CE 597 (029) Adj. of Geospatial Obs. HW6

Assigned Thur. 4 Dec., Due Thur. 11 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 (operated respectively by Purdue University) for 19 November 2008 (Wednesday) 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 prdu324a.08o. 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 from a CORS ftp site. Filename should be something like igu15063_00.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 W=I and compute post-adj estimate of obs. variance, consider satellite positions to be constant. You will find some matlab code from 2007 that you may use & modify as needed.

- Solve the following LS problems using pseudorange observations:
  - Solve for prdu location using only the first epoch (one clock unknown)
  - Solve for prdu location using all 4 epochs (four clock unknowns)
- In both cases try given XYZ and (0,0,0) as initial approximations
- Use Error propagation to get Qdd(ENU) from Qdd(XYZ)
- Use Leick's formulas and compute HDOP and VDOP as, HDOP=sqrt(qe + qn), and VDOP=sqrt(qu)
- Remember that you need a new parameter DT for each receiver for each epoch
- Use the following condition equation:

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