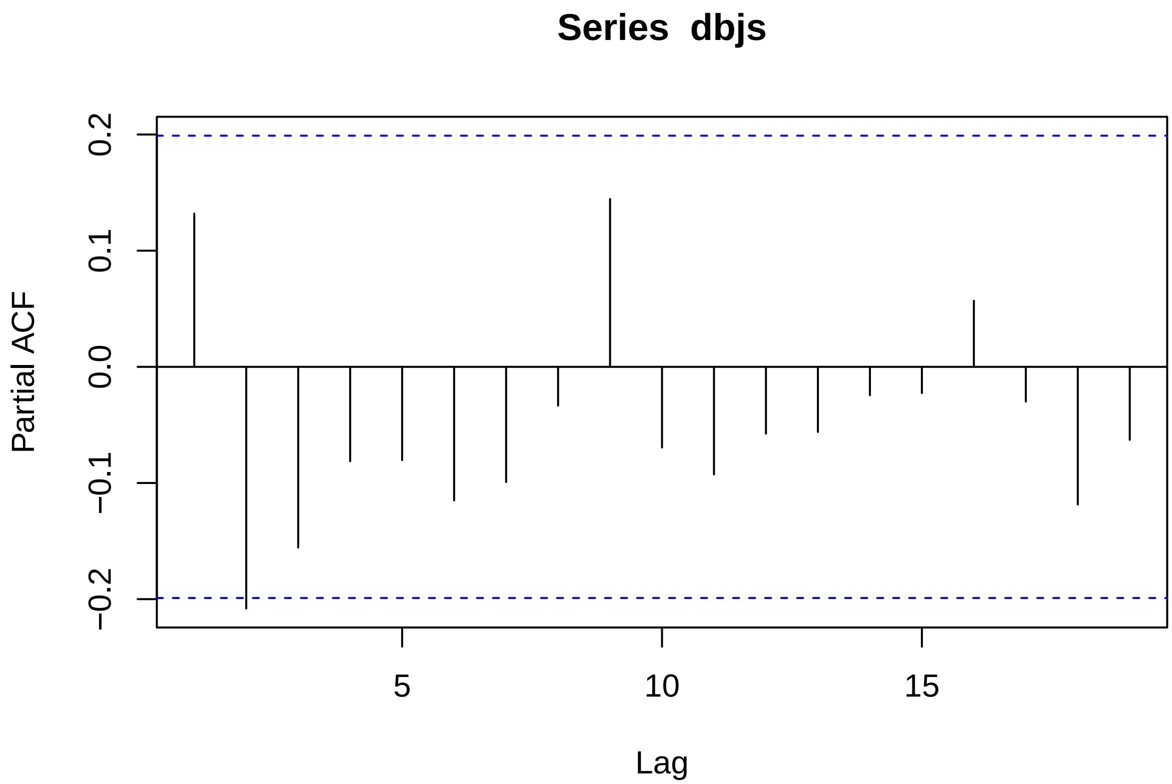
```
data(LakeHuron)

#Try differencing since it's not stationary.
dbjs = diff(LakeHuron)
ts.plot(dbjs)
```




```
acf(dbjs)
```



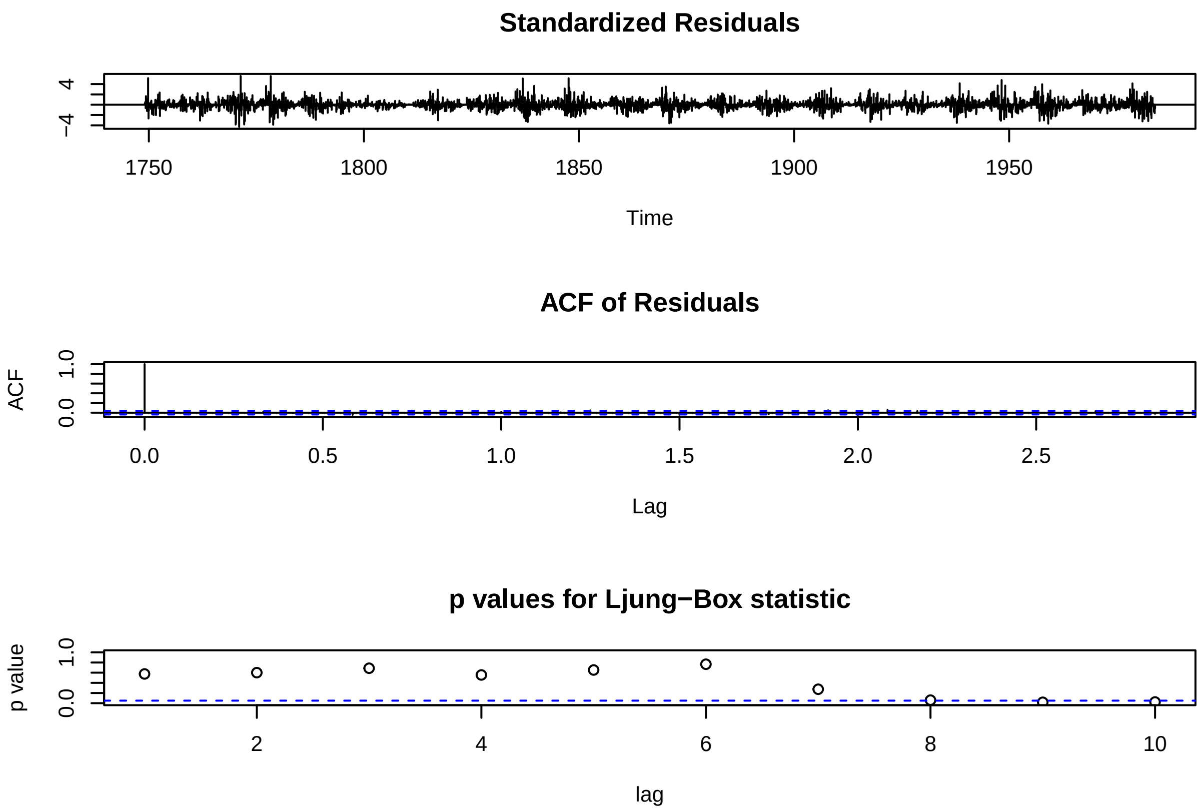

```
pacf(dbjs)
```




```r
library(forecast)
#This looks better, stationary enough, with one spike in ACF
fit3<-auto.arima(sunspots,ic="aicc")
fit3
```

```
## Series: sunspots
## ARIMA(2,1,2)
##
## Coefficients:
##          ar1      ar2      ma1     ma2
##       1.3467  -0.3963  -1.7710  0.8103
## s.e.  0.0303   0.0287   0.0205  0.0194
##
## sigma^2 = 243.8:  log likelihood = -11745.5
## AIC=23500.99   AICc=23501.01   BIC=23530.71
```

```r
#OK, this returns ARMA(2,1,2).Let's try this.

tsdiag(fit3)
```

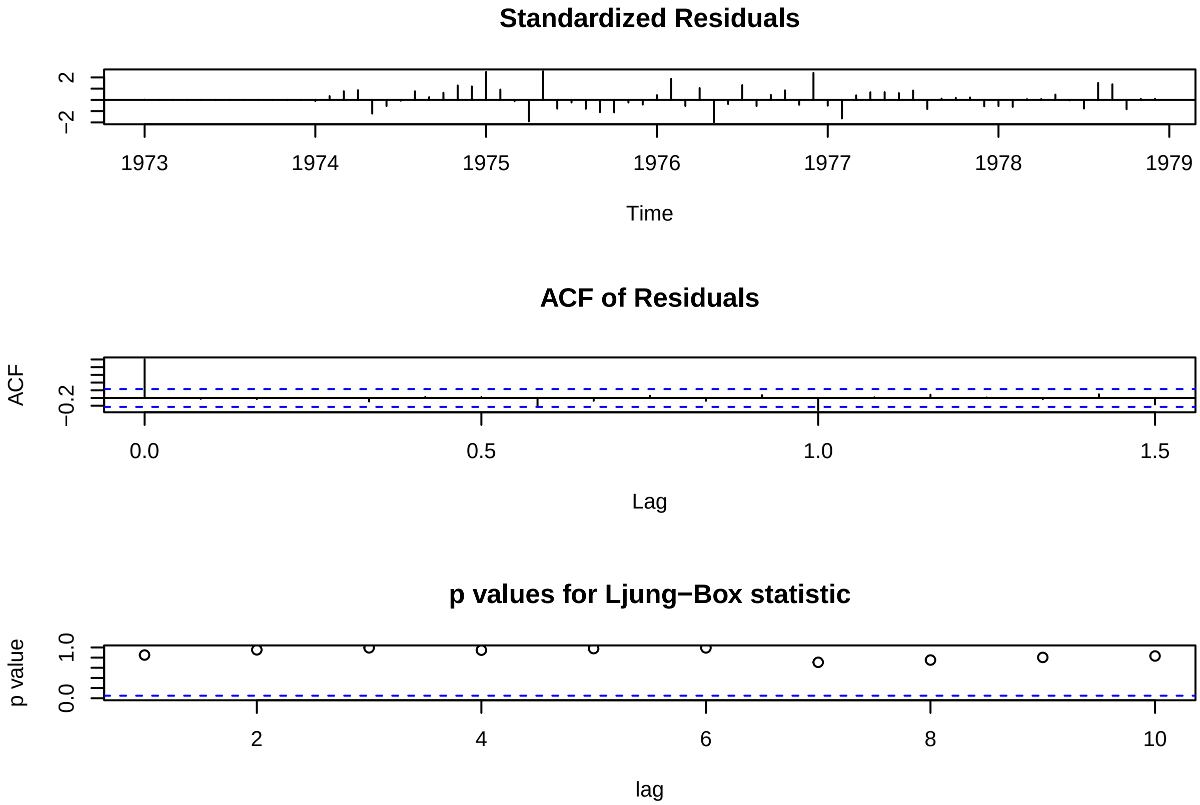



```
# Well, that seemed to work. ARMA(2,1,2), it is.
```

```
data(AirPassengers)
#ts.plot(AirPassengers)
#ts.plot(AirPassengers)
#acf(AirPassengers)
#pacf(AirPassengers)
#take difference
#dbj = diff(AirPassengers)
#dbj2 = diff(dbj)
#ts.plot(dbj)
library(forecast)
fit3<-auto.arima(AirPassengers,ic="aicc")
fit3
```

```
## Series: AirPassengers
## ARIMA(2,1,1)(0,1,0)[12]
##
## Coefficients:
##          ar1     ar2      ma1
##       0.5960  0.2143  -0.9819
## s.e.  0.0888  0.0880   0.0292
##
## sigma^2 = 132.3:  log likelihood = -504.92
## AIC=1017.85   AICc=1018.17   BIC=1029.35
```

```
fit<-arima(USAccDeaths, order = c(2,1,1), seasonal = list(order = c(0,1,0),period=12))
tsdiag(fit)
```




```
#I tried differencing but it didn't make
#it stationary. AICC, bic, and aicc returned
#three different answers and what I fit looks
#like best one although the it's not clear if
#the residuals are white noise but I don't see
#a clear structure. So this should do.
```