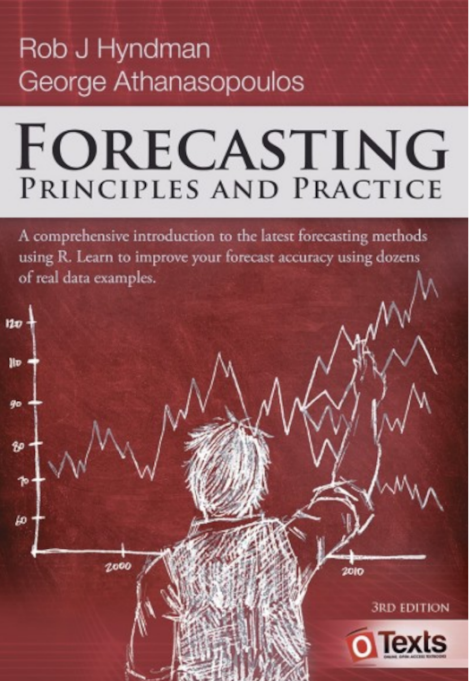


2. Time series graphics

2.6 Scatterplots

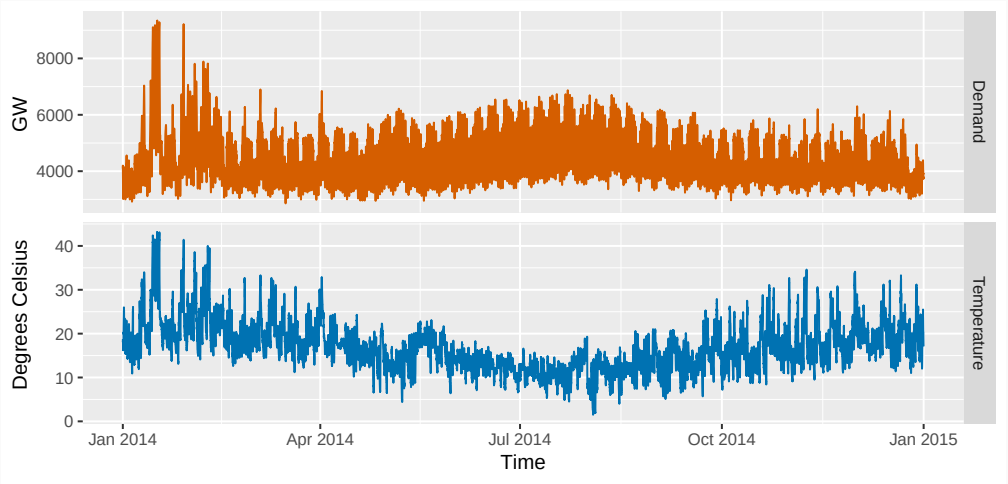
OTexts.org/fpp3/

Electricity Demand in Victoria, Australia

```
vic_elec_day_type <- vic_elec |>
   filter(year(Time) == 2014) |>
   mutate(Day_Type = case_when(
      Holiday ~ "Holiday",
      wday(Date) %in% 2:6 ~ "Weekday",
      TRUE ~ "Weekend"))
vic_elec_day_type
```

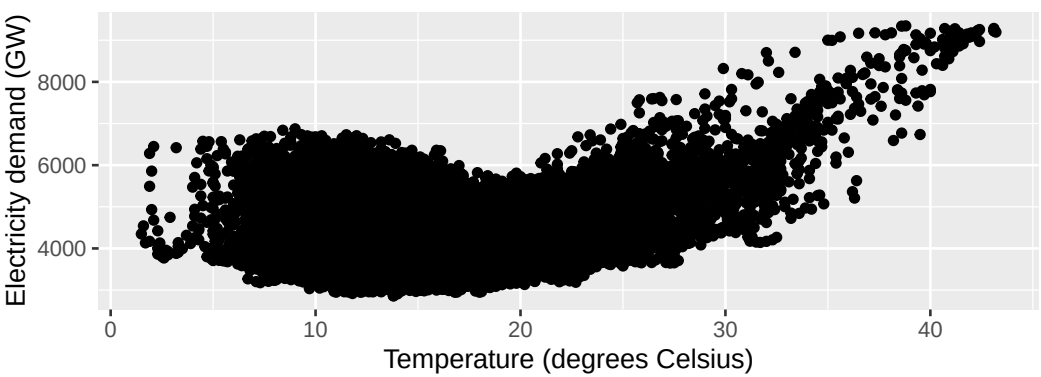
```
## # A tsibble: 17,520 x 6 [30m] <Australia/Melbourne>
##    Time                Demand Temperature Date       Holiday Day_Type
##    <dttm>               <dbl>       <dbl> <date>     <lgl>   <chr>
##  1 2014-01-01 00:00:00  4092.        18.7 2014-01-01 TRUE    Holiday
##  2 2014-01-01 00:30:00  4198.        18.1 2014-01-01 TRUE    Holiday
##  3 2014-01-01 01:00:00  3915.        18.2 2014-01-01 TRUE    Holiday
##  4 2014-01-01 01:30:00  3673.        17.9 2014-01-01 TRUE    Holiday
##  5 2014-01-01 02:00:00  3498.        17.6 2014-01-01 TRUE    Holiday
##  6 2014-01-01 02:30:00  3339.        16.8 2014-01-01 TRUE    Holiday
##  7 2014-01-01 03:00:00  3204.        16.3 2014-01-01 TRUE    Holiday
##  8 2014-01-01 03:30:00  3100.        16.6 2014-01-01 TRUE    Holiday
```

Time plots


GW
8000
6000
4000
Demand
Degrees Celsius
40
30
20
10
0
Temperature
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Time

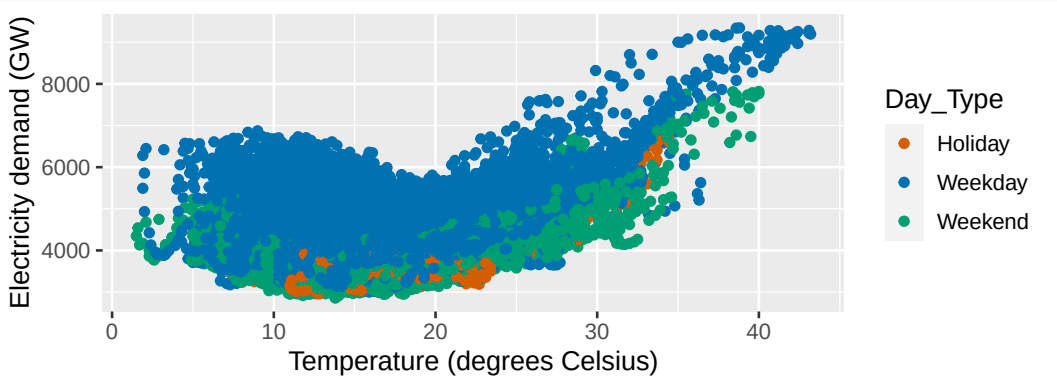
Scatterplots

```
vic_elec_day_type |>
  ggplot(aes(x = Temperature, y = Demand)) +
  geom_point() +
   labs(x = "Temperature (degrees Celsius)", y = "Electricity demand (GW)")
```



Scatterplots

```
vic_elec_day_type |>
  ggplot(aes(x = Temperature, y = Demand, colour = Day_Type)) +
  geom_point() +
   labs(x = "Temperature (degrees Celsius)", y = "Electricity demand (GW)")
```

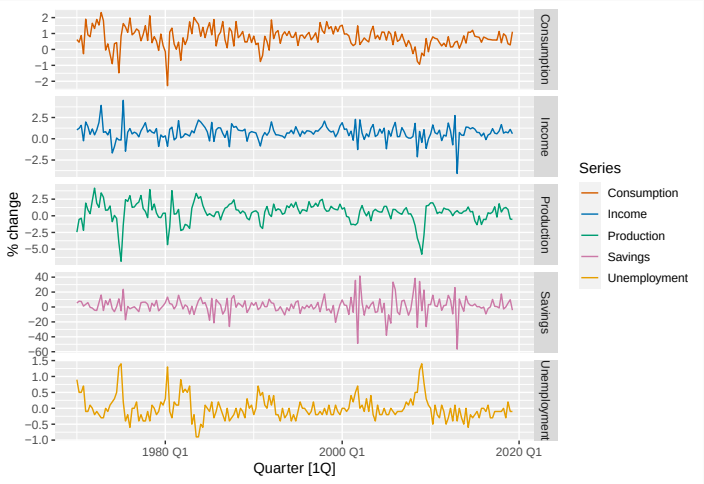


Correlation coefficient

Measures the extent of a linear relationship between two variables (y and x).

- $r = \frac{\sum_{t=1}^{T}(y_t-\bar{y})(x_t-\bar{x})}{\sqrt{\sum_{t=1}^{T}(y_t-\bar{y})^2}\sqrt{\sum_{t=1}^{T}(x_t-\bar{x})^2}}$
- Lies between -1 and 1

US consumption expenditure



US consumption expenditure

```
us_change |> GGally::ggpairs(columns = 2:6)
```