pstat271_lab05_aoxu

AO XU

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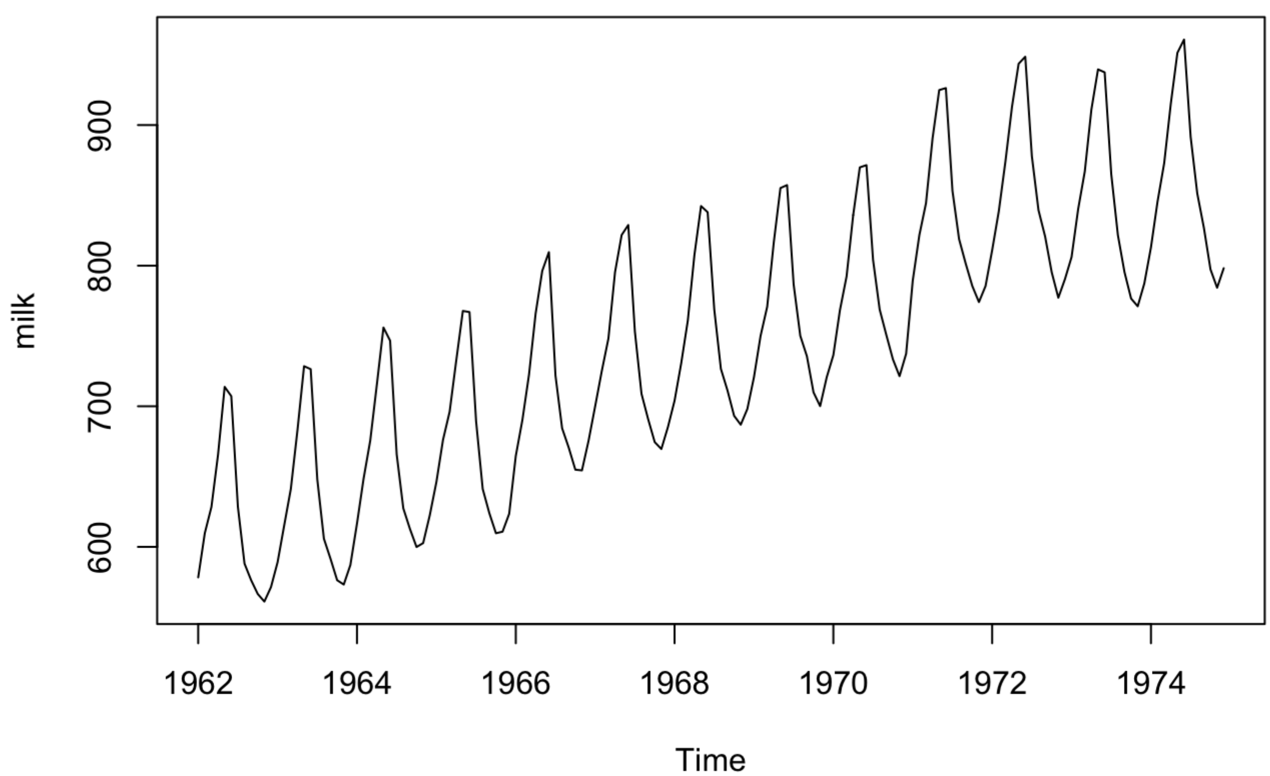
```
library(tsdl)
milk <- subset(tsdl, 12, "Agriculture")[[3]]
plot(milk)
```



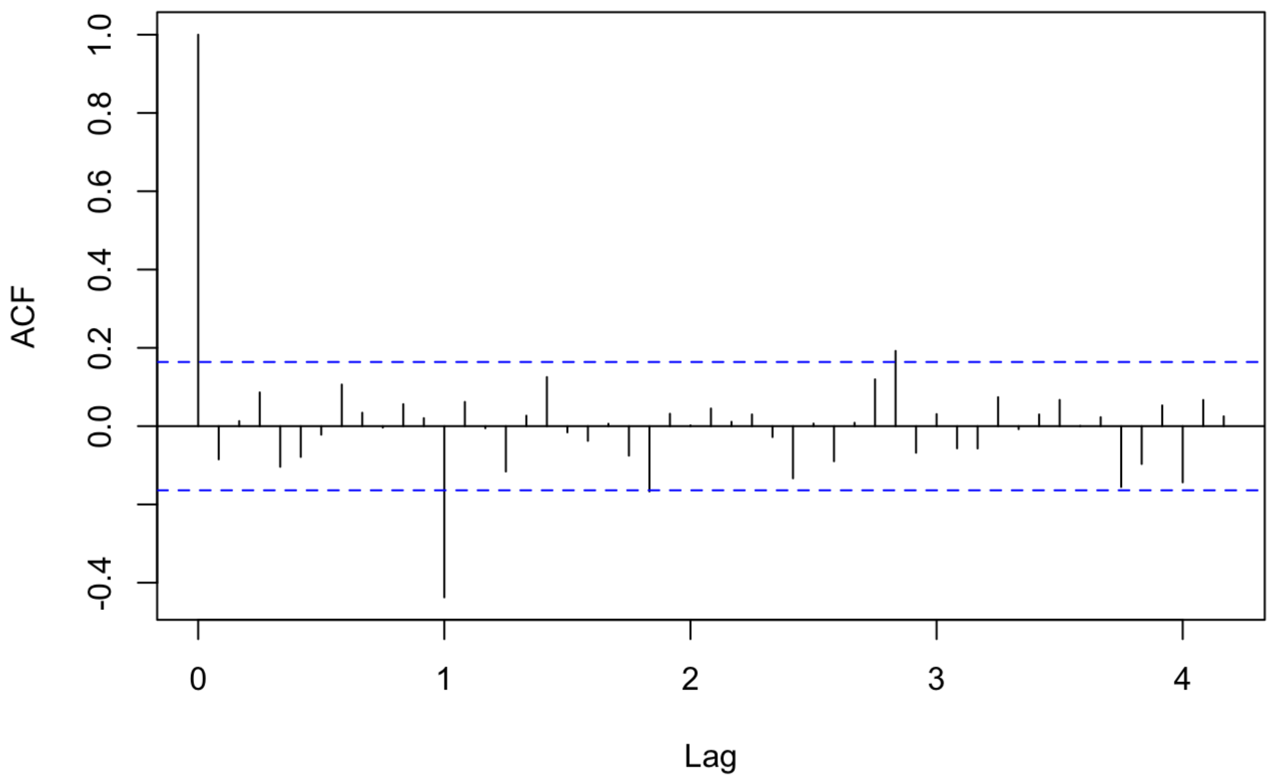

```
# To make it more stationary, we use the following code:
dmilk <- diff(milk, 12)
ddmilk <- diff(dmilk, 1)
```

a.

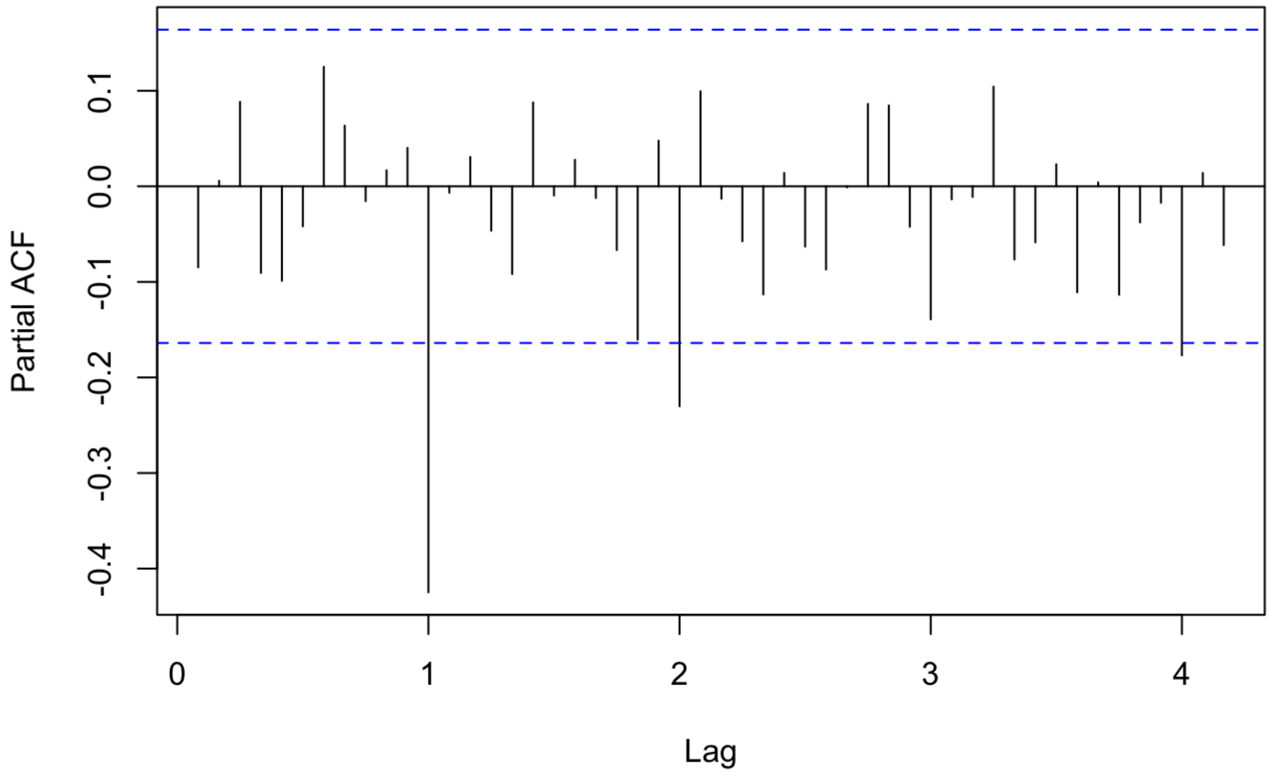
It has a positive linear trend and seasonality, then it is not stationary.

b.

```
dmilk <- diff(milk, 12)
ddmilk <- diff(dmilk, 1)
acf(ddmilk, lag.max = 50, main="")
```




```
pacf(ddmilk,lag.max = 50, main="")
```



c.

Since it’s one seasonal differencing, then we get that D=1 at lag s=12. And ddmilk applied one differencing to remove trend, so d=1. From acf, there is one peak at 1, so Q is 1. From PACF, there are peaks at 1,2 or 4. So P could be 1 or 2 or 4. For 0-1 from both ACF and PACF, there are no peaks. Then we get

SARIMA (0, 1, 0) x (1, 1, 1)$_{s=12}$

SARIMA (0, 1, 0) x (2, 1, 1)$_{s=12}$

SARIMA (0, 1, 0) x (4, 1, 1)$_{s=12}$

d.

```
library(astsa)
#library(sarima)
fit.i <- sarima( xdata = milk,
                 p = 0, d = 1, q = 0,
                 P = 1 , D = 1, Q = 1, S = 12,
                 details = F)
print('Coefficients')
```

```
## [1] "Coefficients"
```

```
fit.i$fit$coef
```

```
##        sar1        sma1
##  0.01876417 -0.68617816
```

```
plot(fit.i$fit$residuals)
```