

# 521 M7410 –Adjustment and Analysis of Spatial Information

Fall Semester 2015

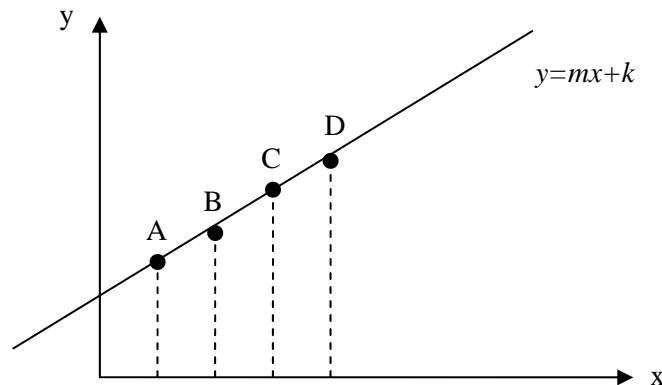
## Homework No. 9

handed out Thursday, December 31, 2015

due Thursday, January 14, 2015, 09:10 Name: \_\_\_\_\_

### Unified Sequential LSQ Adjustment

1. In a 2-D line fitting problem, point coordinates are measured to solve for the slope and intersection of that straight line. Assume all observables are uncorrelated and of equal precision.
  - a. If only point A (1.00, 10.01) is measured. Estimate the line parameters (i.e., slope  $m$  and y-intersection  $k$ ) by a unified sequential LSQ approach.
  - b. In addition to above, a new point B (2.00, 12.98) is measured. Update your solution in 1a by a sequential LSQ approach.
  - c. In addition to above, a new point C (3.00, 16.05) is measured. Update your solution in 1a by a unified sequential LSQ approach.
  - d. In addition to all above, another new point D (4.00, 18.99) is also measured. Update your solution in 1b by a unified sequential LSQ approach.
  - e. If the coordinate measurements of points C (in 1b) are found to be incorrect. A new measurement is performed to give C'(3.00, 16.02). Update your solution in 1c by a unified sequential LSQ approach.
  - f. Plot the straight lines (from 1a to 1d) and all the measured points on a 2-D map.



2. Combine 1a to 1e (in a bundle) and estimate the line parameters by a batch unified LSQ approach. Compare your results here against those in part 1.

Your (individual) final report should contain (use A4 papers):

- this page as the cover sheet
- source code(s) and outputs; do not forget to add your name and lots of comment cards to the source listing (% .....
- input and output files from program [input/output values used and calculated], if any
- plots, including captions on axes, title, your name, LB#/HM#, course title, date (if any)
- derivation and description of formulas used, accompanied by figures where applicable
- evidence of computational accuracy
- discussion of results