CW2

Liangxiao LI

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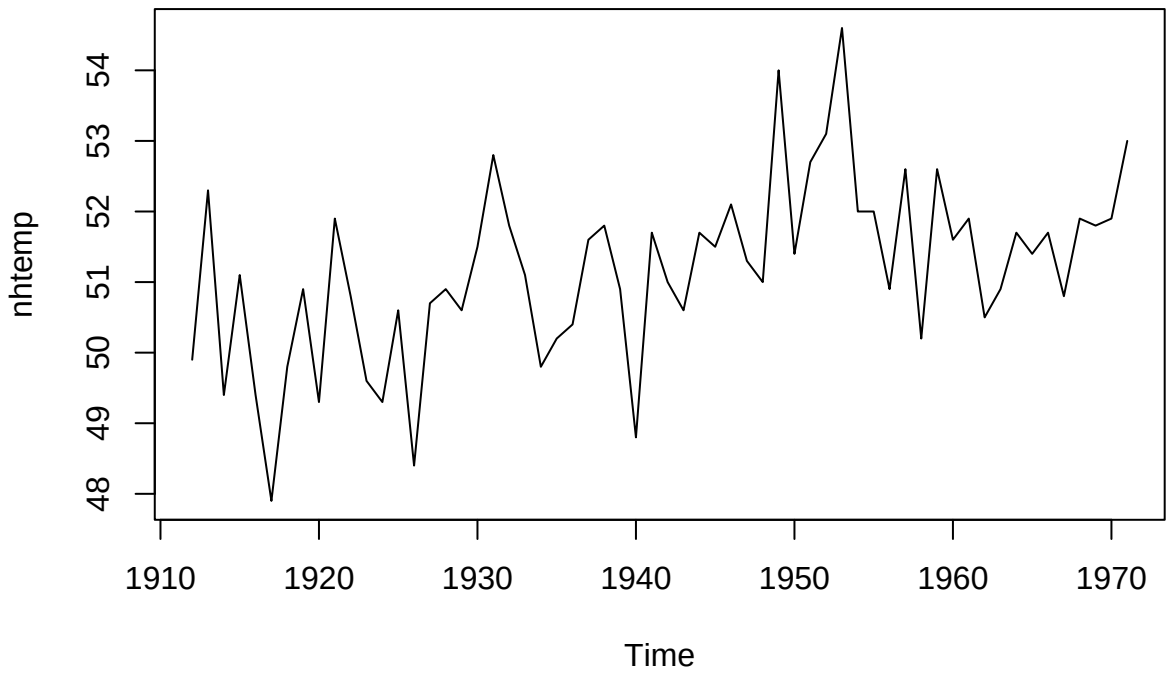
Q1: nhtemp

First we load the dataset

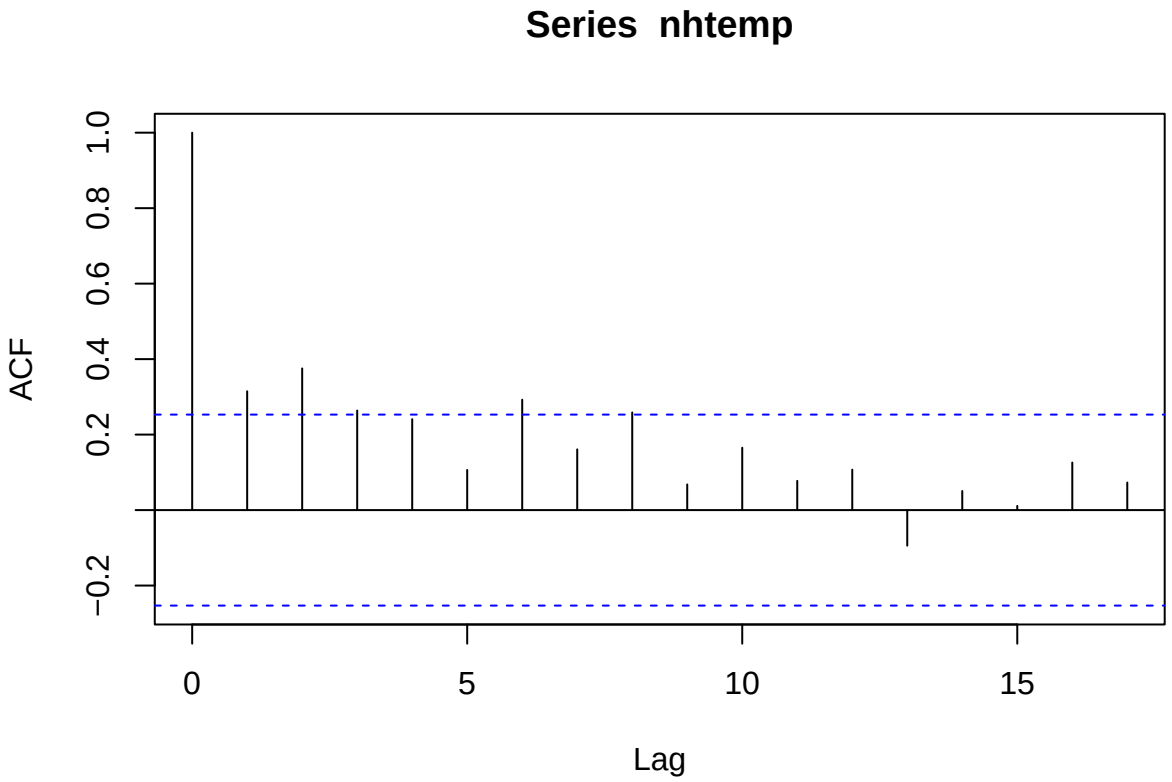
```
load("nhtemp.rda")
```

Then we produce the time plot, sample ACF against the lag and sample PACF against the lag for the nhtemp data.

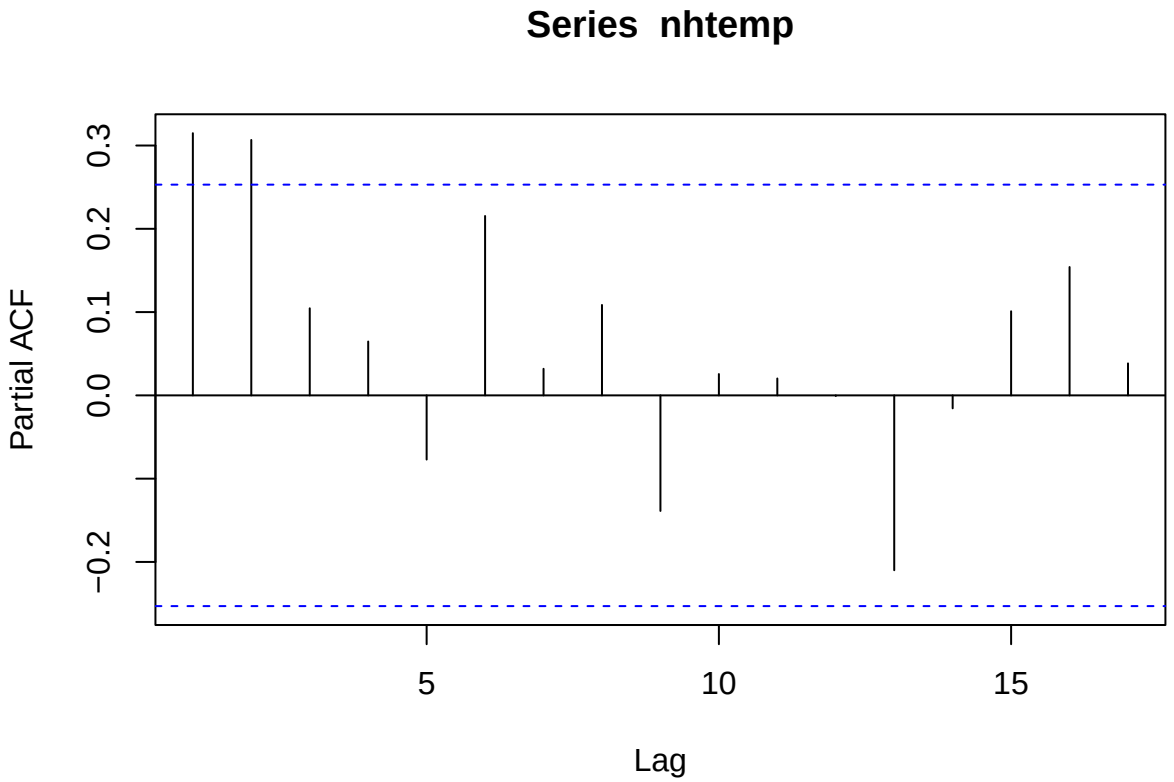
```
ts.plot(nhtemp)
```




```
acf(nhtemp)
```




```
pacf(nhtemp)
```



Looking at the time plot, the mean of the series appears higher between 1940-1970 to the period between 1910-1940.

Since the sample ACF against the lag doesn't decline rapidly, it's not certain that the series is stationary.

The sample PACF doesn't provide much information for the stationarity.

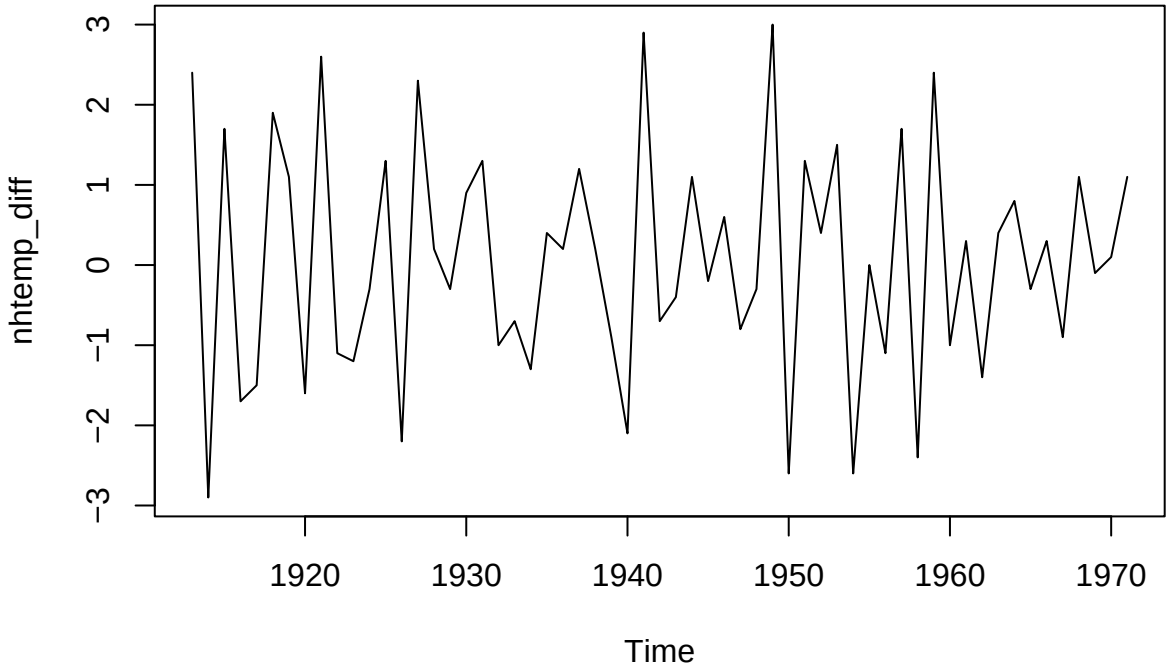
Therefore we cannot conclude that the series is stationary.

Now we calculate the the first difference of the time series nhtemp as nhtemp_diff in the following section:

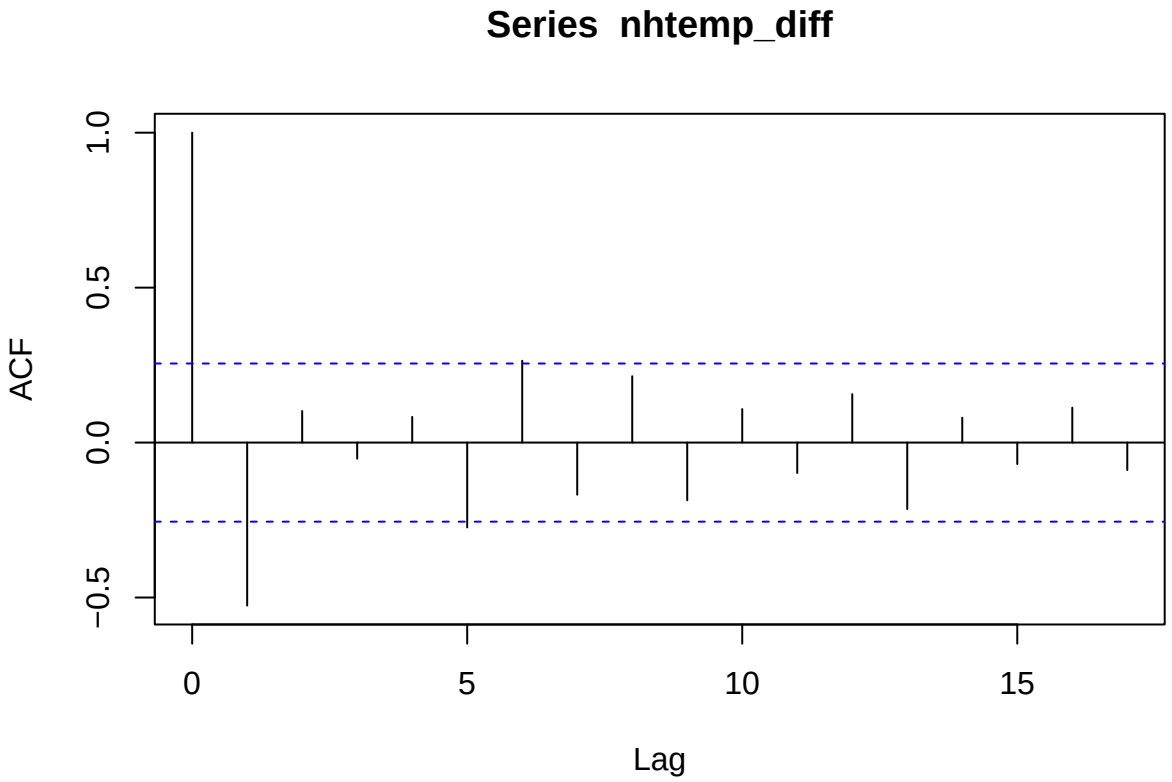
```
nhtemp_diff<-diff(nhtemp)
```

Now we produce the time plot, sample ACF and sample PACF for the nhtemp_diff

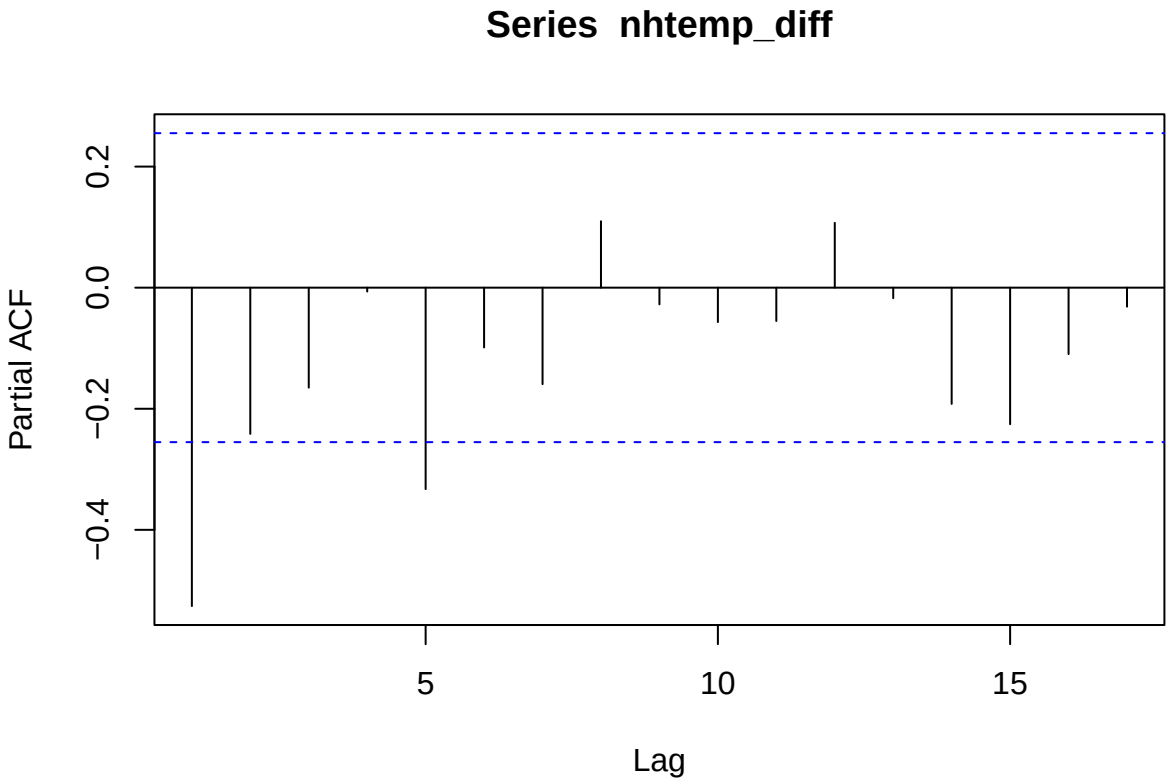
```
ts.plot(nhtemp_diff)
```




```
acf(nhtemp_diff)
```




```
pacf(nhtemp_diff)
```



The above three plot show that the first-difference nhtemp_diff is (weakly) stationary

The time plot has a mean equal to zero and shows constant variability over time.

The sample ACF declines rapidly to zero as the lag increases.

The sample PACF also declines rapidly to zero as the lag increases.

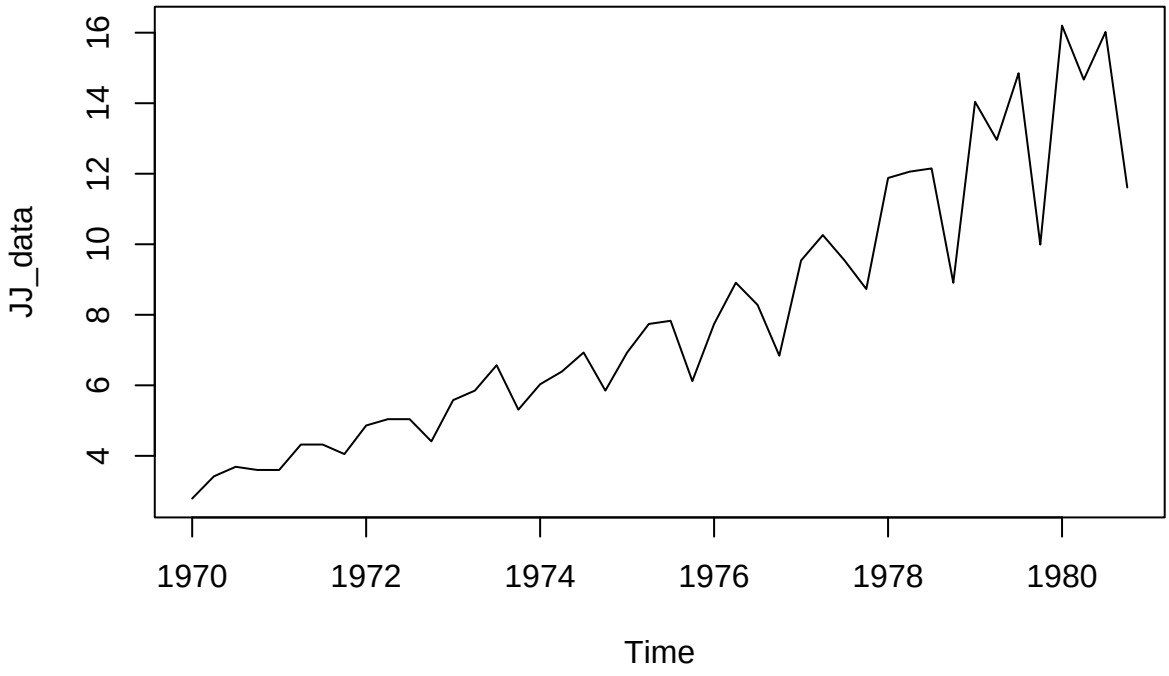
Q2: JJ_data

First we load the dataset

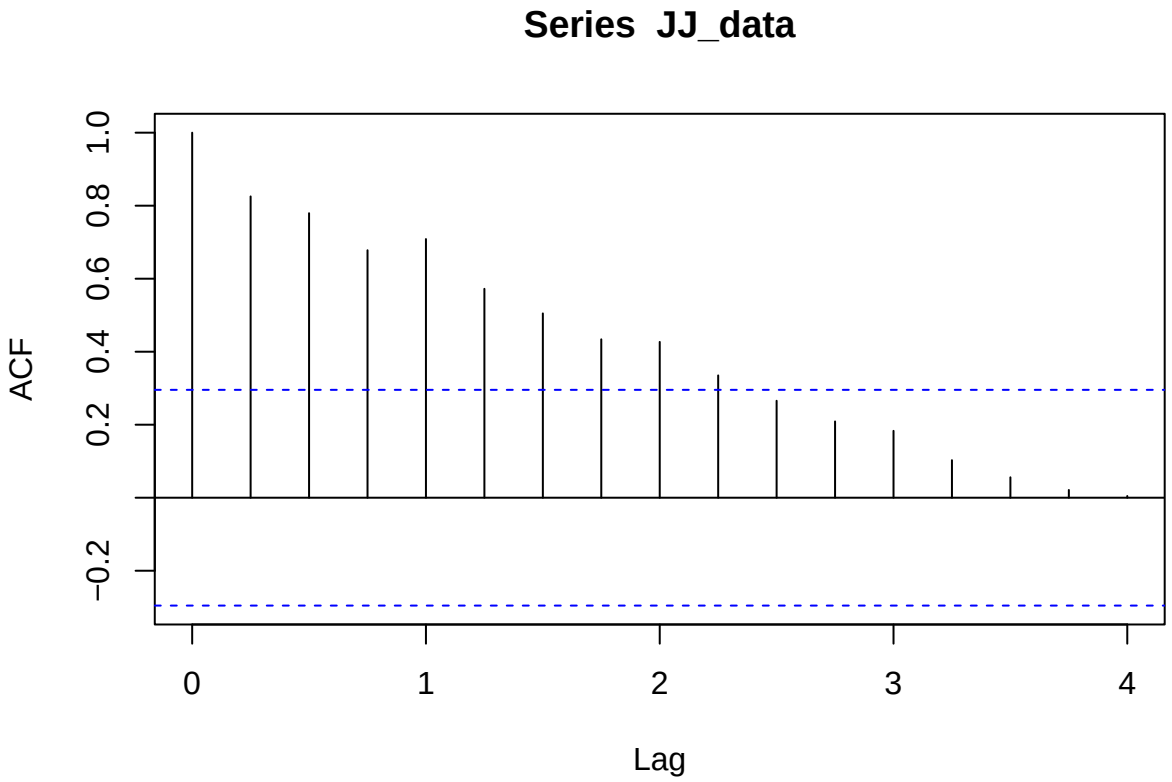
```
load("JJ_data.rda")
```

Then we produce the time plot, sample ACF against the lag and sample PACF against the lag for the nhtemp data.

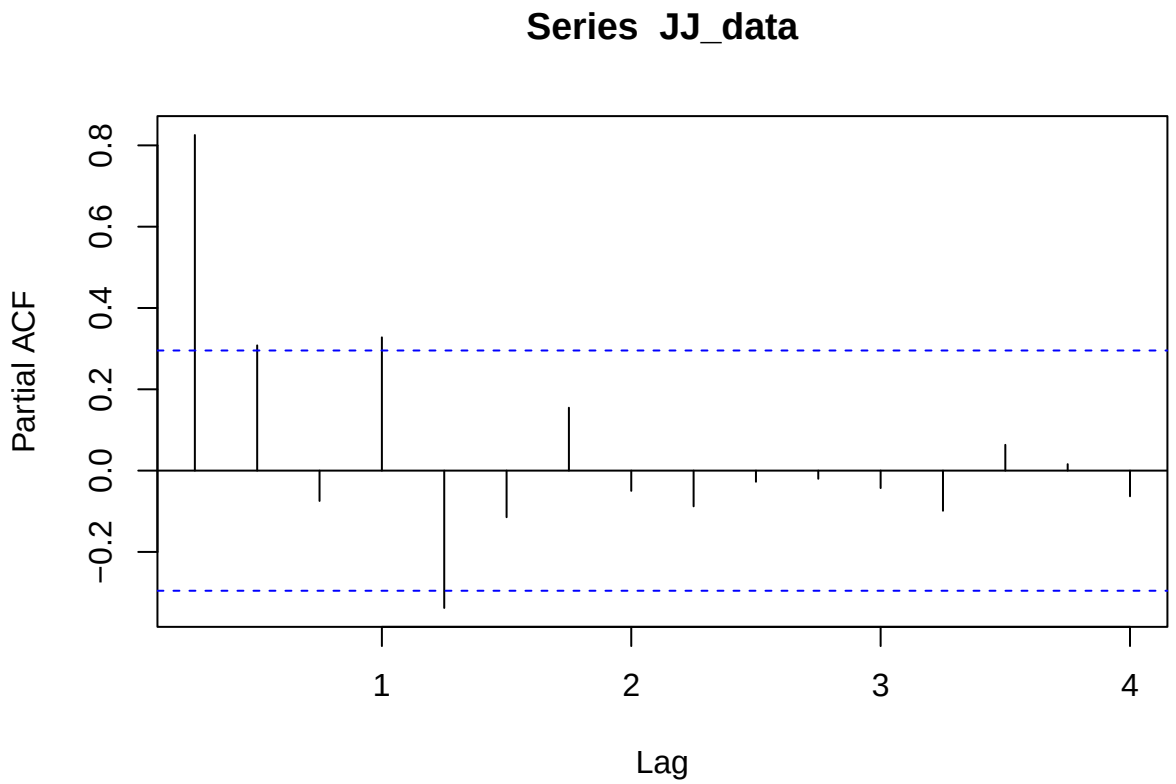
```
ts.plot(JJ_data)
```




```
acf(JJ_data)
```


Series JJ_data
ACF
1.0
0.8
0.6
0.4
0.2
−0.2
0
1
2
3
4
Lag

```
pacf(JJ_data)
```


Series JJ_data
Partial ACF
0.8
0.6
0.4
0.2
0.0
−0.2
1
2
3
4
Lag