CE 597z Adj. of Geospatial Obs. HW4

Assigned Thur. 15 Nov., Due Tue. 4 Dec.

•Go to http://www.ngs.noaa.gov/CORS/ for info and data related to the Continuously Operating Reference Stations operated by and in conjunction with NGS.

•Retrieve compressed RINEX GPS data for stations PRDU and IUCO (operated respectively by Purdue University and University of Indiana) for 1 November 2007 (Thursday) for epochs 0:0:0.00, 0:15:0.00; 0:30:0.00, 0:45:0.00 (h:m:s). Filenames should be something like prdu305a.07o and iuco3050.07o. In each file find the specified epochs and find the field C1 (pseudorange on C/A code). Units are meters for the pseudoranges. Also find approximate geocentric ECEF coordinates of the station.

•Retrieve satellite data for the same day. Filename should be something like ngs14514.sp3. we need data for the same epochs as above for each of the satellites for which there is an observation. Fields needed are X,Y,Z,dt. Units are km, in ECEF, dt units are micro-seconds. PR(corr)=PR(raw) + c*dt. Use c = 299792458 m/s. micro-seconds are 1*10e-06 sec.

•Recommend units in the LS problems: km & usec, use sigma of a single pseudorange = 25m, consider satellite positions to be constant

- Solve the following LS problems using pseudorange observations:
  - Solve for prdu location using only the first epoch
  - Solve for prdu location using all 4 epochs
  - Solve for iuco location using all 4 epochs
  - Solve for prdu and iuco simultaneously, and enforce the constraint that the distance between the two stations is 143450.0 m
- In every case make a 2-sided global test at alpha=0.05
- For case 2 make a 99% confidence ellipse for XY and a 99% confidence interval for Z
- For case 2 compute HDOP, VDOP, and PDOP
- Suppose you were going to assume that each satellite position was an observation with sigma=0.5m, how would that change your model?
- Remember that you need a new parameter DT for each receiver for each epoch
- Use condition equation:

$$F = PR_{corr} - \left[\left(x - x_s\right)^2 + \left(y - y_s\right)^2 + \left(z - z_s\right)^2 \right]^{1/2} - c\left(DT\right) = 0$$