Lab 2: Estimation

ENGO 585: WIRELESS LOCATION

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Due Date: February 1, 2018

Submitted on:

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# Introduction

The following report contains the methodology and analysis perform in this lab in order to achieve the requirements from the lab handout. The purpose of this lab is to “review non-linear least-squares estimation and related concepts” according to [1]. This lab involves performing Parametric Least Squares, Sequential Least Squares and Kalman Filtering. The necessary coding of this lab was wrote in Matlab.

# Methodology

## Task 1: Batch Parametric Least Squares

### 2-D Solution for epoch

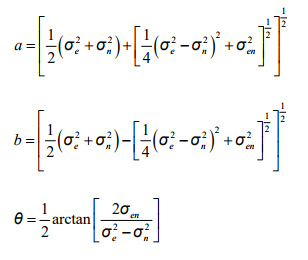
In order to perform a non-linear least squares adjustment, it was needed to first obtain the weight matrix of the observations using the following formulas:

Once the weight matrix was calculated, it was needed to iterate the following formulas in order to obtain a correct disclosure, misclosure and the unknown coordinates. The threshold for this iteration was that any value of matrix should not exceed 0.5 mm.

### Batch Parametric Least Squares

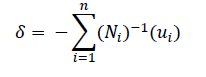
### Residuals

### 2D Error ellipse

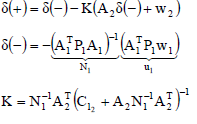


## Task 2: Summation of Normals and Sequential Least Squares

### Summation of Normals of Static Data



### Sequential Least Squares of Static Data



## Task 3: Kalman Filter

### Sequential Least Squares of all data

### Kalman Filter

# Results and Analysis

## Task 1: Batch Parametric Least Squares

## Task 2: Summation of Normals and Sequential Least Squares

# References

[1] Lab Handout

[2] El Sheimy Chapter 8

# Appendix A: Matlab Code