EcoDep course 2023

Introduction to univariate time series analysis for climate data

Teacher: Federico Maddanu [*]

- **Program:** Introduction to univariate time series analysis and application on real world climate datasets via the open source software OCTAVE (`https://octave.org/`). Particular focus will be on: weakly stationary process, Autoregressive Moving Average (ARMA) processes, nonstationary processes, long memory processes, cyclical processes, structural models with unobserved components and decomposition of a time series in the singular components of trend, cycle and noise. Even through theoretical references will be provided during the course, the focus will be more on the computational side: how to simulate the above processes, how to estimate the relative models, how to choose, set and estimate a model on a real climate datasets, how to yield forecasts.

- **Prerequisites:** Basic notion on linear algebra, statistics and probability theory (e.g. properties and operations between vectors and matrices, descriptive statistics ...). Basic knowledge in programming (e.g. just have an idea of how to run a script in a program and what operators like the for and if operators do). It is strongly suggested to download and install OCTAVE before the beginning of the lessons in order to have some familiarity with the interface of the software.

- **Exam:** The exam will be a take-home exam.

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