SF2943 Project Presentation, Group 2

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Introduction

Data selection

- Daily minimum temperature in Melbourne 1981-1990 ($n = 3650$) from Kaggle
- Analysis was performed in **R**

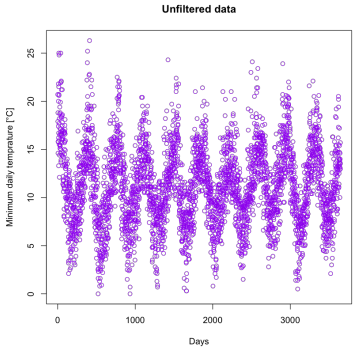


Figure: Daily minimum temperature

Expectations

- Temperature data should have a static variance over time
- Daily temperature should be periodic of 365 days
- Global warming is a large issue - theory: linear trend

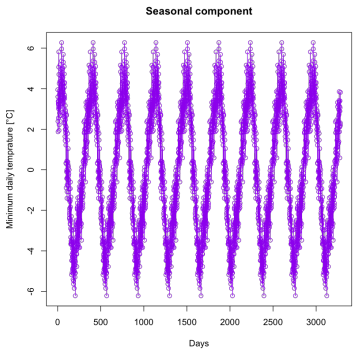
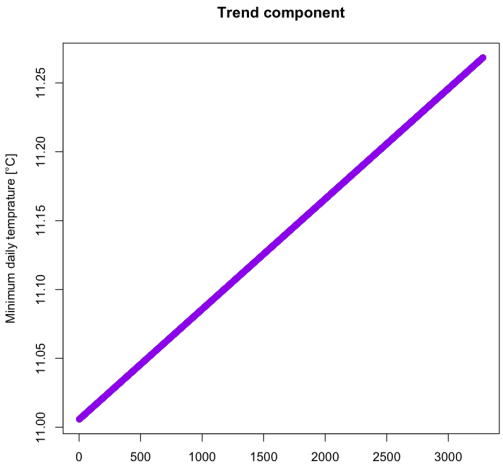
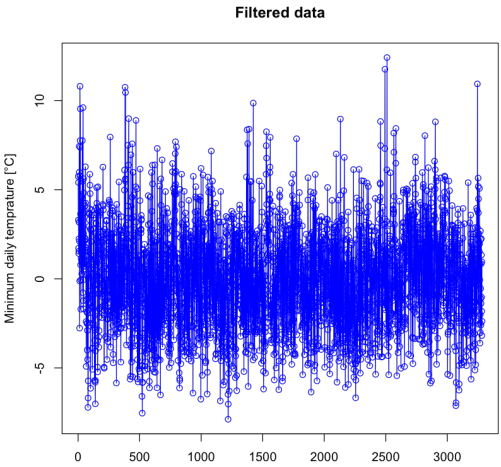


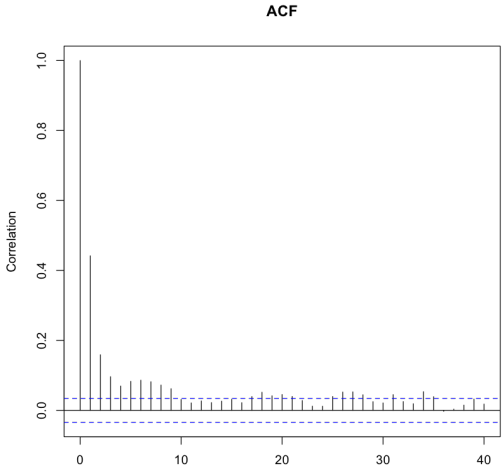
Figure: Seasonal component

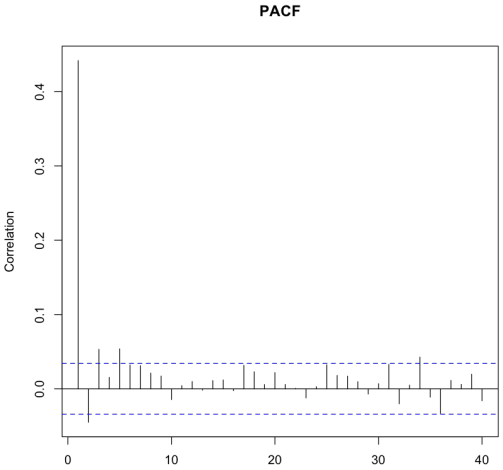
Cleaning the Data





Validation of the cleaned Data





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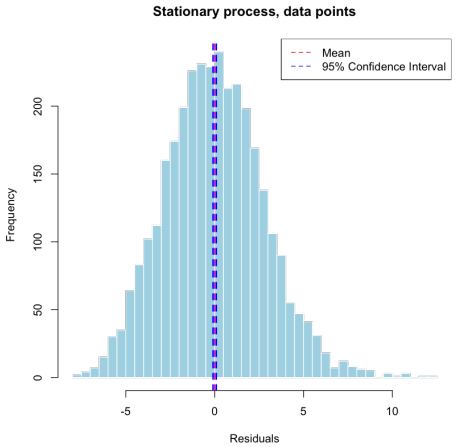
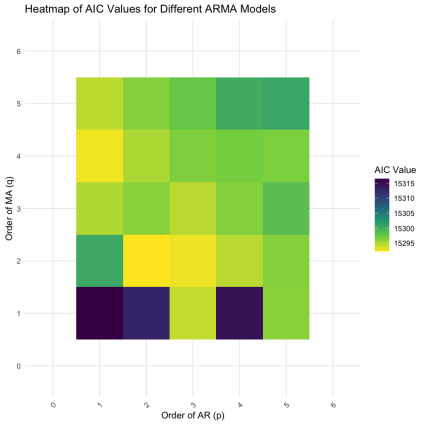


Fitting the model



Estimating the parameters

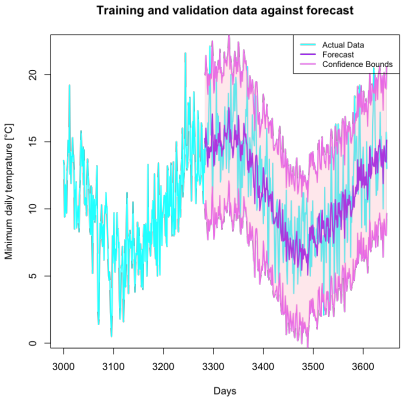
Our ARMA(2,2) model:

$$X_t = 1.21X_{t-1} - 0.23X_{t-2} + Z_t - 0.75Z_{t-1} - 0.19Z_{t-2}$$

with

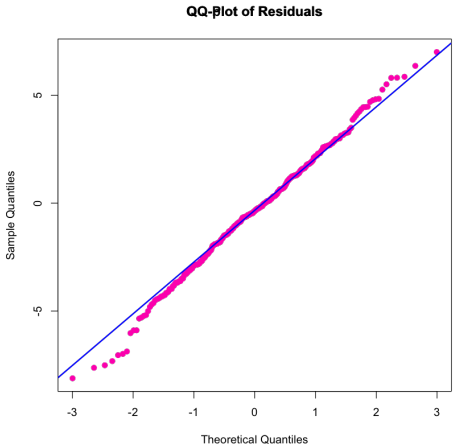
$$\{Z_t\} \sim \mathrm{WN}(0, 7.74)$$

Forecast


Training and validation data against forecast
Actual Data
Forecast
Confidence Bounds
Minimum daily temprature [°C]
0
5
10
15
20
3000
3100
3200
3300
3400
3500
3600
Days

Evaluation of residuals

- Residuals normally distributed



Difficulties and Alternatives

- Python was hard in the beginning
- Difficult to find an appropriate dataset
- More complicated models like ARIMA / SARIMA could provide a better fit

Thank you!