

Autonomous Robotics

Ex0 - GNSS Raw Measurements

This assignment focuses on the basic principles of GNSS, in particular, you are asked to implement a naive positioning algorithm based on RMS (Root Mean Square) of selected (i.e., weighted) pseudo-ranges.

ToDo:

1. Get to know the basic concepts of GNSS in particular, the notion of pseudo-ranges, see [Presentation](#), [GNSS Raw Measurements](#), and android [GnssLogger](#) App.
2. Download the following [dataset](#), go over the data, and design a parsing tool that converts the log file to a csv (txt) file with the following format:
GPS time, SatPRN (ID), Sat.X, Sat.Y, Sat.Z, Pseudo-Range, CN0, Doppler (nice to have), See this [link](#) for a complete explanation + python code for solving most of this assignment. Note: the sat position should be in [ECEF](#) coordinates.
3. Given a csv file (as in the above format) Implement a **Positioning Algorithm** which for a Given GPS time, computes the appropriate positioning (in X,Y,Z coordinates). You are expected to implement an iterative numerical minimal RMS algorithm on a weighted set of SatPRNs.
4. Implement a converting method from X,Y,Z to Lat, Lon, Alt ([see wiki page](#))
5. Integrate the above tasks into a complete solution that receives a Raw Measurements GNSS (log) file and computes two output files: (i) [KML](#) file (see [time and animation](#)) with the computed path. (ii) CSV file as in (2) with the following additional columns: Pos.X, Pos.Y, Pos.Z, Lat, Lon, Alt
6. Perform a testing on the given dataset and add your own data files. Conclude your work as a github repo - including a detailed readme with "how to run"