

UROP Project
First Semester 2023/2024
Regression and Time Series Modeling and Forecasting
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Regression analysis and time series analysis are considered two of the main topics in statistics and data science.

Regression analysis is relatively older than time series analysis, but on many occasions as well as in the literature, these two fields of statistics are highly mentioned together.

Given a data set, one of the problems one might think of solving is: to discover a rule that governs the behavior of the data, “a model that fits the data”. Another naturally occurring problem one might think of solving is: to explore the unknown, the behavior of the data in the past or the future, by using the model previously discovered.

In this project, we are going to work with data sets to build models that fit the data sets of interest and estimate the parameters of these models. We shall evaluate the quality of these models to choose the “best possible” model. We shall use these models for making forecasts and forecast intervals.

The data sets we are going to work with could be artificial data (simulated using software), real data used in the academic context (available with some textbooks, software packages, and various websites), and finally real data from open-source databases on the internet (that could be weather data, financial data, economic data, etc.)

Expected skills:

- Calculus: Single and Multivariable.
- Linear Algebra: Matrices and Systems of Equations, Determinants, Vector Spaces, Linear Transformations, and Eigenvalues.
- Probability Theory: Probability and Distributions, Multivariate Distributions, Some Special Distributions (Binomial, Poisson, Gamma, and Normal), and Distributions of Functions of Random Variables.

Expected Start Date:

September 23, 2023 (First day of Classes at Birzeit)

Expected Completion Date:

January 22, 2024 (Last Day of Classes at Birzeit)