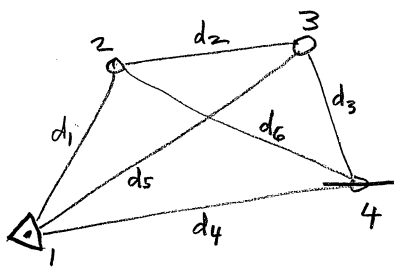


# Adj. Geog. Obs. HW7 Constraints

assigned Wed. 15, nov.

due Tues. 21<sup>st</sup>

1.



adjust the trilateration network (2D)

observations 1→6: 29.94, 29.68, 26.54, 52.21, 51.84, 44.92

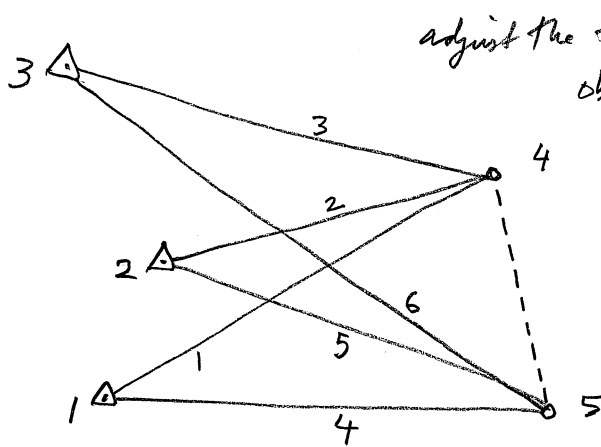
$\sigma = 0.15$

fix  $x_1, y_1 = 113.8, 11.0$  and  $y_4 = 15.0$

Using constraints

make global test, show residuals, parameters,  $\sum \frac{x_i}{y_i}$ ,  $\sum \frac{x_2}{y_2}$ ,  $\sum \frac{x_3}{y_3}$ ,  $\sum \frac{x_4}{y_4}$

2.



adjust the trilateration network (2D)

observations 1→6: 56.66, 43.00, 42.22, 57.82, 51.15, 63.76

$\sigma = 0.15$

fix points 1, 2, 3 any way you wish.

(a) without distance<sub>45</sub> constraint

(b) with distance<sub>45</sub> constraint

$d_{45} = 35.5$

in both cases show  $\sum \Delta\Delta$

make global test, show residuals, parameters, and  $\sum \Delta\Delta$

3. Derive the expression for  $Q_{\Delta\Delta}$  for "regular case" ( $N$  full rank):

$$\Delta = \Delta^0 + \bar{N}' C^T (C \bar{N}' C^T)^{-1} (g - C \Delta^0), \quad \Delta^0 = \bar{N}' t$$

$$Q_{\Delta\Delta} = \bar{N}' (I - C^T (C \bar{N}' C^T)^{-1} C \bar{N}')^{-1}$$

by error propagation techniques.