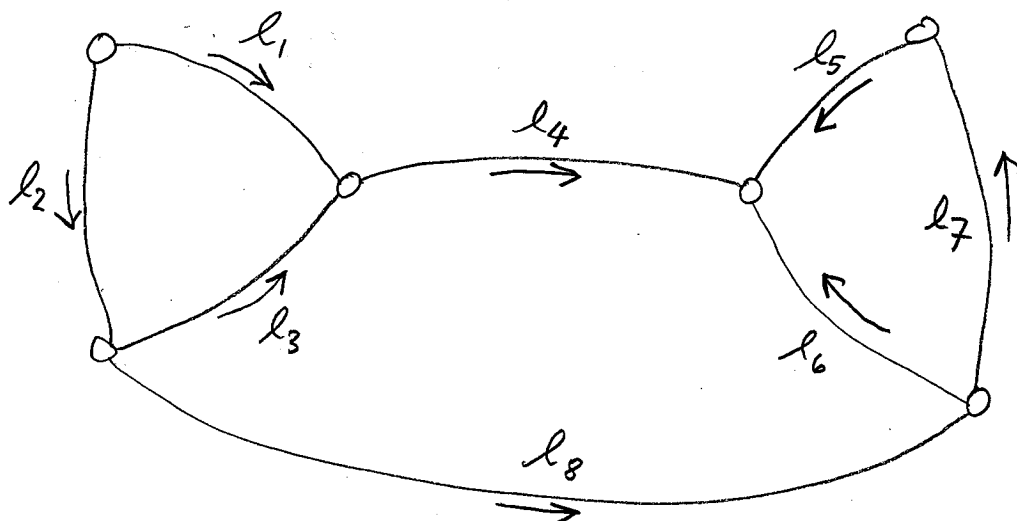Adj. of Geospatial Obs. — Homework 3
assigned 7 Sept, 2012, due Monday, 17 Sept.
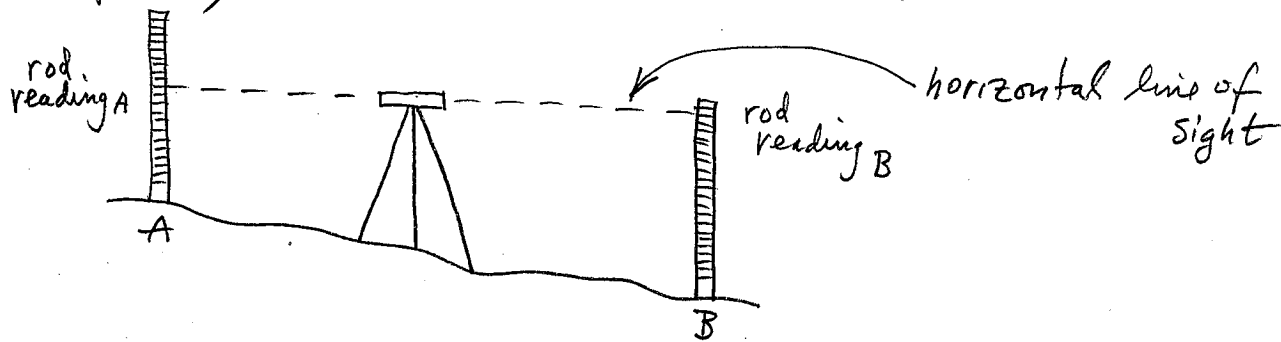
1. Adjust the observations in the level network by Least Squares, using the "<u>observation only</u>" method (pencil & paper). Arrows point up hill.

| # | $\ell$ | $\sigma$ |
|---|------|------|
| 1 | 16.11 | .05 |
| 2 | 6.94 | .05 |
| 3 | 9.03 | .05 |
| 4 | 6.92 | .05 |
| 5 | 5.25 | .15 |
| 6 | 10.85 | .15 |
| 7 | 6.10 | .15 |
| 8 | 4.80 | .15 |



Note: the observation $\ell$ is an elevation difference between the two points, often measured with a "level"
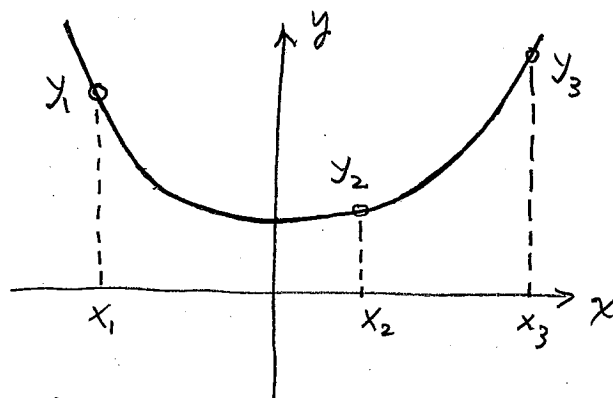


$$\ell = \text{rod reading}_B - \text{rod reading}_A$$

You can make the condition equations by summing around closed loops — the sum must be zero! (with the arrow $+$, against the arrow $-$)

2. you observe the y-coordinate of three points on a curve of the form $y = ax^2 + b$



the x-coordinate is a constant.

Find the condition equation(s) necessary to express this model using observations only ( no parameters !).

Then solve the Least squares problem for the data

| x | y |
|---|---|
| -2 | 11.15 |
| 1 | 4.97 |
| 3 | 20.92 |

using the observations only, pencil & paper method.

( hint: you can find the condition equation(s) by elimination. )