ENSAE 2A
Linear Time Series
TD n°4

The goal of this tutorial is to apply the usual methods of univariate time series data processing. We will put together the identification, estimation and selection of a model for a given raw time series.

Q1. Open R and import the series "Donnees1.csv". We will consider in the sequence xm the private series of its last four observations.

Q2. Graphically represent the series xm. What do you observe ? How can you solve the seasonality problem of xm ? We denote the sequence $desaison$ the series obtained via the de-seasonalizing of xm, and we will assume that the $desaison$ follows an ARIMA(p, d, q).

Q3. Study the auto-correlograms of the $desaison$ series. Does it look integrated ?

Q4. Run the unit root test you believe to be the most suitable to the series $desaison$. Does this test confirm the previous conclusions ?

Q5. Propose believable orders p^*, d^*, q^* for the $desaison$ series. Verify that the corresponding ARIMA(p^*,d^*,q^*) model is valid.

Q6. What are the possible sub-models of the ARIMA(p^*,d^*,q^*) model ? How can we choose among those sub-models ?

Q7. For each of the possible sub-models, make a 4-month out-sample forecast of the $desaison$ and xm series. Compare the results with the last 4 observations of "Données1.csv". What can you deduce about the proposed models ?

Q8. Following a comparable procedure, propose a model for the series contained in the file "Donnees2.csv".