

Lab Project - Master 1

Project title:

Transneptunian Object database and Survey Simulator

Name and details project's advisor:

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Subject:

Over the last 20 years, the study of the Trans-Neptunian Objects (TNOs) has made great progress. A great number of objects have been detected thanks to the effort of many observers, with various degrees of quality and characterization of the data. In order to better exploit this wealth of data, one needs to access a carefully characterized set of observations which can be fully simulated. Since 2003 our group has run 4 large surveys to detect a big sample of TNOs and precisely determine their orbits. All raw and processed data produced by these surveys are kept in an ad-hoc *database* made up of a large set of files and home-made program that deal with these files. This database can be searched or modified only by accessing a specific computer and using specific programs. A very old version of the database – holding less than a quarter of the full database – is available online to the wider community, but it did not follow the evolution of the master database. The survey simulator exists in the form of Fortran and/or Python programs that require local installation on each user's computer, limiting its wide-spread use.

The goal of the project is to update the structure of the database currently online to follow the present content of the master database, to develop tools to ingest the master database into the online database, to update the online querying interface, and to control access to private/public data.

The second stage of the project will be to develop a Web-service that allows to check the validity of a given TNO model by comparing it to the detection data present in our TNO database. Running a program that simulate our surveys, this service will apply to the model the same observational biases as those existing in the real sample, allowing a direct comparison. A statistical study of the similarities of the real and simulated sample will be proposed.

This projects involves SQL database, ingesting heterogeneous data, Human-Machine interface and Web-services.