

Project on Time Series

March 3, 2021

Assignment 1

- The file “2014-2019 PM10 LisAvLib.xlsx” contains a time series of **hourly-levels** of PM_{10} particles (in micrograms per cubic meter), collected at Avenida da Liberdade monitoring station in Lisbon from **01/01/2014** to **31/12/2019**.
- Fit a **SARIMA-type** model to the time series representing **24-h average levels** of PM_{10} particles. Discuss your model fitting in a step-by-step fashion, presenting your (a) initial examination of the data, (b) transformations (if necessary) (c) initial identification of the dependence orders and degree of differencing, (d) parameter estimation, (e) residual diagnostics and model choice.
- After deciding on an appropriate model, forecast the data into the future up to **5 time periods ahead** and calculate **95%** prediction intervals for each of the **5** forecasts.

Assignment 2

- The file “2016-20-Nasdaq.txt” contains the date, open, high, low, closing, adjusted close and volume values of the Nasdaq composite index from 04/01/2016 to 30/12/2020.
- Calculate the time series of **log-returns** associated to the daily closing values of the Nasdaq composite index.
- Fit the best **GARCH-type** model to the time series of log-returns. Discuss your model fitting in a step-by-step fashion.