

ADS 506 - Time Series

Fall 2023 - Week 2 OH

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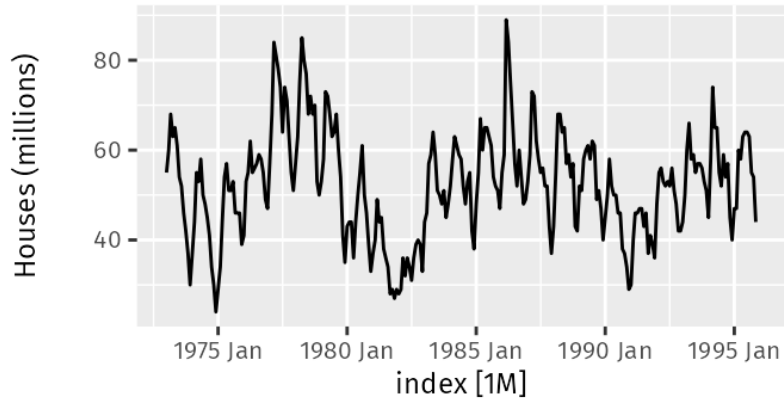
Agenda

- Time Series Data Set Selection
- Assignment Observations
- `fpp3` framework
- Hints for Assignment 5.8
- Quiz and Assignment prep → Erin

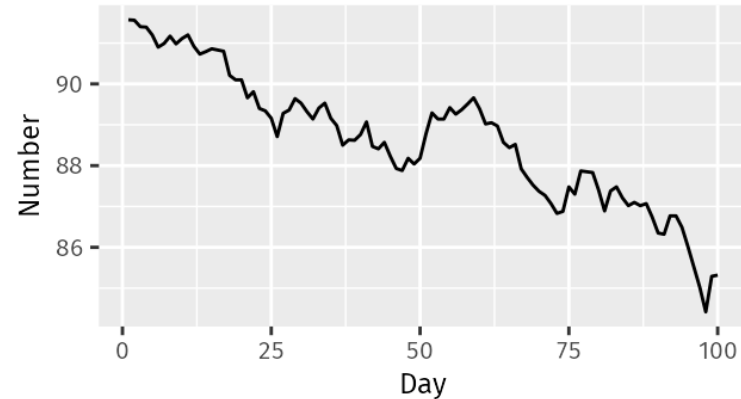
Time Series Data Sets (for forecasting)

<https://otexts.com/fpp3/tspatterns.html>

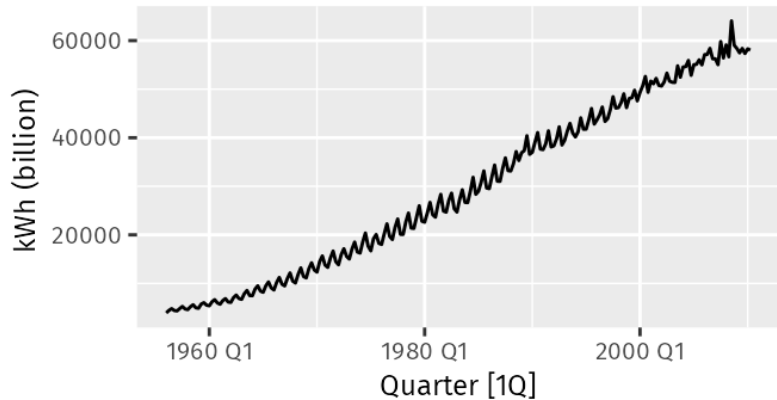
Sales of new one-family houses, USA



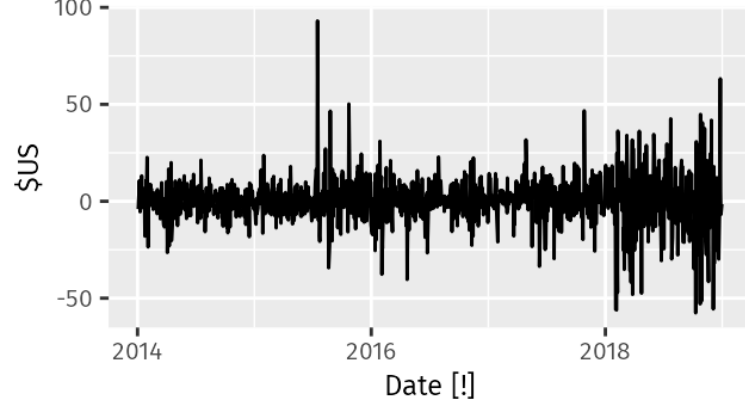
US treasury bill contracts



Australian quarterly electricity production



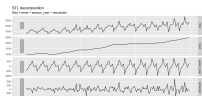
Daily changes in Google closing stock price



Time Series Data Sets - Trend (and Cycle) + Season + Noise

Decomposing your data and plotting it separately can be a good way to see how well it can be forecasted.

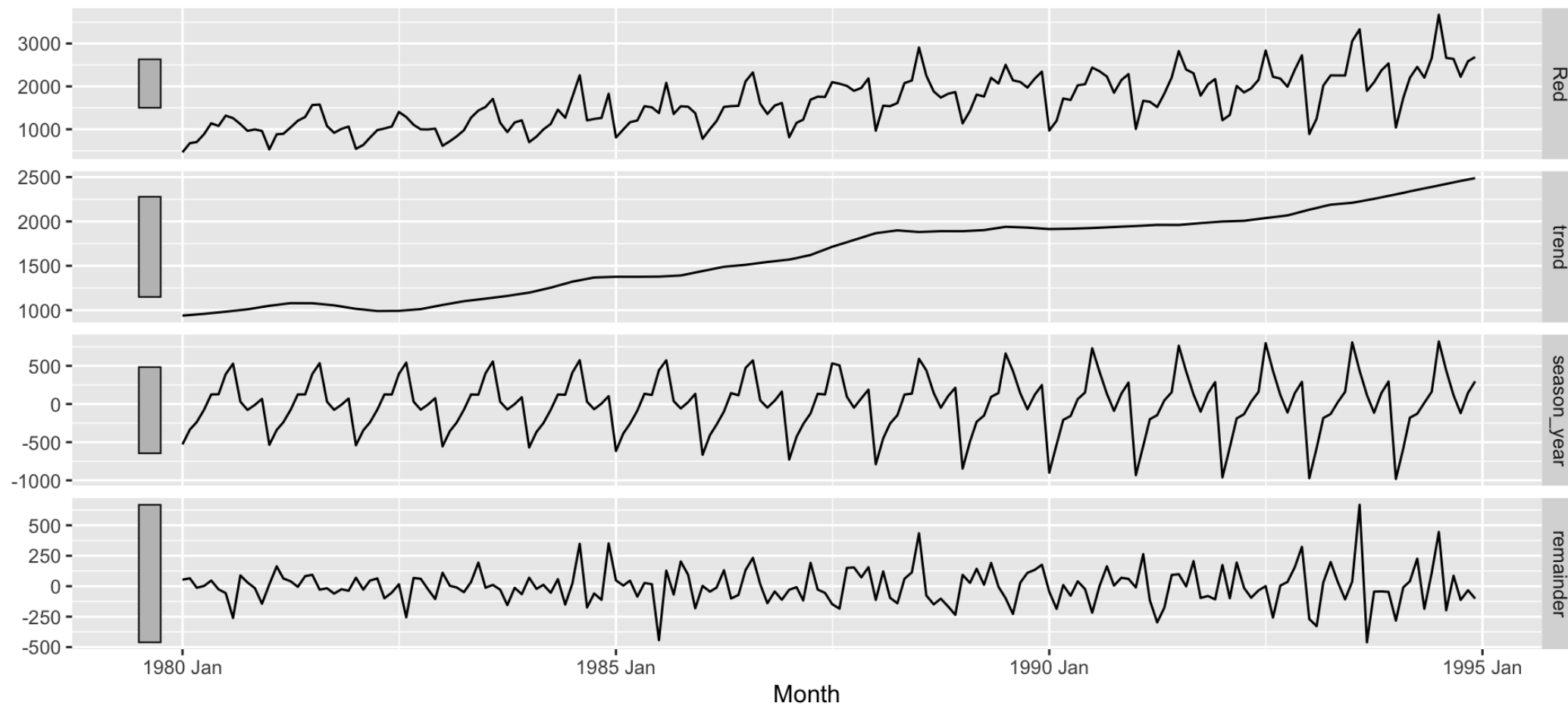
```
1  aus_wine <- read_csv("AustralianWines.csv", na = "*",  
2                        col_types = cols(Rose = col_number()),  
3                        show_col_types = FALSE) |>  
4    mutate(Month = mdy(str_replace(Month, '-', '-01-'))) |> yearmonth() |>  
5    select(Month, Red) |>  
6    as_tsibble(index = Month)  
7  
8  aus_wine |>  
9    model(stl = STL(Red)) |>  
10   components() |>  
11   autoplot()
```





STL decomposition

Red = trend + season_year + remainder



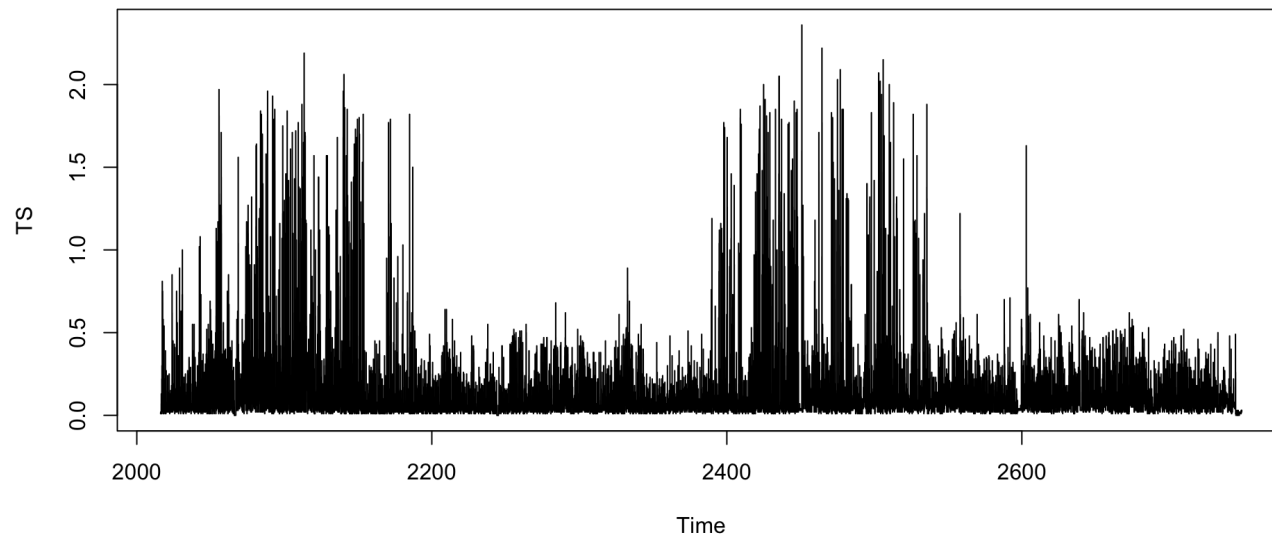
Issues with Assignment 1.2

- Financial data
- Infrequent measurements
- Seasons vs Cycles
- Improperly formed time series

ts vs tsibble - example ts

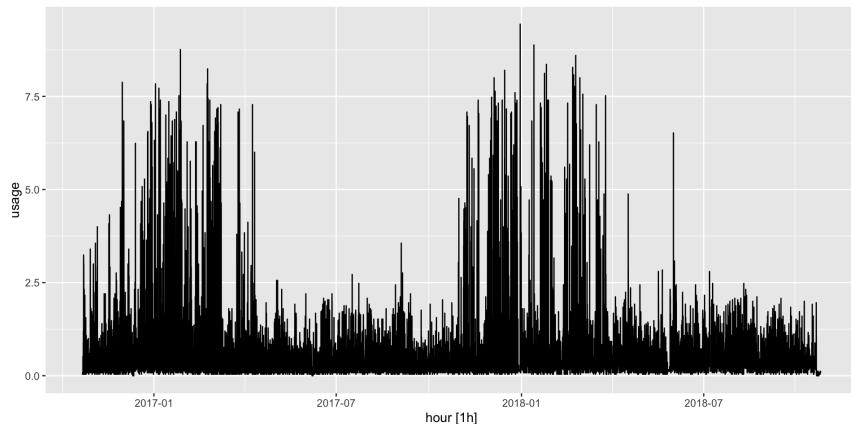
House Hold Energy Data - Time Series (Kaggle)

```
1 # Load data
2 D202 <- read_csv("D202.csv", col_types = cols(NOTES = col_character())) # C
3 TS <- ts(D202$USAGE, start = c(2016, 10, 22), frequency = 96) # Data collec
4 # Plot the time series
5 plot(TS)
```



example tsibble()

```
1 #lets use hourly granularity
2
3 d202_hr <- D202 |>
4   janitor::clean_names() |>
5   mutate(hour_of_day = str_extract(start_time, '^..'),
6          hour = mdy_h(paste(date, hour_of_day))) |>
7   group_by(hour) |>
8   summarise(usage = sum(usage, na.rm = TRUE)) |>
9   as_tsibble(index = hour)
10
11 d202_hr |>
12   autoplot(usage)
```



tidyverts **fpp3** framework vs base R

PTFS Figures and Tables - Chapter 6

