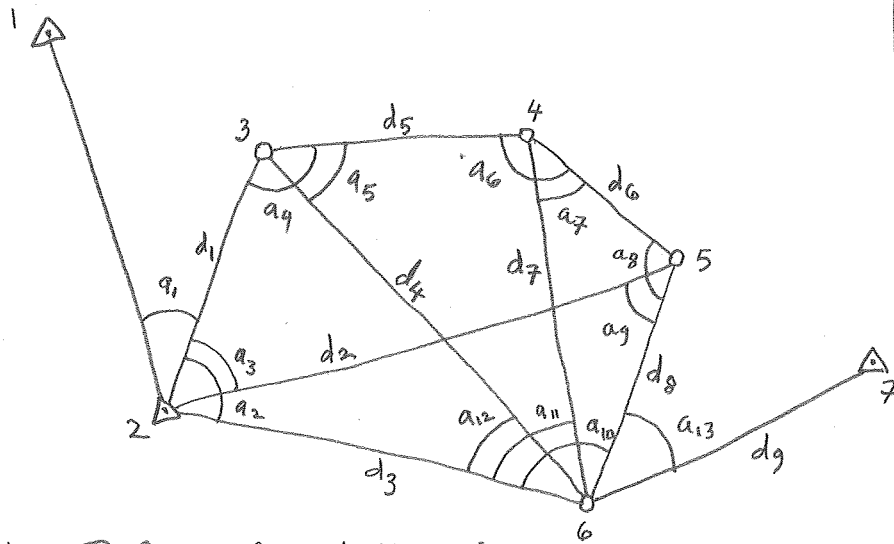


Adj. Geospa. Obs. CE 597 Homework 4

assigned wed. 26 oct. 2016, due 1 week, 2 nov.

Make LS adjustment of the following 2D network (indirect observations)



CP	X(m)	Y(m)
1	12.0	326.0
2	71.0	113.0
7	421.0	120.0

△ = control point (fixed)

○ = unknown point

$$\sigma_{ang} = 10''$$

$$\sigma_{dist} = 0.01 m$$

show B, f, w for 1st iteration only.

show Δ every iteration

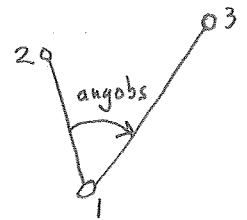
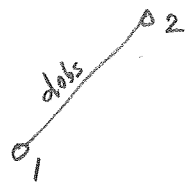
careful to resolve the 2π ambiguity for F_a

suggest: result = distance-cond-eqn ($x_1, y_1, x_2, y_2, dobs$)

$$result = \begin{bmatrix} \frac{\partial F_d}{\partial x_1} & \frac{\partial F_d}{\partial y_1} & \frac{\partial F_d}{\partial x_2} & \frac{\partial F_d}{\partial y_2} & F_d \end{bmatrix}$$

result = angle-cond-eqn ($x_1, y_1, x_2, y_2, x_3, y_3, angobs$)

$$result = \begin{bmatrix} \frac{\partial F_{ang}}{\partial x_1} & \frac{\partial F_{ang}}{\partial y_1} & \frac{\partial F_{ang}}{\partial x_2} & \frac{\partial F_{ang}}{\partial y_2} & \frac{\partial F_{ang}}{\partial x_3} & \frac{\partial F_{ang}}{\partial y_3} & F_{ang} \end{bmatrix}$$



show final residuals (in arc sec for angles)

make global test on ref. variance @ $\alpha = 0.05$, 2-sided

make 99% conf. intervals for x_4, y_4

make 99% conf. region (ellipse) for x_4, y_4 jointly, show a, b, θ

you may use supplied code (draw-ell.m)

turn in all results (↑) + source code, if it does not work, send code by email.

angles (# DMS)

1	36	5	14.1
2	87	3	15.7
3	57	20	39.7
4	109	17	2.2
5	49	29	55.6
6	139	29	59.3
7	40	49	47.2
8	108	2	28.9
9	54	10	11.2
10	96	6	58.0
11	64	59	12.6
12	33	9	54.3
13	40	44	49.7

hw4_dat

distances (# m)

1	133.544
2	258.709
3	210.946
4	243.787
5	130.028
6	101.984
7	187.550
8	128.962
9	165.042

draw_ell

```
% draw_ell.m 22-oct-08
% function to draw ellipse

function result=draw_ell(xorg,yorg,a,b,theta)

th=theta;
x0=a;
y0=0;
nseg=50;
dalpha=2*pi/nseg;
for i=1:nseg
    alpha=i*dalpha;
    x1=a*cos(alpha);
    y1=b*sin(alpha);
    px0=xorg + cos(th)*x0 - sin(th)*y0;
    py0=yorg + sin(th)*x0 + cos(th)*y0;
    px1=xorg + cos(th)*x1 - sin(th)*y1;
    py1=yorg + sin(th)*x1 + cos(th)*y1;
    plot([px0 px1],[py0 py1],'r-','linewidth',2);
    if(i == 1)
        hold on
    end
    x0=x1;
    y0=y1;
end
result=0;
```