

Assignment:

Develop a MATLAB/Python program to calculate the position and clock bias of a GNSS receiver, along with the GDOP. Use the following data sources:

- Pseudorange data recorded at epoch 11:00:00.0 from the RINEX observation file zimm1000.23o. At this epoch, observations were made on 11 satellites.
- Extract satellite positions and clock biases from the orbit file igs22571.sp3. The satellite positions are given in kilometers in the ECEF, and clock biases are in microseconds.
- The a priori position of the receiver in ECEF (in meters) is provided in the RINEX file header.
- Troposphere and ionosphere should be disregarded in this assignment.

Compare solutions using signals from satellites broadcasting on the C1, C2, P2, and C5 frequencies.

Bonus Assignment (+15%):

Extend your MATLAB/Python program to process a 24-hour RINEX observation file (zimm1000.23o) along with the corresponding RINEX navigation file (zimm1000.23n). Calculate and visualize the following time series:

- Site position, north-south component.
- Site position, east-west component.
- Site position, up component.
- PDOP.
- Ensure that your program includes corrections for both tropospheric and ionospheric effects.
- Generate plots for each of the time series to provide a comprehensive visualization of the receiver's movement and the associated precision metrics over the 24-hour period.