

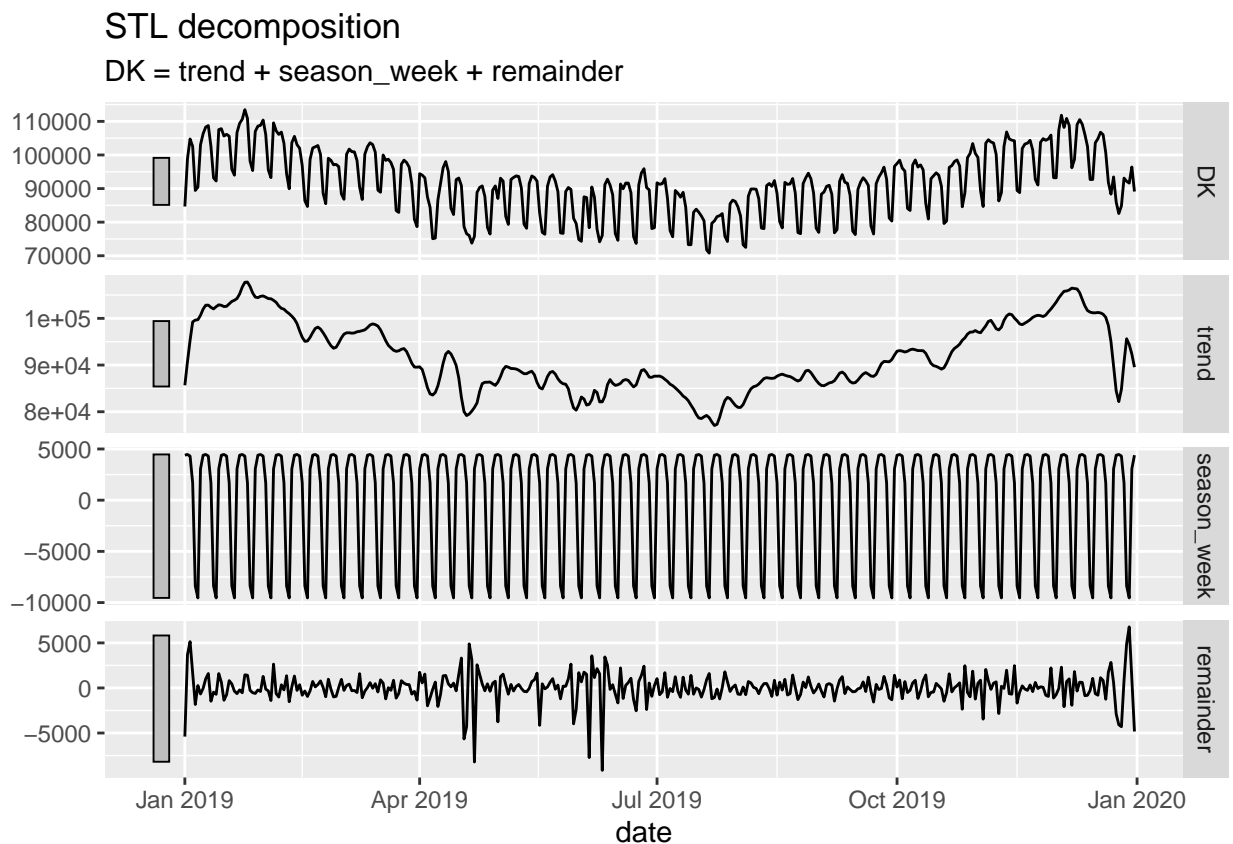
## Assignment 5

### Assignment 1: Comparison of variance of consumption data in Norway and Denmark

```
## Seasonal decompositon of Danish electricity consumption

cons_comp_dk = cons_ts %>% model(
  STL(DK ~ trend(window=7) + season(window="periodic"))
) %>% components

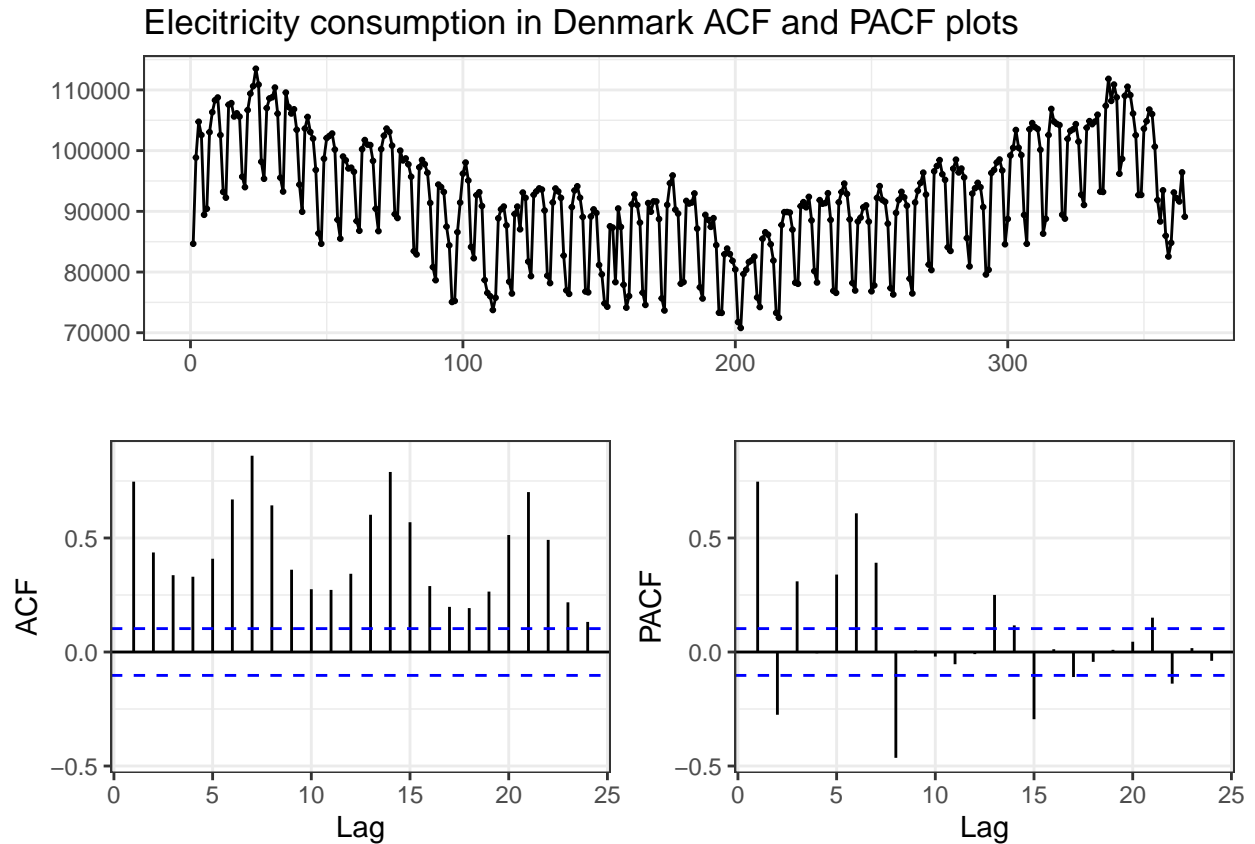
cons_comp_dk %>% autoplot()
```



A clear assumption in an ARIMA forecasting model is that the data is stationary in terms of its variance and mean. We plot the time series containing electricity consumption data, as well as its autocorrelation and partial autocorrelation plots. We see clear signs of non-stationarity and perform unit root tests confirming the need for first order differencing. We lose some information contained in the data by performing a differencing, but we confirm the assumption of stationarity of the data.

```
forecast::ggtsdisplay(cons$DK, plot_type='partial',
                      lag.max = 24,
                      theme = theme_bw(),
                      main = "Elecitricity consumption in Denmark ACF and PACF plots")
```

```
## Warning: Ignoring unknown parameters: plot_type
```



```
unitroot_kpss(cons$DK)
```

```
##      kpss_stat kpss_pvalue
##      1.219224   0.010000
```

```
adf.test(cons$DK)
```

```
##
## Augmented Dickey-Fuller Test
##
## data:  cons$DK
## Dickey-Fuller = -2.17, Lag order = 7, p-value = 0.5052
## alternative hypothesis: stationary
```