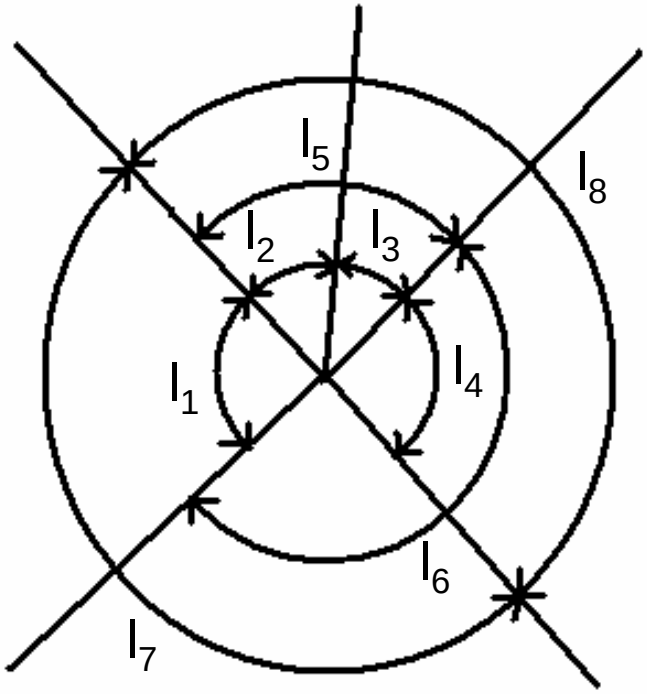
CE 597Z – Adj. of Geos. Obs. – Homework 1

Assigned 4-Sep, due 11-Sep



obs	Angle (deg)
1	96
2	44
3	37
4	98
5	83
6	182
7	180
8	181

1. Adjust the angle figure using the LS method of observations only & Lagrange Multipliers

$$X = ax + by + c$$

$$Y = -bx + ay + d$$

Pt.	x	y	X	Y
1	1	1	5.8	8.4
2	2	2	7.3	10.6
3	1	2	5.5	10.2

2. Solve for the trans-formation parameters a,b,c,d by LS method of indirect observations. X,Y are observations, x,y are constants.

3. Fit the given observations, y, to a parabola of the form shown in the equation. Use the LS method of indirect observations.

$$y = a_0 + a_1 x + a_2 x^2$$

Pt	x	y
1	-0.4	3.0
2	0.2	1.2
3	1.5	1.1
4	2.4	2.4
5	2.8	4.0

4. A single object is measured four times with values: 6.0, 5.8, 6.1, 6.2. Make an adjustment by LS. Is it the same as sample mean?

Note: for all problems, show model elements n, n_0, r. Solve by “manual methods” demonstrated in class. Show all of your work. Show residuals, adjusted observations, and any parameter estimates. Unless otherwise stated, all observations are of equal precision and are uncorrelated.