
# ARMA Process

## TD 2

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# Libraries ACF and PACF

The main library you of today will be statsmodels, note that different version might work differently. I am using the last 0.12.2

To plot acf and pacf you can

`import statsmodels.api as sm`

`sm.plot_acf()` or `sm.plot_pacf()`

check `help(sm.plot_acf)` to see how they works

# Libraries ARMA

To fit the parameters of an ARMA:

```
from statsmodels.tsa.arima_model import ARMA

ARMA( series, ( p , q ) ).fit( method='mle' )
```

Then from the output you can obtain the AIC and a summary with the confidence interval on the fitted parameters and the residues.

If you are using the last version you will receive a future warning, because they will substitute it with ARIMA, that is a more general model that include ARMA as a special case. ARIMA class works slightly differently.

# Assignment

1. Load the synthetic_arma.csv and characterize the two time-series
2. Generate an ARMA(3,1) with T=500 $\boldsymbol{\rho}$={0.7,-0.2,0.2}, $\boldsymbol{\theta}$={0.4}, and characterize the time-series
3. Generate an ARMA(3,1) with T=5000 $\boldsymbol{\rho}$={0.7,-0.2,0.2}, $\boldsymbol{\theta}$={0.4}, and characterize the time-series
4. Generate an ARMA(3,1) with T=500 $\boldsymbol{\rho}$={0.7,-0.4,0.4}, $\boldsymbol{\theta}$={0.4}, and characterize the time-series