ENSAE 2A
Linear Time Series
TD n°5

The point of this session is to practice the usual methods of univariate time series treatment. It is especially about identifying, estimating and selecting a model for a given raw time series.

Q1. Import the series from the data_tp5.csv file. The series studied is the spread of rates between BAA and AAA bonds (for firms).

Q2. Graphically represent the series $spread$ and the differentiated series of order 1. What do you observe ?

Q3. Conduct unit root tests to determine the order of integration. Justify the choice of your specification and determination of the number of lags (e.g., in the case of Augmented Dickey-Fuller tests). What can you conclude ? In particular, propose a maximum order of d^*.

Q4. Study the total and partial autocorrelation functions of the chosen series. In particular, propose believable maximum orders p^* et q^* for the studied series.

Q5. By studying the information criterion, offer plausible different specifications.

Q6. For each of the studied models, determine the parameter estimations. Can we improve the adjustment quality of these models ? Explain.

Q7. For each of the previous question's models, perform a residual autocorrelation test. What can we conclude ?

Q8. Which model(s) can we pick after the three first steps of the Box-Jenkins method ?

Q9. From your best model, determine the adjusted residuals. What is the effect of the 2001m12 observation ? How can we take into account this observation ? Explain.

Q10. *(Optionnel)* We would like to conduct a stability test (for instance, before and after 1995). How could be proceed ?