

# hw1 409

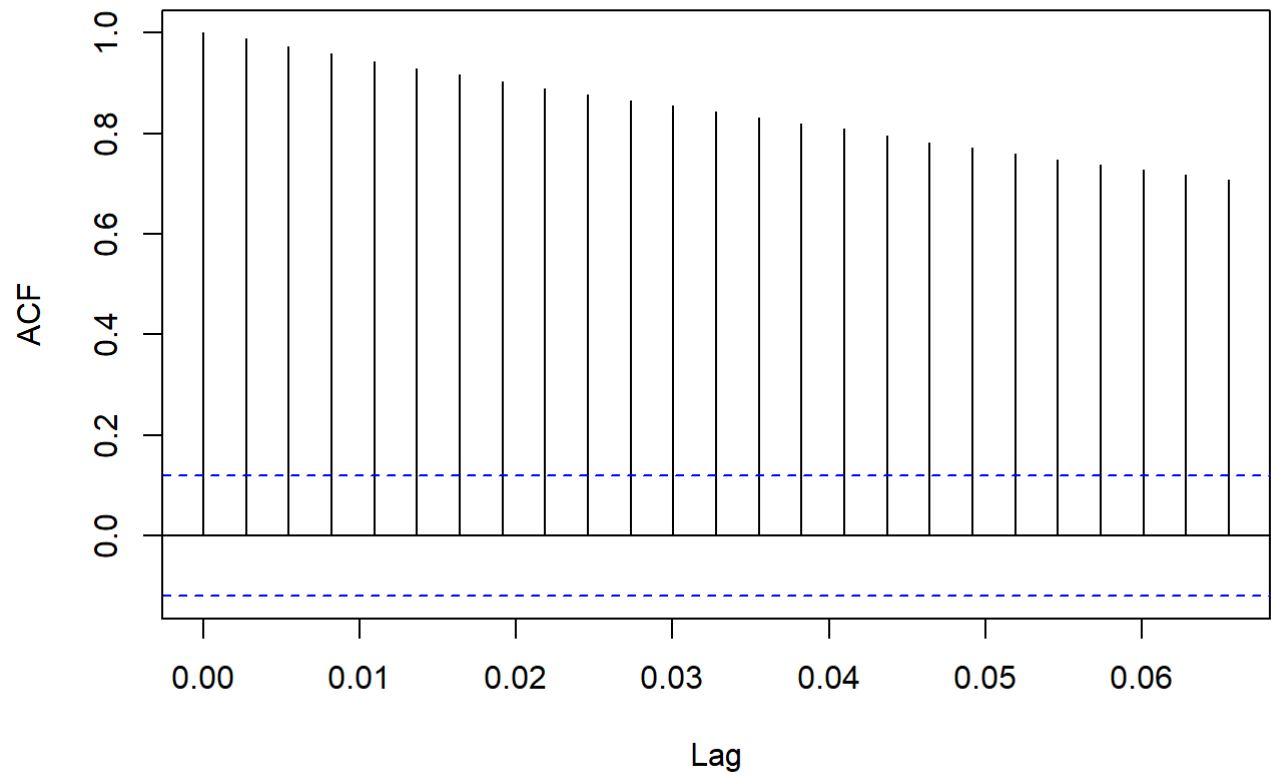
2021/1/12

```
dailydata=read.table('eurdaily.txt')
attach(dailydata)
dailydata=na.omit(dailydata)
eurdaily=ts(dailydata, start=2020, freq=366)
plot(eurdaily)
```



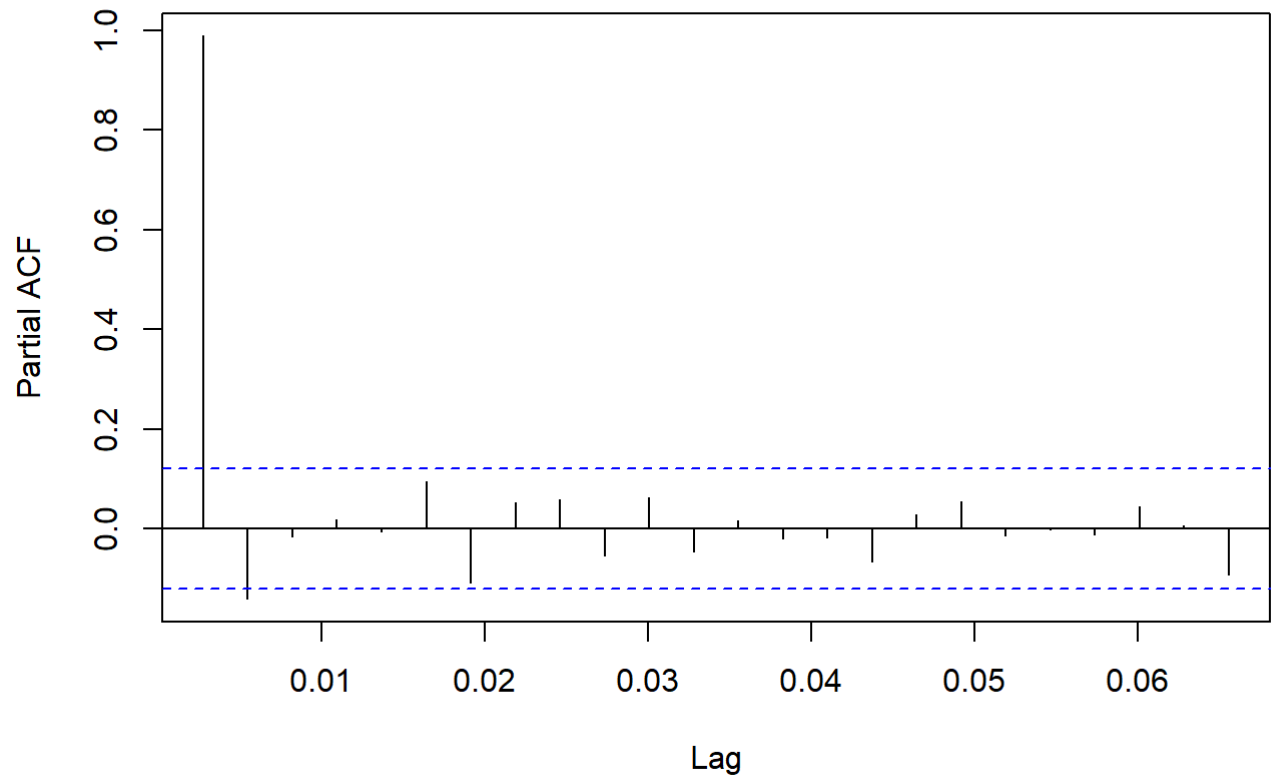
```
acf(eurdaily)
```

V1

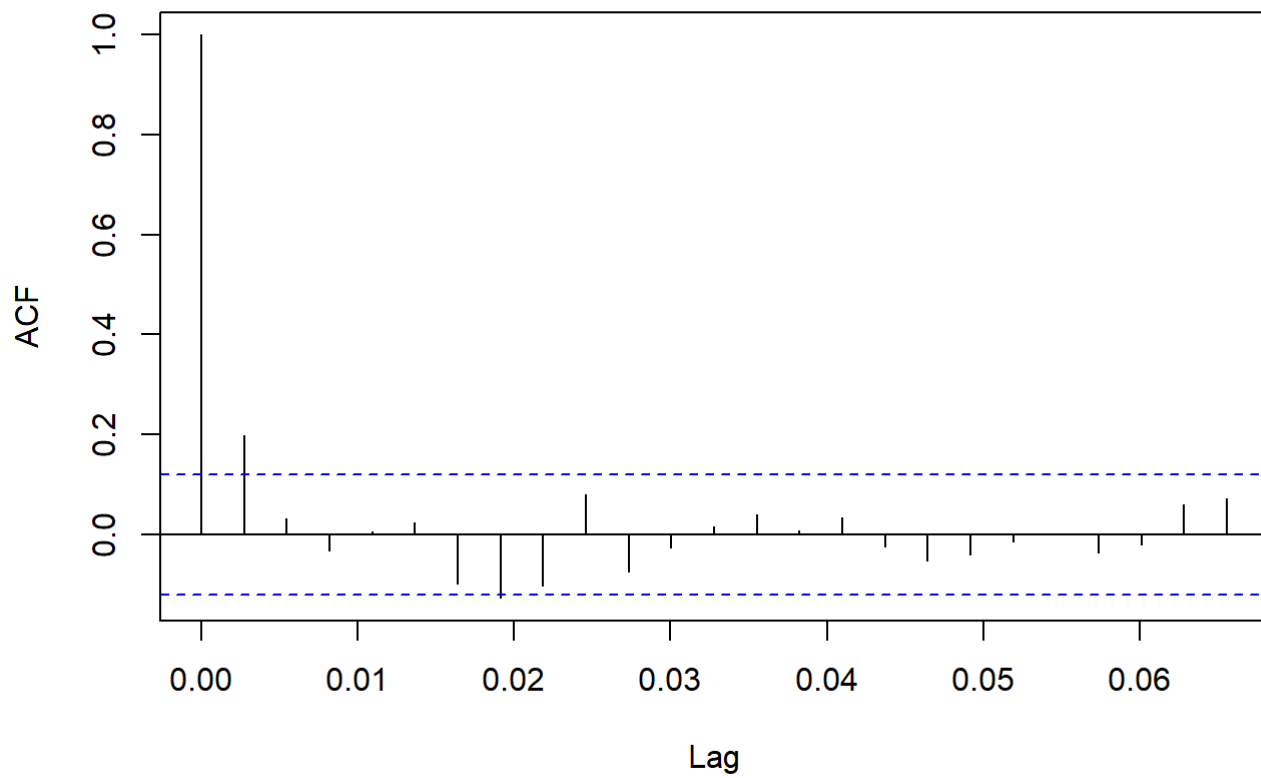


```
pacf(eurdaily)
```

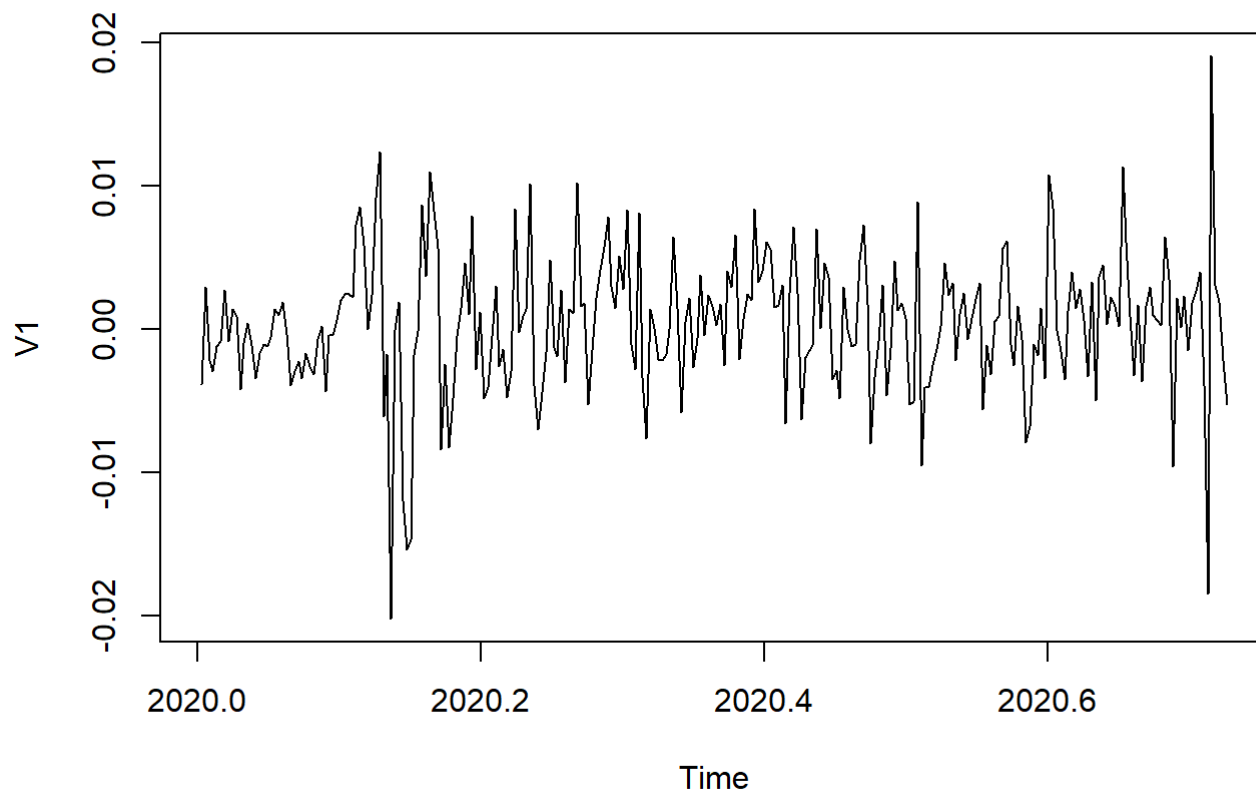
Series eurdaily



```
acf(diff(eurdaily))
```

**V1**

```
eurdaily.diff=diff(eurdaily)
plot(eurdaily.diff)
library(tseries)
```

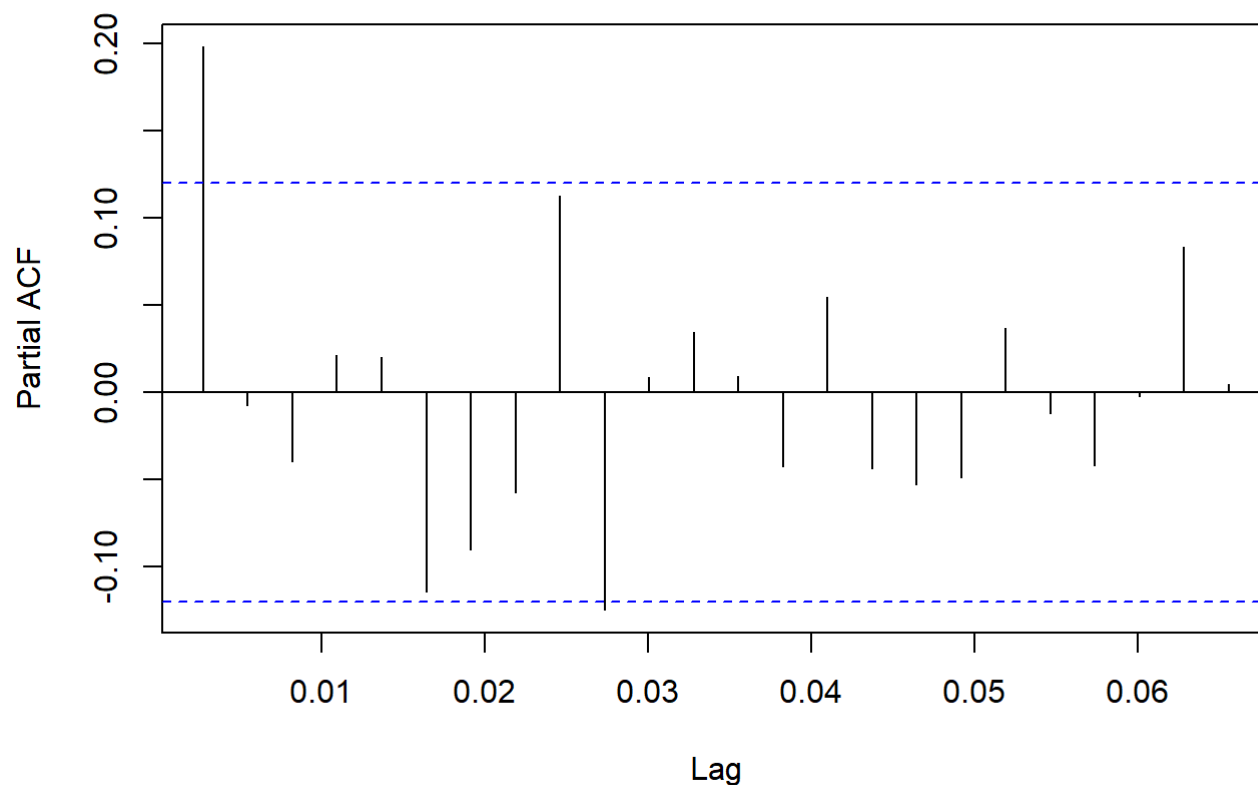


```
adf.test(eurdaily.diff)
```

```
##  
## Augmented Dickey-Fuller Test  
##  
## data: eurdaily.diff  
## Dickey-Fuller = -7.069, Lag order = 6, p-value = 0.01  
## alternative hypothesis: stationary
```

```
pacf(eurdaily.diff)
```

## Series eurdaily.diff



```
library(forecast)
auto.arima(eurdaily)
```

```
## Series: eurdaily
## ARIMA(1,1,0) with drift
##
## Coefficients:
##          ar1  drift
##          0.1992 4e-04
## s.e.    0.0602 4e-04
##
## sigma^2 estimated as 2.205e-05:  log likelihood=1049.63
## AIC=-2093.26   AICc=-2093.17   BIC=-2082.51
```

```
model.daily=arima(eurdaily,order=c(1,1,0))
Box.test(eurdaily,type="Ljung-Box")
```

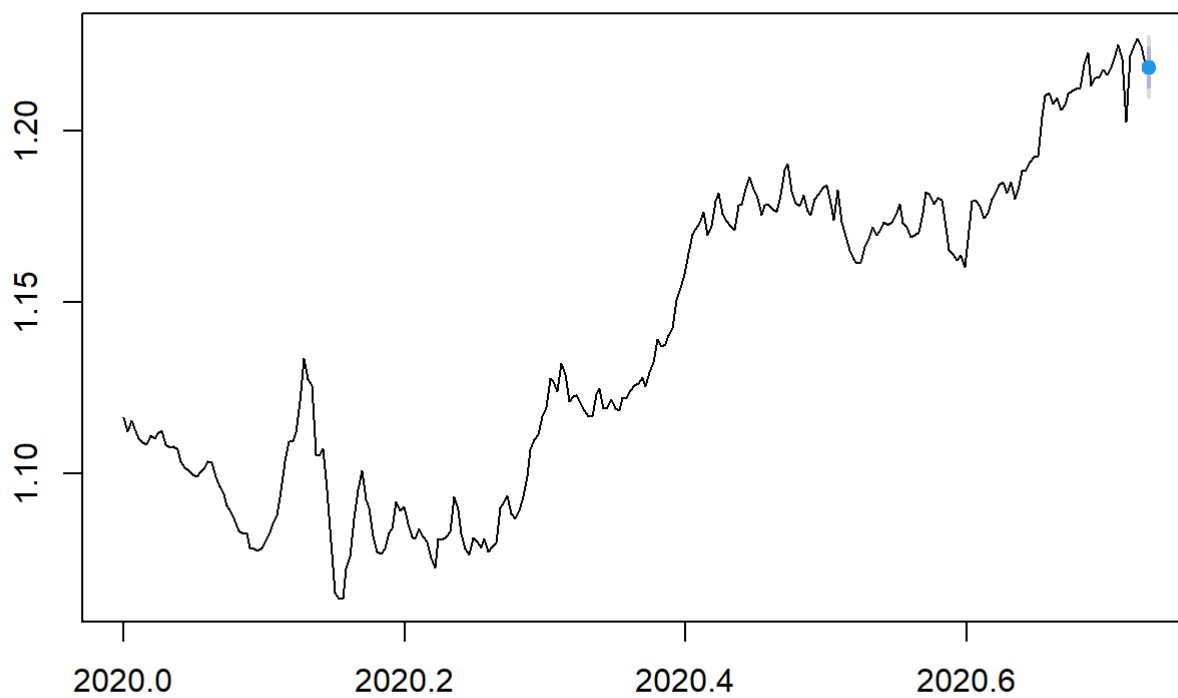
```
##
## Box-Ljung test
##
## data:  eurdaily
## X-squared = 263.77, df = 1, p-value < 2.2e-16
```

```
Box.test(eurdaily,type='Box-Pierce')
```

```
##  
## Box-Pierce test  
##  
## data:  eurdaily  
## X-squared = 260.82, df = 1, p-value < 2.2e-16
```

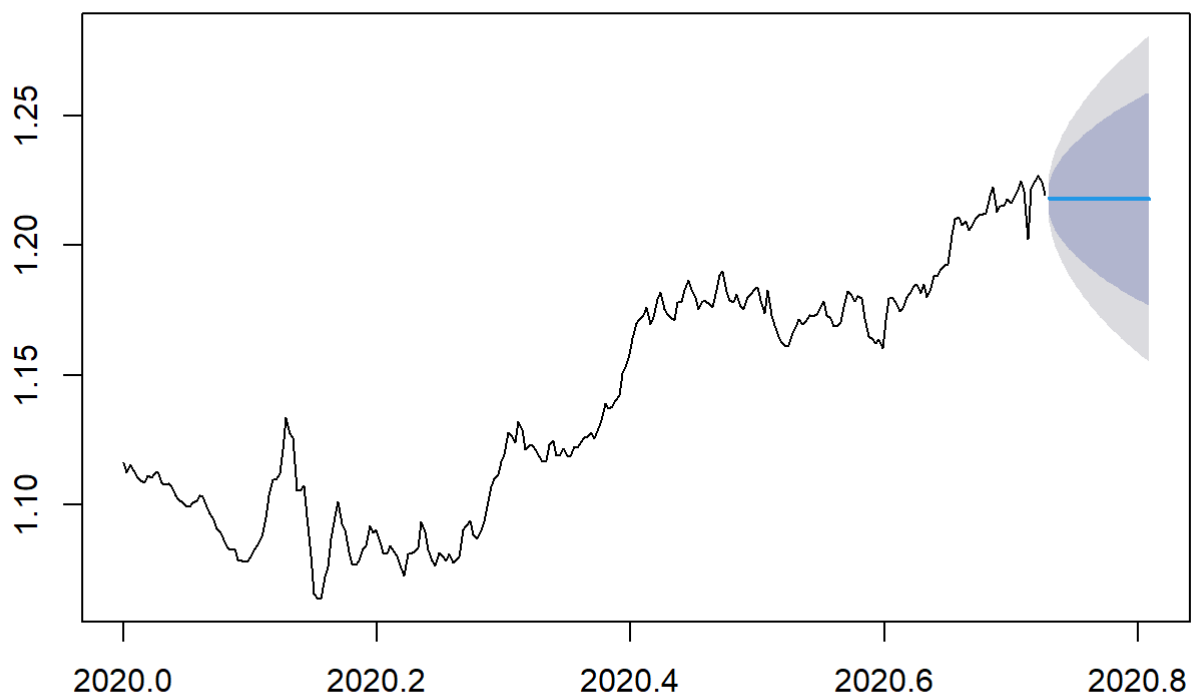
```
model.daily.forecast.1day=forecast(model.daily,h=1)  
plot(model.daily.forecast.1day)
```

### Forecasts from ARIMA(1,1,0)



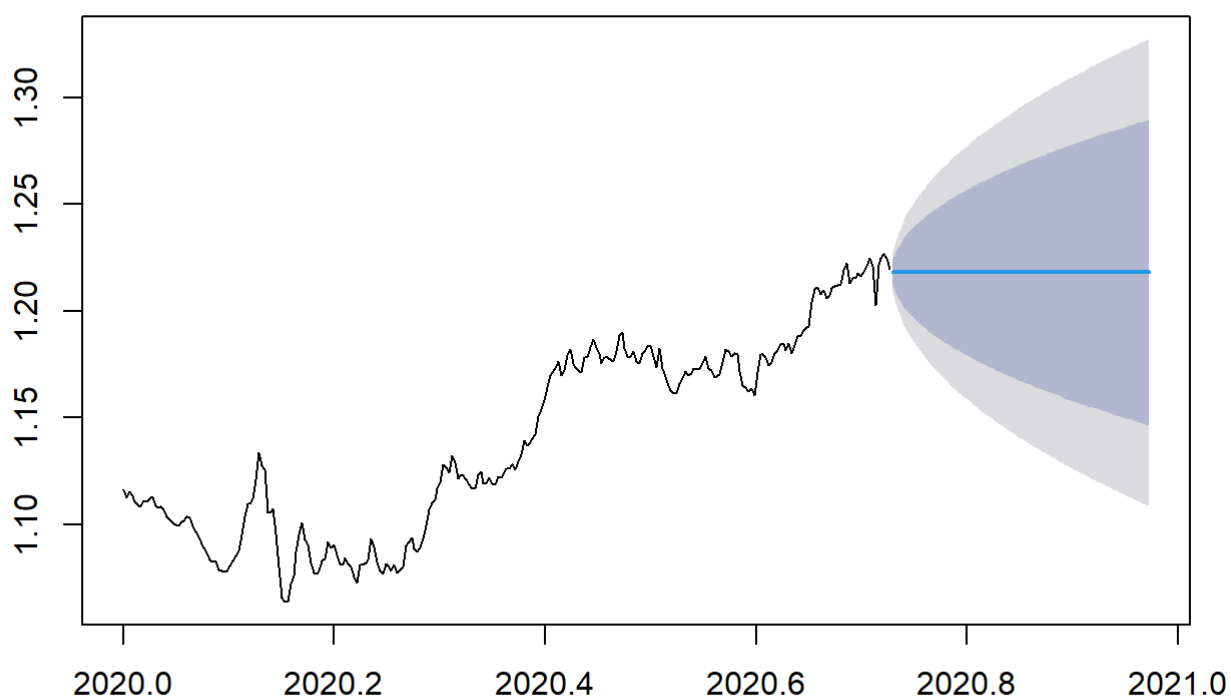
```
model.daily.forecast.1month=forecast(model.daily,h=30)  
plot(model.daily.forecast.1month)
```

### Forecasts from ARIMA(1,1,0)



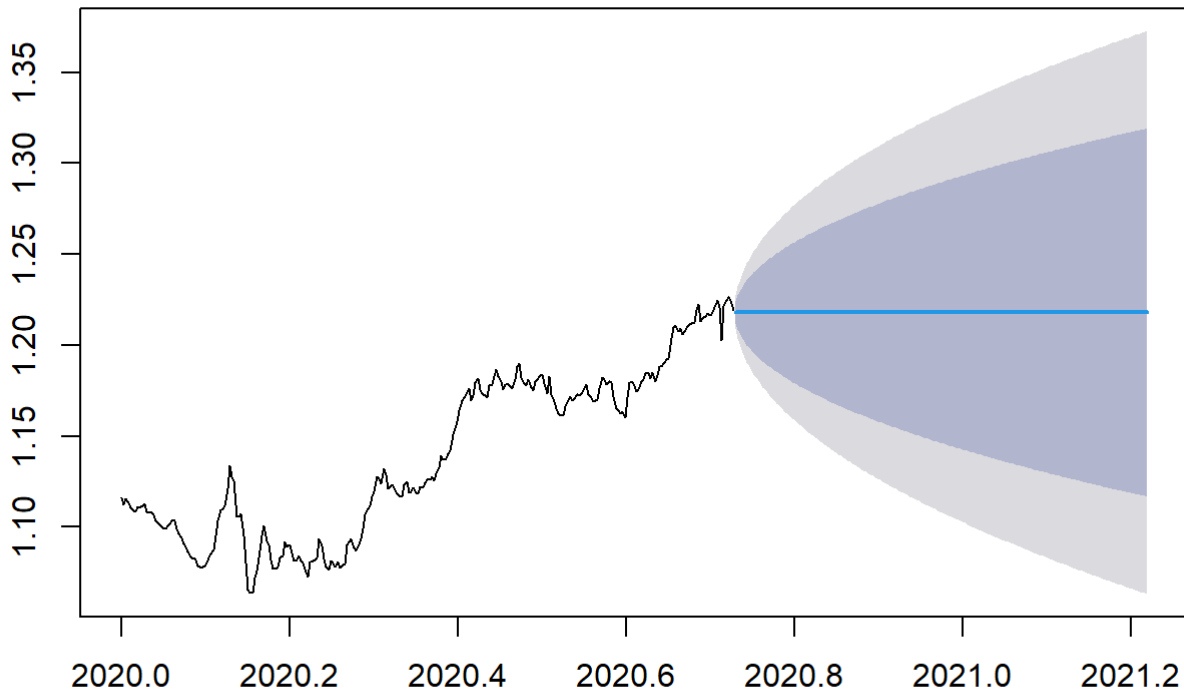
```
model.daily.forecast.3month=forecast(model.daily,h=90)  
plot(model.daily.forecast.3month)
```

### Forecasts from ARIMA(1,1,0)



```
model.daily.forecast.6month=forecast(model.daily, h=180)  
plot(model.daily.forecast.6month)
```

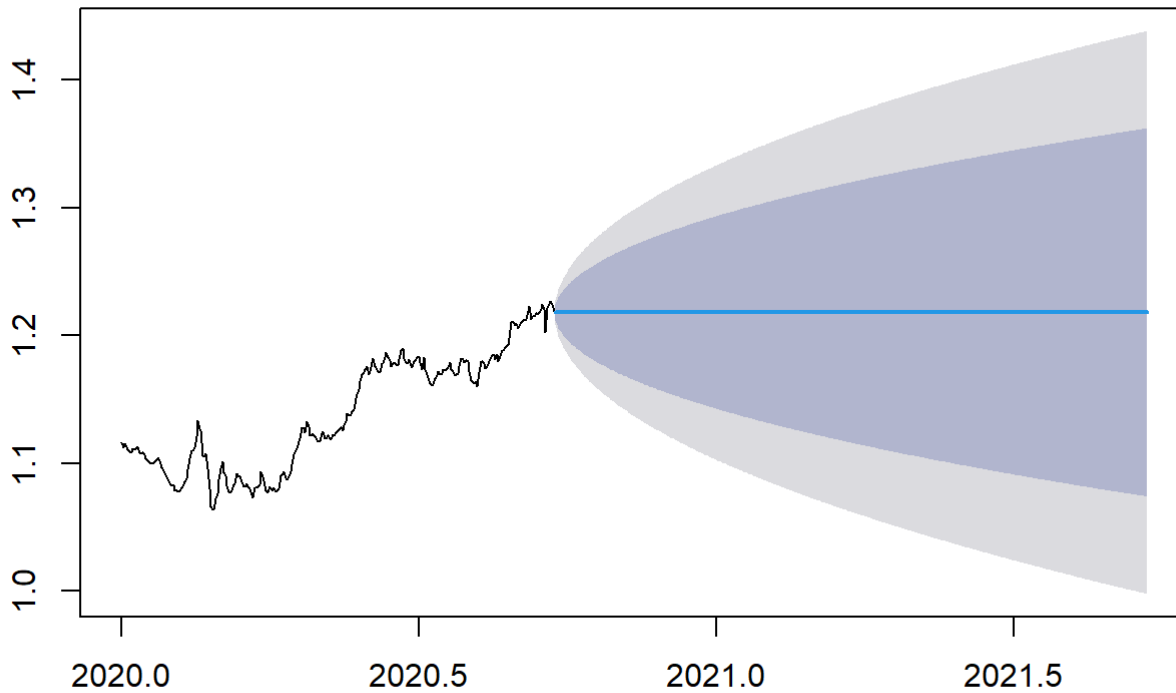
### Forecasts from ARIMA(1,1,0)



```
model.daily.forecast.12month=forecast(model.daily, h=365)  
plot(model.daily.forecast.12month)
```



## Forecasts from ARIMA(1,1,0)



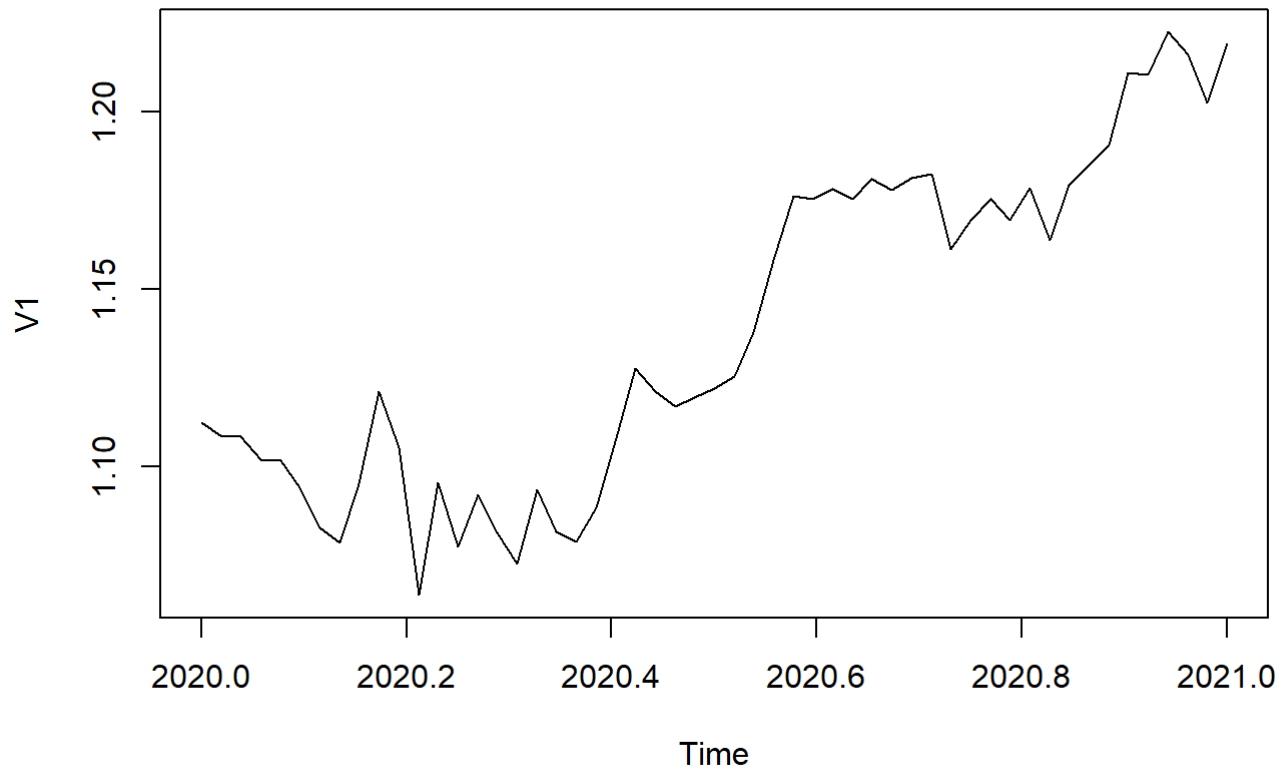
```
dailymodel.summary=summary(model.daily)
```

```
##
## Call:
## arima(x = eurdaily, order = c(1, 1, 0))
##
## Coefficients:
##      ar1
##      0.2048
## s.e.  0.0601
##
## sigma^2 estimated as 2.197e-05:  log likelihood = 1049.08,  aic = -2094.16
##
## Training set error measures:
##              ME      RMSE      MAE      MPE      MAPE
## Training set 0.0003071536 0.004678912 0.003345106 0.02572763 0.2937031
##              MASE      ACF1
## Training set 0.9545757 -0.004400447
```

```
rmse.dailymodel=dailymodel.summary[2]
mse.dailymodel=rmse.dailymodel^2
print(mse.dailymodel)
```

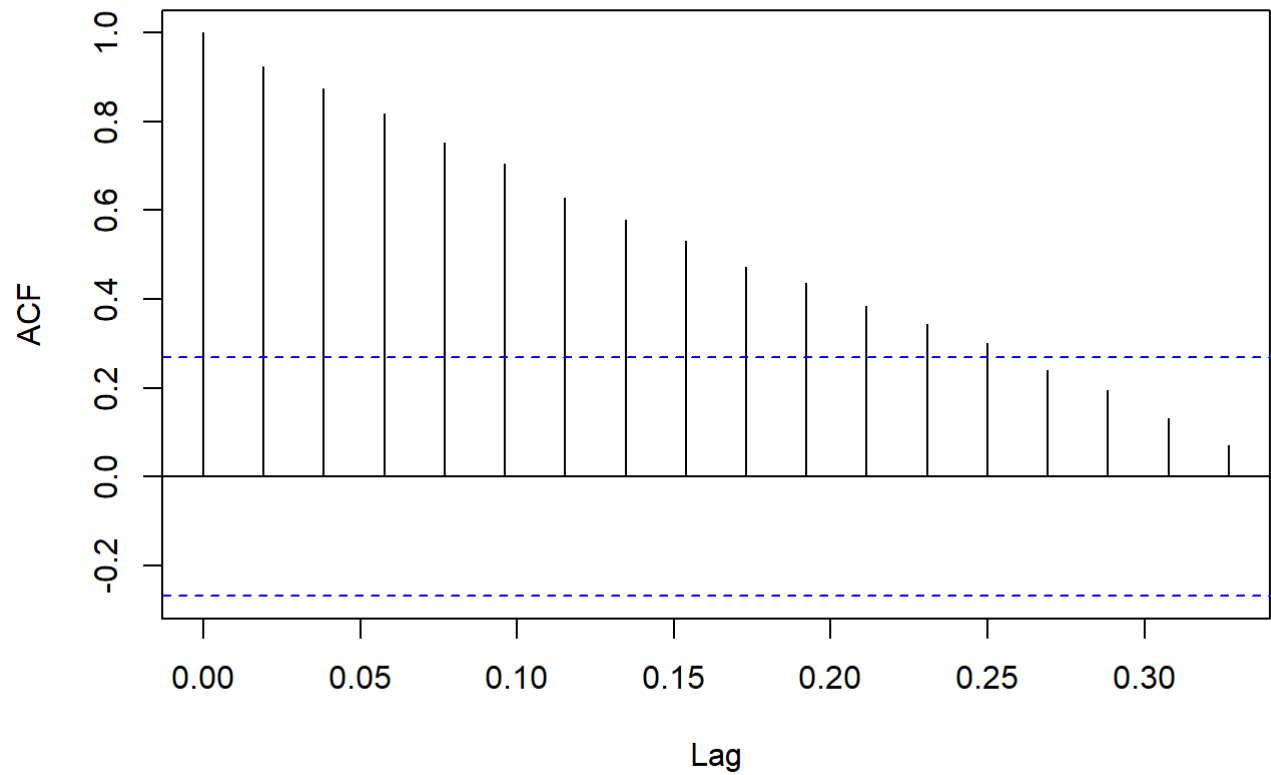
```
## [1] 2.189222e-05
```

```
weeklydata=read.table('eurweekly.txt')  
attach(weeklydata)  
eurweekly=ts(weeklydata, start=2020, freq=52)  
plot(eurweekly)
```



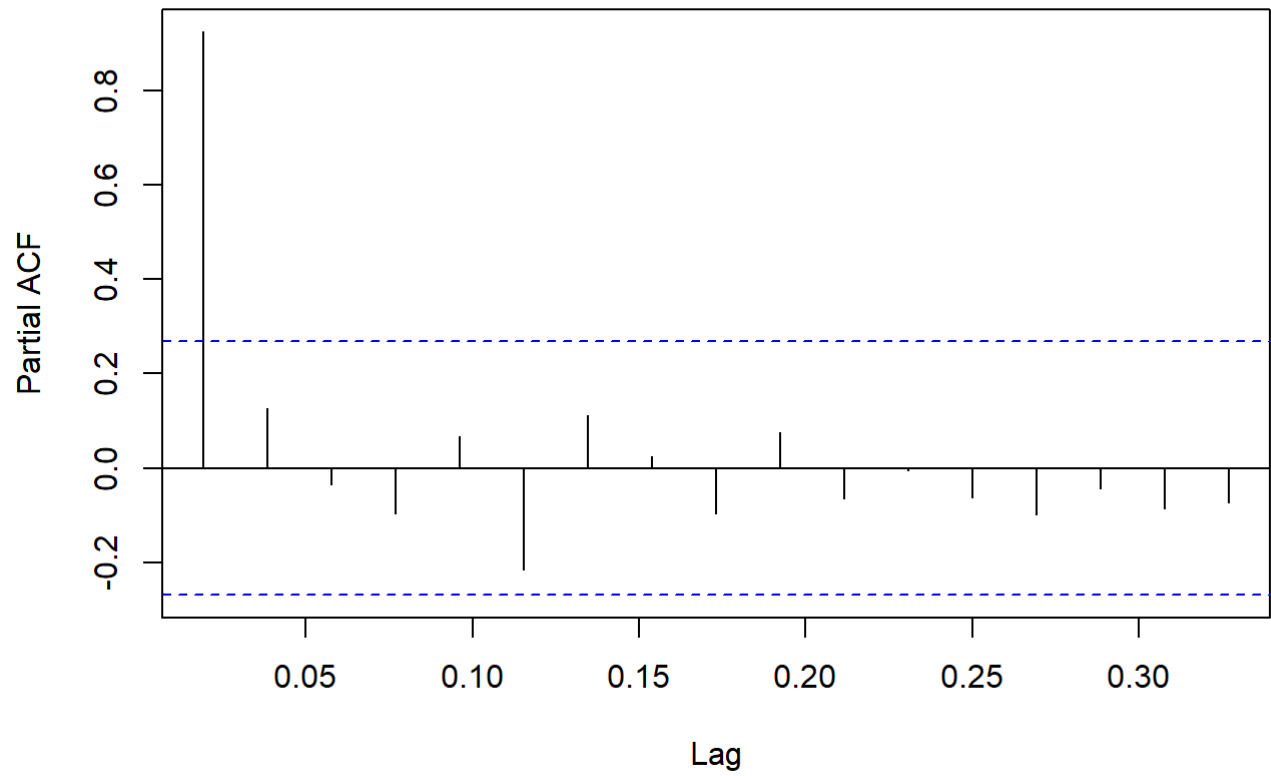
```
acf(eurweekly)
```

V1

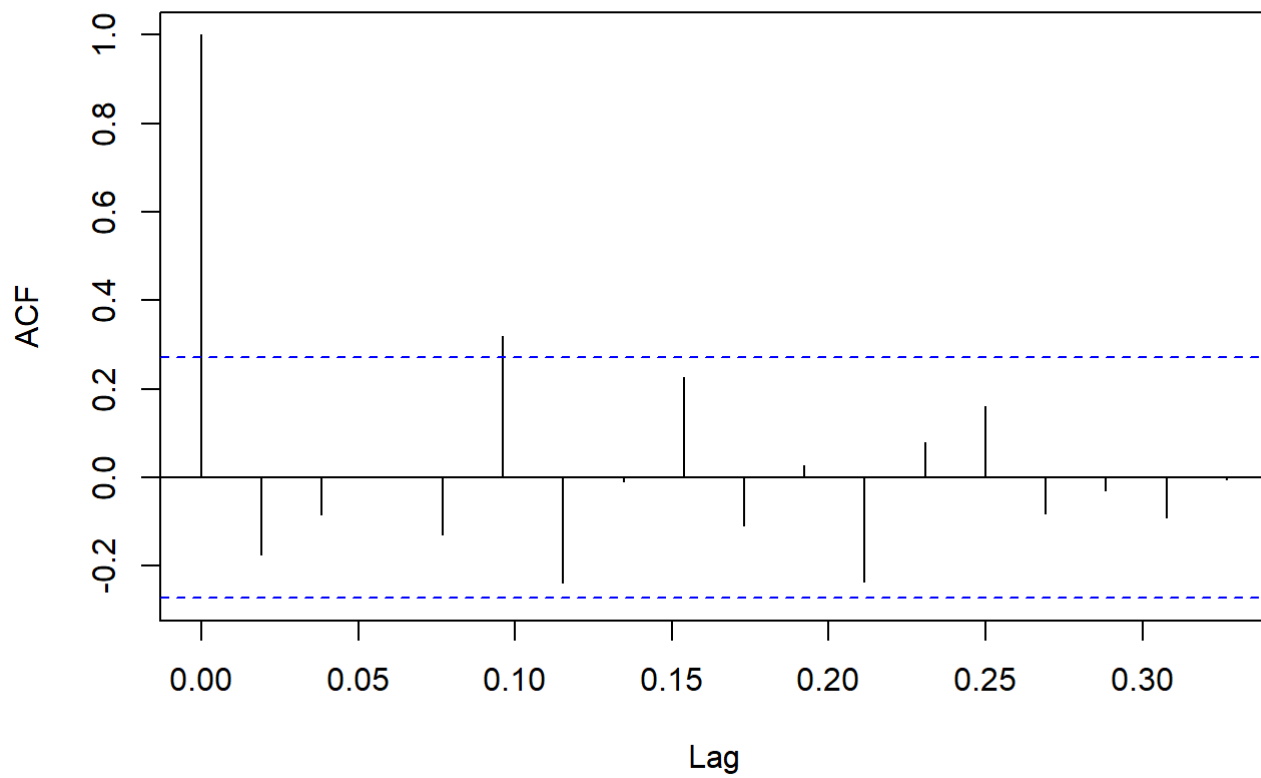


```
pacf(eurweekly)
```

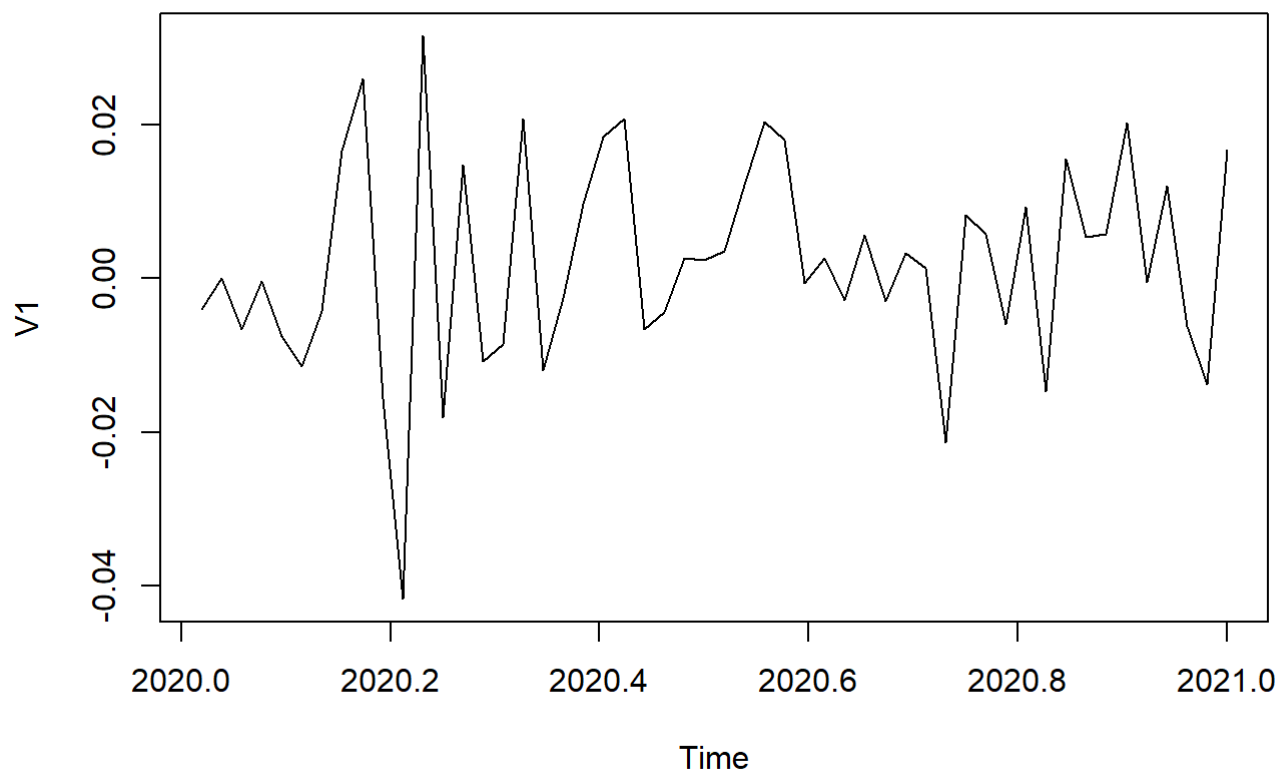
Series eurweekly



```
acf(diff(eurweekly))
```

**V1**

```
eurweekly.diff=diff(eurweekly)  
plot(eurweekly.diff)
```

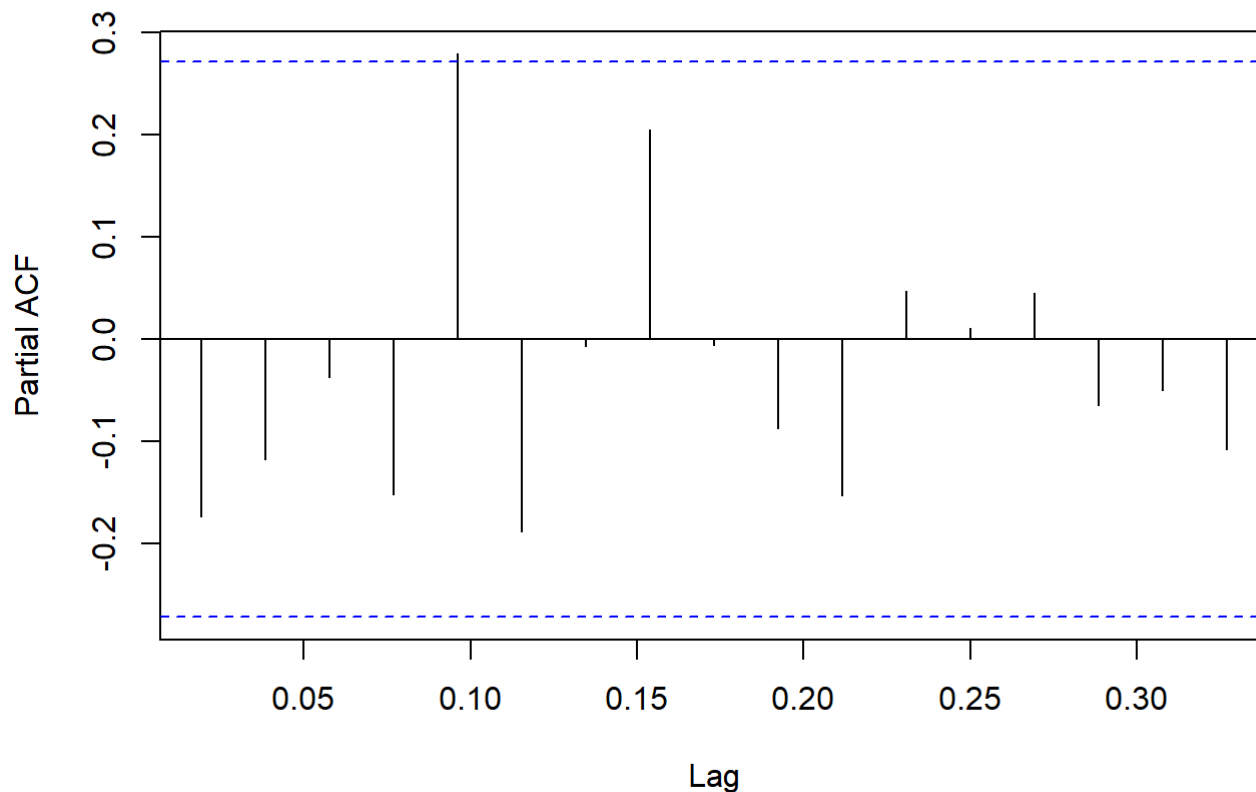


```
library(tseries)
adf.test(eurweekly.diff)
```

```
##
## Augmented Dickey-Fuller Test
##
## data:  eurweekly.diff
## Dickey-Fuller = -4.5764, Lag order = 3, p-value = 0.01
## alternative hypothesis: stationary
```

```
pacf(eurweekly.diff)
```

## Series eurweekly.diff



```
library(forecast)
auto.arima(eurweekly)
```

```
## Series: eurweekly
## ARIMA(0,1,0)
##
## sigma^2 estimated as 0.0001867: log likelihood=149.46
## AIC=-296.92 AICc=-296.84 BIC=-294.97
```

```
model.weekly=arima(eurweekly,order=c(0,1,0))
Box.test(eurweekly,type="Ljung-Box")
```

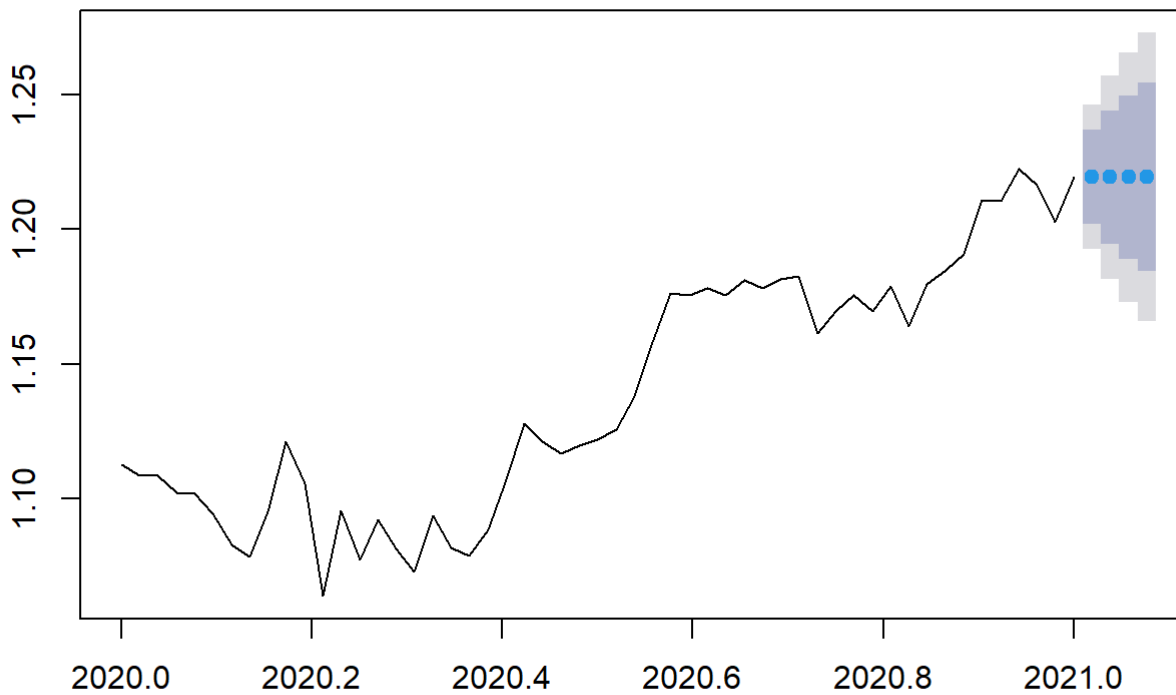
```
##
## Box-Ljung test
##
## data: eurweekly
## X-squared = 47.941, df = 1, p-value = 4.392e-12
```

```
Box.test(eurweekly,type='Box-Pierce')
```

```
##
## Box-Pierce test
##
## data: eurweekly
## X-squared = 45.326, df = 1, p-value = 1.668e-11
```

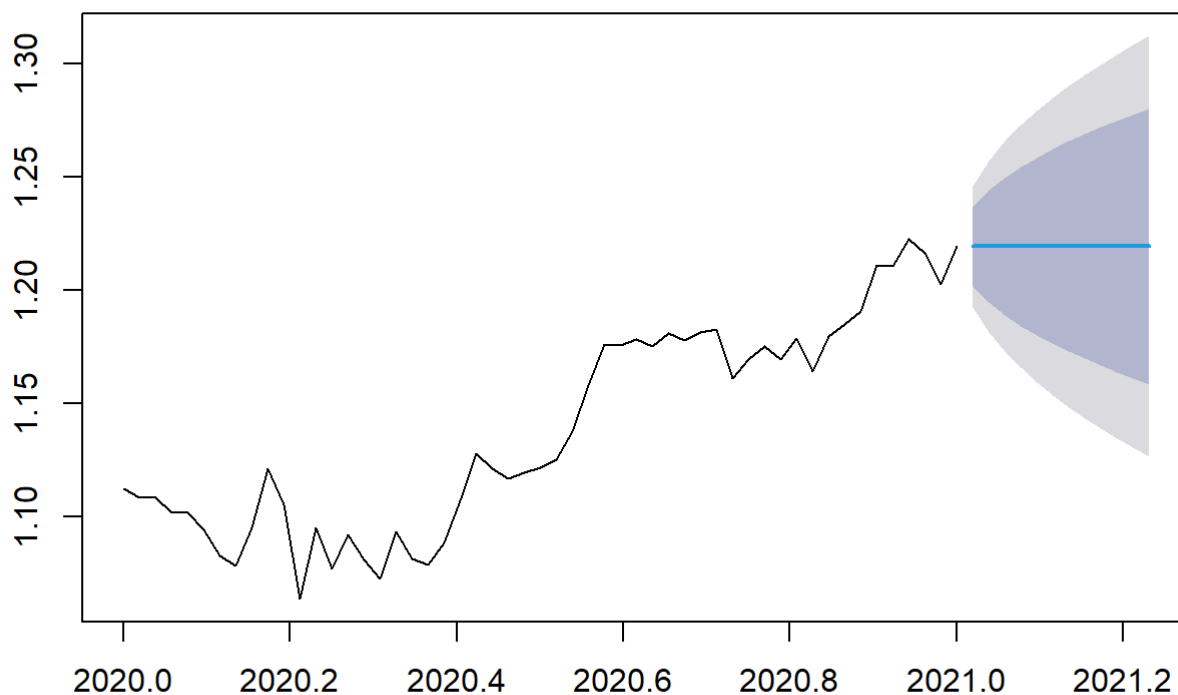
```
model.weekly.forecast.1month=forecast(model.weekly, h=4)  
plot(model.weekly.forecast.1month)
```

### Forecasts from ARIMA(0,1,0)



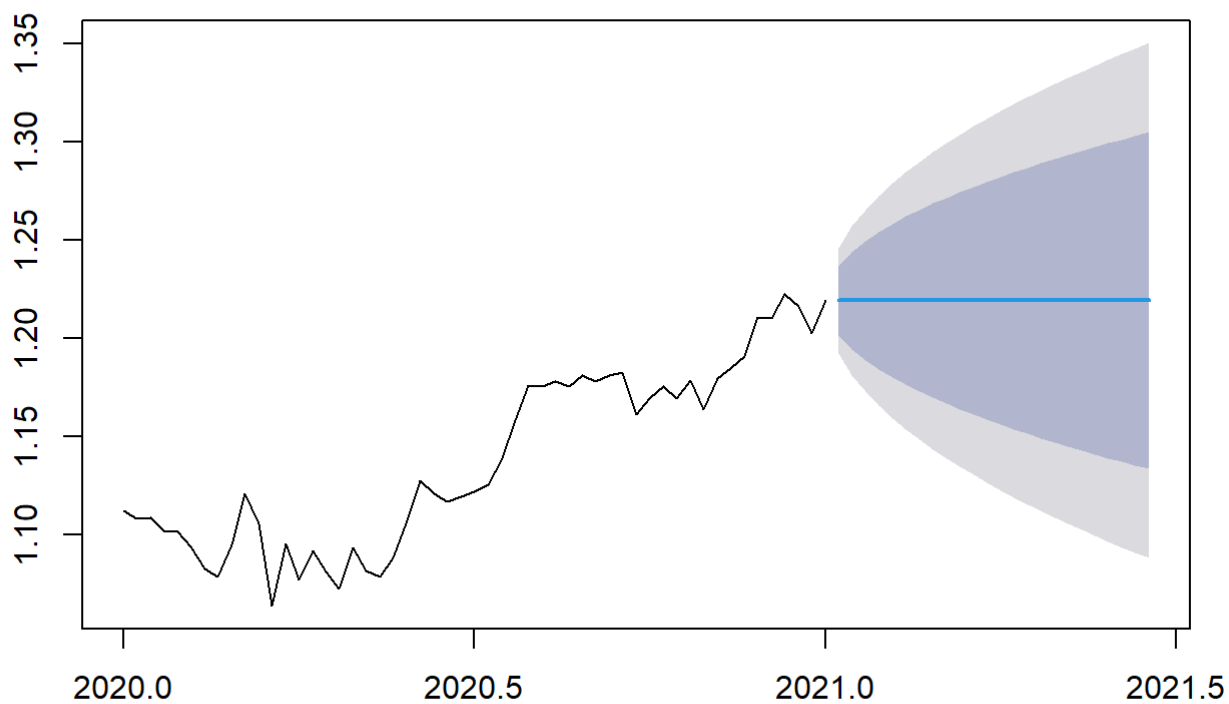
```
model.weekly.forecast.3month=forecast(model.weekly, h=12)  
plot(model.weekly.forecast.3month)
```

### Forecasts from ARIMA(0,1,0)



```
model.weekly.forecast.6month=forecast(model.weekly,h=24)  
plot(model.weekly.forecast.6month)
```

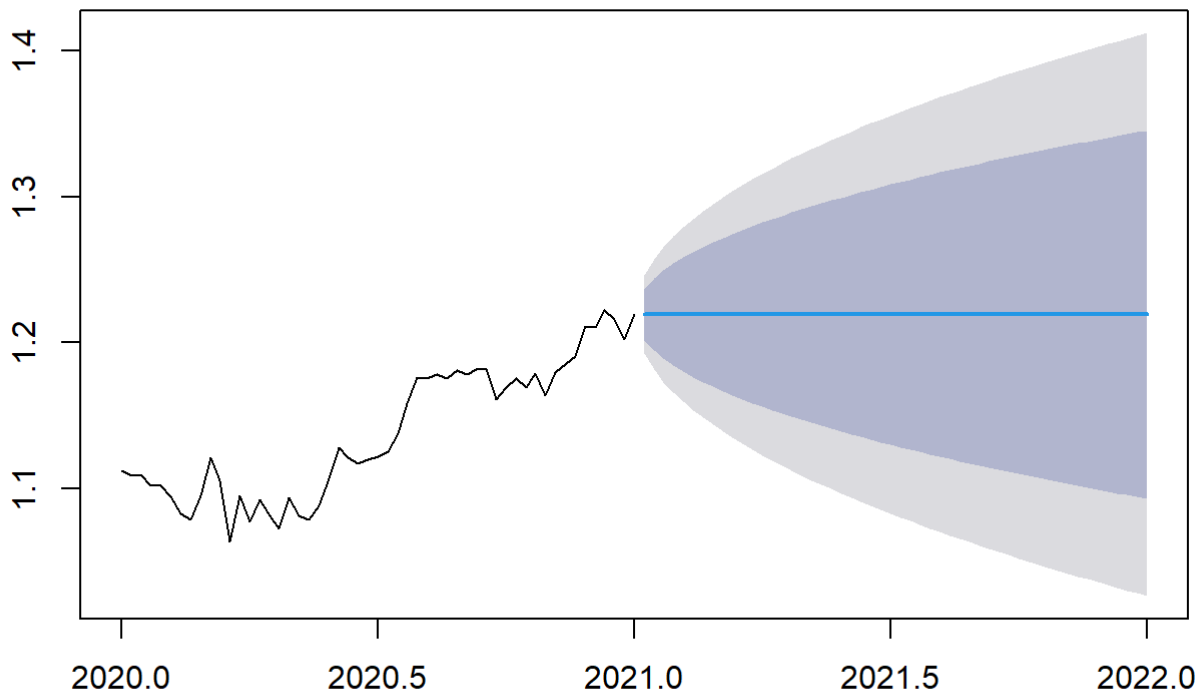
### Forecasts from ARIMA(0,1,0)





```
model.weekly.forecast.12month=forecast(model.weekly, h=52)
plot(model.weekly.forecast.12month)
```

### Forecasts from ARIMA(0,1,0)



```
weeklymodel.summary=summary(model.weekly)
```

```
##
## Call:
## arima(x = eurweekly, order = c(0, 1, 0))
##
##
## sigma^2 estimated as 0.0001866:  log likelihood = 149.46,  aic = -296.92
##
## Training set error measures:
##              ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 0.002036085 0.01353329 0.01047307 0.1675139 0.9273848 0.9831025
##              ACF1
## Training set -0.1731274
```

```
rmse.weeklymodel=weeklymodel.summary[2]
mse.weeklymodel=rmse.weeklymodel^2
print(mse.weeklymodel)
```

```
## [1] 0.0001831501
```