# Lab 1

Analysis of stationery data:

Data size: 568 values.

Location: In front of the Snell library.

Parameters: Latitude: 42.3389   Longitude: -71.0884   Altitude: 11   UTM Easting: 3.2796e+05
Northing: 4.6895e+06   Zone: 19   Letter: 'T'

UTM Easting VS UTM Northing:

The below graph shows utm_easting values vs utm_northing values and the best line fit. The mean for
utm_easting and utm_northing is 3.2796e+05, 4.6895e+06 respectively. The standard deviation for the
values for utm_easting is 1.7194 and for utm_northing is 1.9982 which defines the range of error of the
easting northing values.
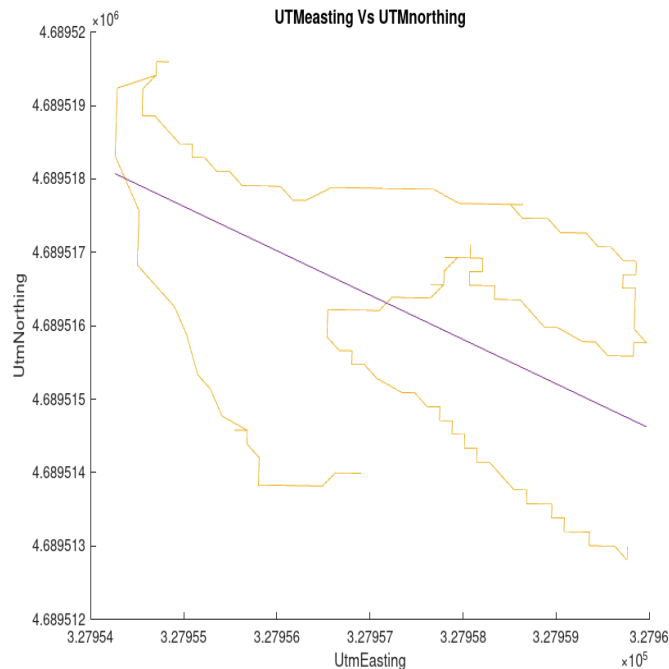
Time VS Altitude:

The graph below shows time vs altitude values and the best line fit. The altitude value in static
measurement either decreases or increases with respect to time and the standard deviation is 2.8865 which
defines the range of error of the altitude values and the mean for altitude is 9.1235.

Seq

Error analysis:

The estimation of error is strictly subjected to many factors. We cannot put a definite bound on these error
estimates as the signal is dependent on weather conditions, calculation and rounding errors, ephemeris

data errors. multipath effects, objects around the GPS receiver, dilution of precision, satellite, and receiver clocks etc. But I think we can also consider the following situation as a source of error.

In the figure we can see that the plot for utm_easting and northing is dense which means the points are closely distributed; the reason behind this is minute movement of the devices. While collecting the data I was carrying, the laptop and the puck and because of the body movement we can see the close distribution of points.

The reading was collected in a location which is surrounded by buildings. This may be one of the reasons for error, also the signals can be disturbed by the interference of electronic gadgets in that area.

Analysis of moving data:

Data size: 363 values.

Location: Behind the ISEC building

Parameters: Latitude: 42.3372   Longitude: -71.0868 Altitude: 29.4000 UtmEasting: 3.2809e+05 UtmNorthing: 4.6893e+06   Zone: 19 Letter: 'T'.

UTM Easting VS UTM Northing:

The below graph shows utm_easting values vs utm_northing values and the bestline fit. The mean for utm_easting and utm_northing is 3.2818e+05, 4.6894e+06 respectively. The standard deviation for the values for utm_easting is 6.7194 and for utm_northing is 5.9982 which defines the range of error of the easting northing values.

UtmEasting   ×10⁻

Time VS Altitude:

The graph below shows time vs altitude values and the best line fit. The altitude value in moving measurement either decreases or increases with respect to time and the standard deviation is 7.8865 which defines the range of error of the altitude values and the mean for altitude is 12.1235.

Error analysis:

The data set is plotted on 363 values which were recorded while walking in a straight line of about 400 meters. The minimum and the maximum error for the moving reading is 0.0664, 15.7901, respectively. The reading was collected in a location which is surrounded by buildings. This may be one of the reasons for error, also the signals can be disturbed by the interference of electronic gadgets in that area.