2018R2 Financial Time Series (STAT6104) Assignment 3

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```
Y = ts(c(1.33,-0.56,-1.31,-0.37,0.05,0.46,2.00,
         -0.19,-0.25,1.07,-0.17,1.14,0.63,-0.75,0.15,
         0.71,0.45,-0.14,0.57,1.43));
```

1a

```
model <- arima(Y, order = c(1,0,1));
forecast <- forecast::forecast(model);
```

Step 1 prediction interval: (-0.7923417, 1.9482247) Step 2 prediction interval: (-1.3035296, 1.7771761)

1b

```
model <- arima(Y, order = c(1,1,0));
forecast <- forecast::forecast(model);
```

Step 1 prediction interval: (-0.8608736, 3.2611673) Step 2 prediction interval: (-1.2934967, 3.8166566)

1c

```
model <- HoltWinters(Y, beta = FALSE, gamma=FALSE);
forecast <- forecast::forecast(model);
```

Day 21: 0.6228929 Day 22: 0.6228929

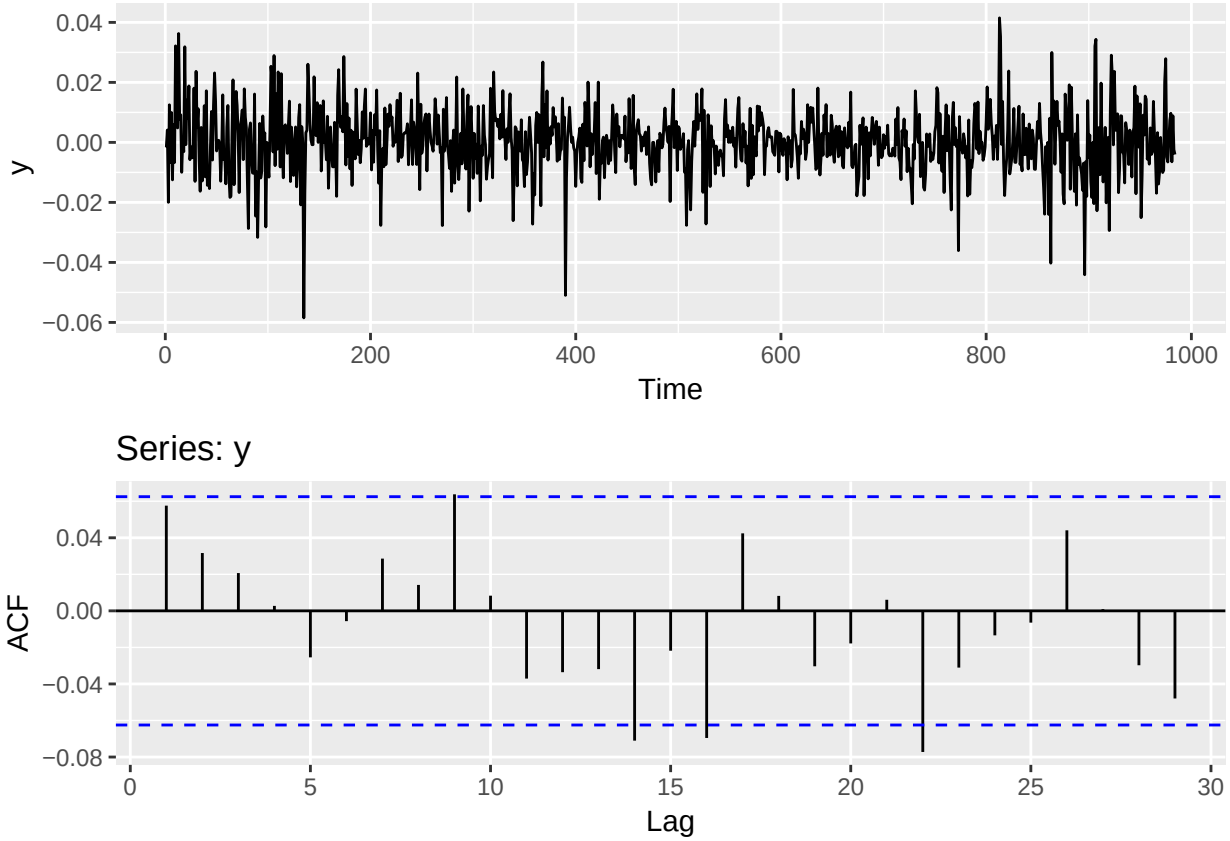
2a

```
x <- tseries::get.hist.quote(instrument = "0005.hk",
                             start = "2012-01-01",
                             end = "2016-01-01",
                             quote = "AdjClose");
```

```
## time series starts 2012-01-03
## time series ends   2015-12-31
```

```r
y <- as.ts(as.numeric(diff(log(x))));

plot1 <- forecast::autoplot(y);
plot2 <- forecast::ggAcf(y);
gridExtra::grid.arrange(plot1, plot2, nrow=2);
```



It is stationary

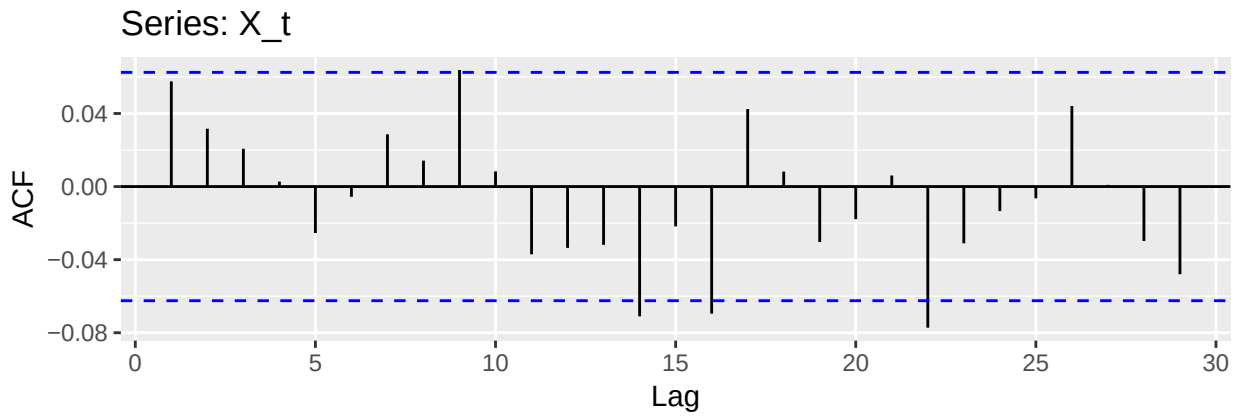
2b

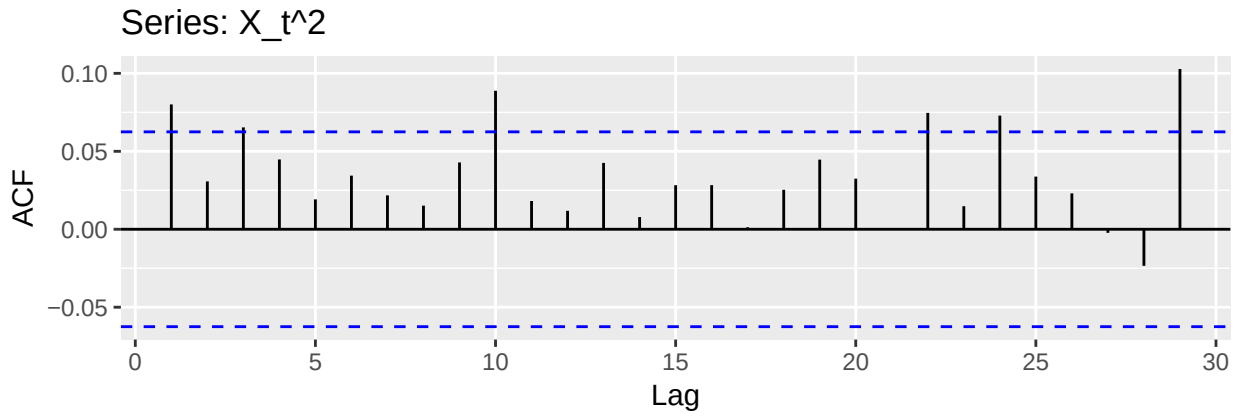
```r
model <- forecast::auto.arima(y, ic = "aic");
```

2c

```r
X_t <- model$residuals;

plot1 <- forecast::ggAcf(X_t);
plot2 <- forecast::ggAcf(X_t ^ 2);
gridExtra::grid.arrange(plot1, plot2, nrow=2);
```


Series: X_t
ACF
0.04
0.00
−0.04
−0.08
0
5
10
15
20
25
30
Lag


Series: X_t^2
ACF
0.10
0.05
0.00
−0.05
0
5
10
15
20
25
30
Lag