

Adj. of Geospatial Observations - HW 5
 assigned Monday 1 October, due Wed. 10 October

1. Fit a curve of the form $y = a_0 + a_1 \sin \theta + a_2 \cos \theta$ to the given data. $y = \text{observations}$, $\theta = \text{constant}$. Carry only 2 parameters in your least squares adjustment.

θ	1	2	3	4	5	6	units = radian
y	0.98	0.71	-0.22	-0.84	-0.62	0.28	$\sigma_y = 0.05$

2. get 1844n.jpg and imeas.m from
<ftp.ecn.purdue.edu/bethel>

use matlab program imeas.m and the point sketches to measure image coordinates of all of the points except 1077, 1078, 1016.

Fit your measurements (l, s) to the planimetric ground coordinates (E', N') by least squares using the 8-parameter transformation. Use any LS method. $\begin{pmatrix} E', N' \\ \text{constant} \end{pmatrix}$

Take a few points, measure each 10 times to determine the σ_l, σ_s for the observations.

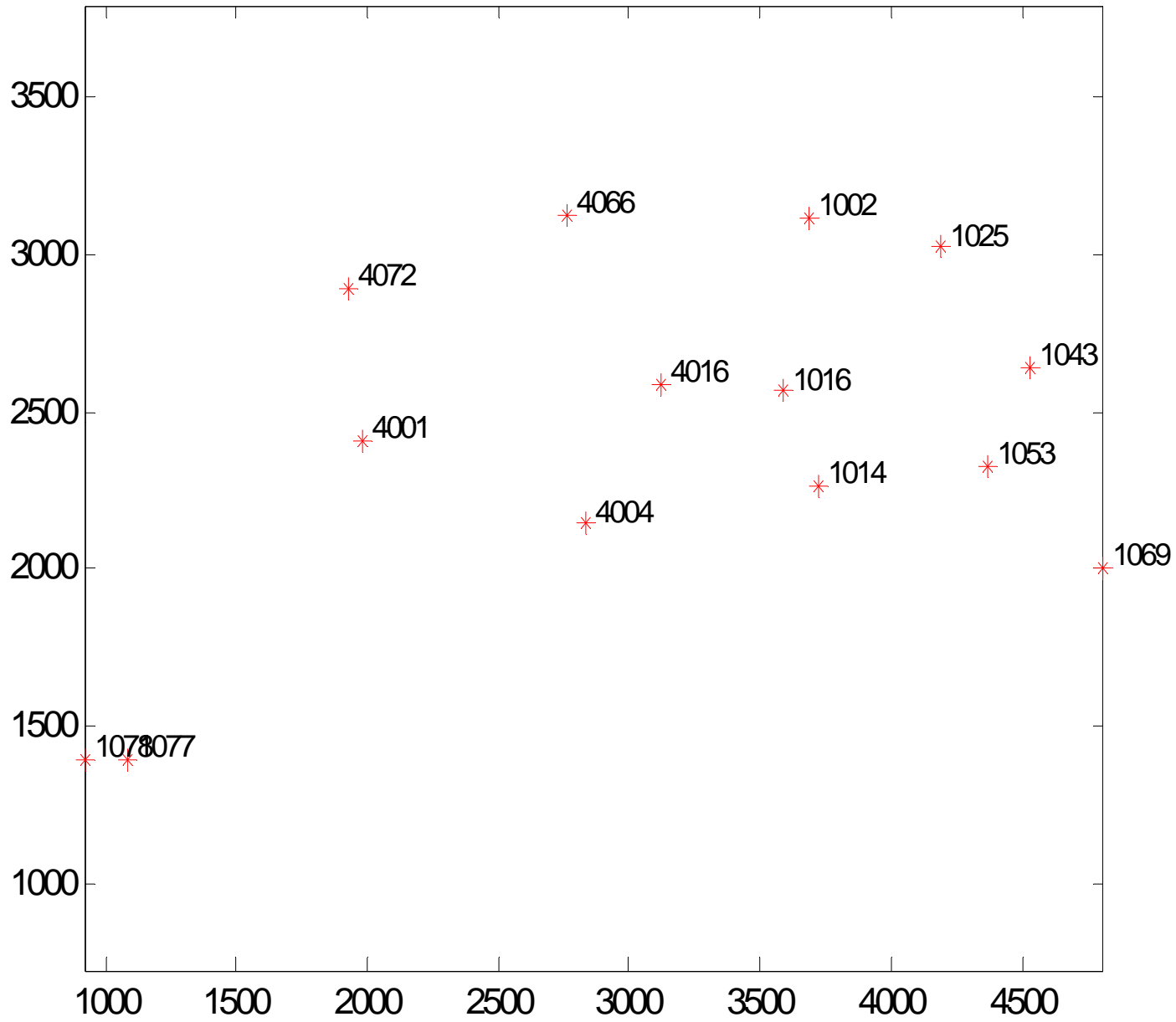
Obtain $\Sigma_{\Delta\Delta}$ as $\sigma_0^2 Q_{\Delta\Delta}$. What are $\sigma_{a_0}, \sigma_{b_0}, \sigma_{a_0 b_0}$, and $r_{a_0 b_0}$ (correlation coefficient)

Data in the file is (s, l) . Use it as (l, s)

Pick a local origin to obtain E', N' from E, N . What happens if you do not do this?

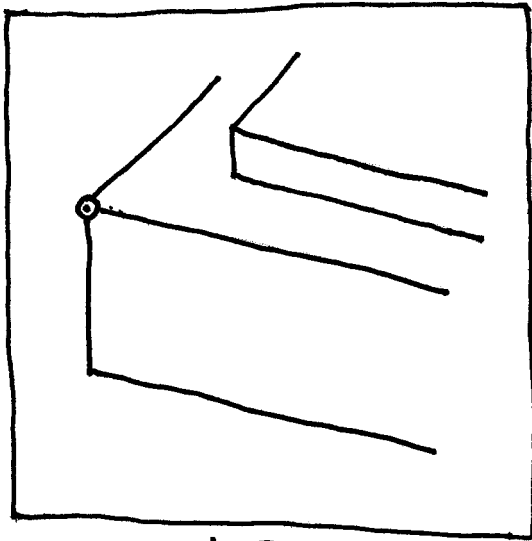
Always include listing of all Matlab source code.



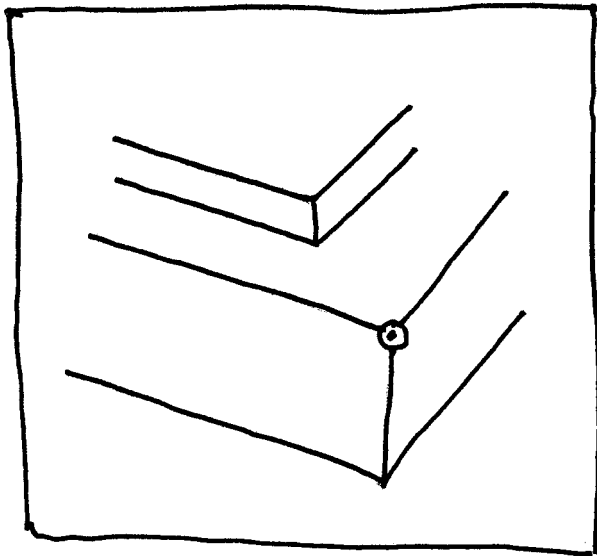


gcp.txt

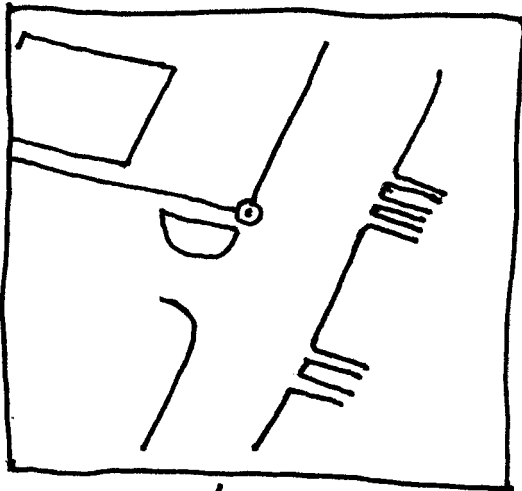
1053 507182.684 4474652.620 154.678
4072 506019.942 4475089.265 154.509
4004 506502.951 4474461.737 152.837
4001 506114.115 4474637.873 156.284
1078 505826.347 4473934.451 158.819
1077 505887.377 4473934.848 158.872
1069 507320.990 4474426.703 152.232
4016 506630.763 4474830.353 157.237
4066 506440.060 4475399.675 154.763
1043 507309.038 4474936.626 154.822
1002 506949.044 4475416.655 155.793
1025 507205.922 4475325.697 156.161
1014 506890.328 4474579.625 154.932
1016 _____ . _____ . _____ 156.090



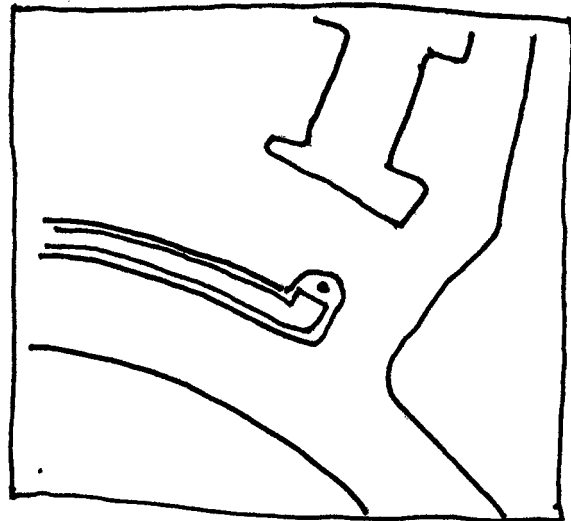
1078
building corner



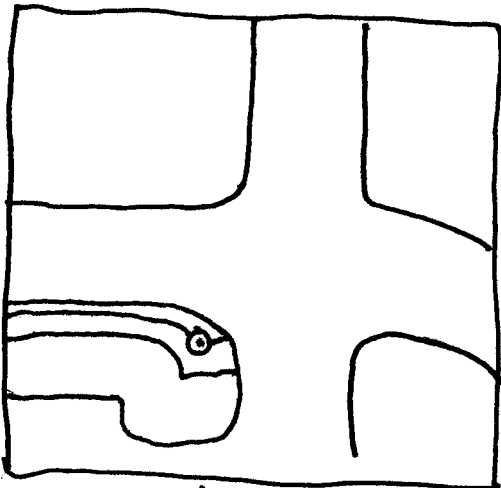
1077
building corner



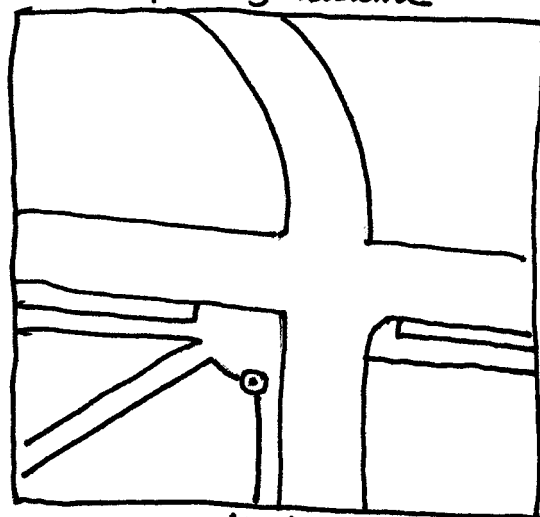
4072
grass corner



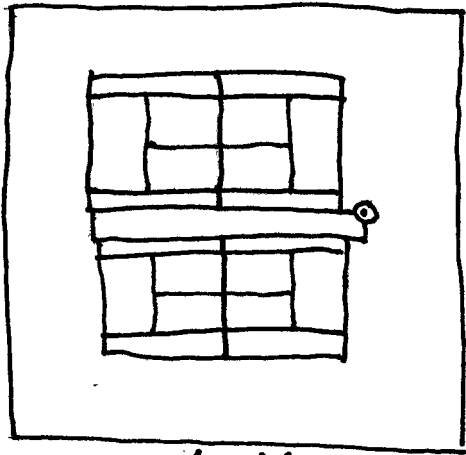
4001
center of semi-circle shape on
parking island



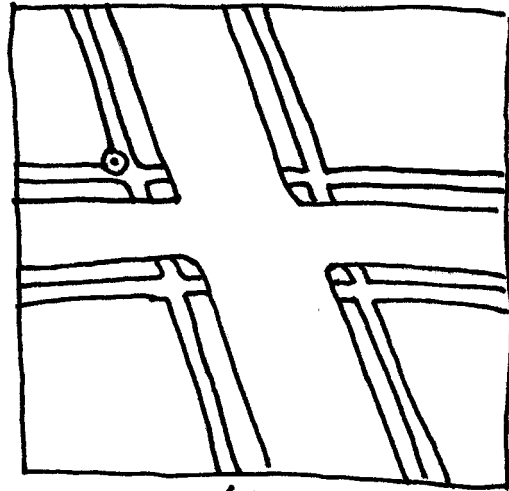
4004
sidewalk corner



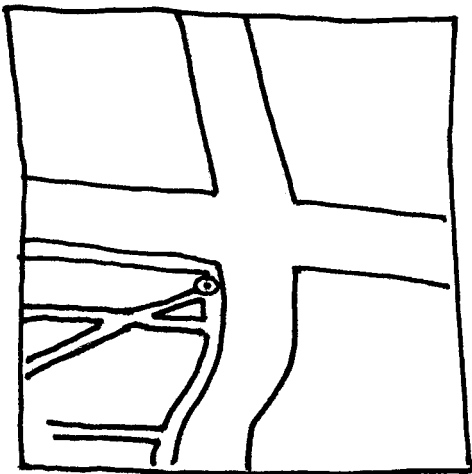
4016
sidewalk corner



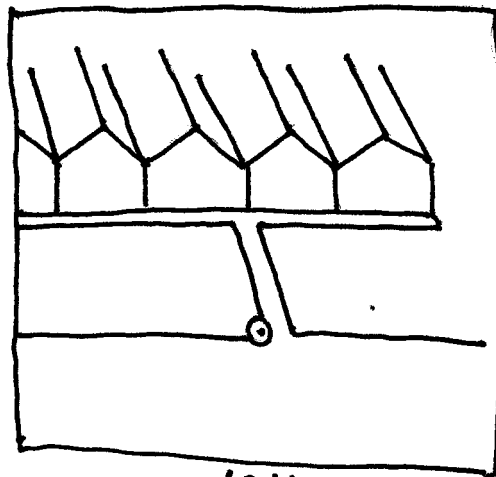
4066
sidewalk corner between
tennis courts



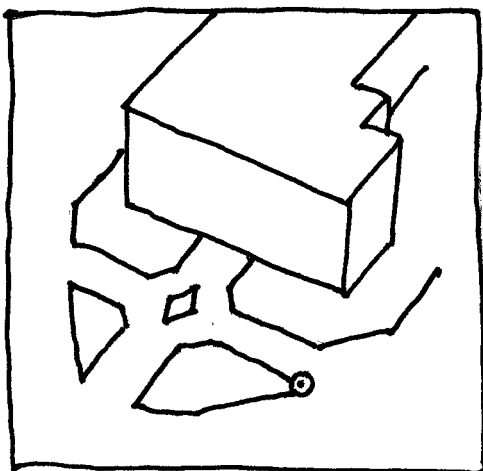
1002
sidewalk corner



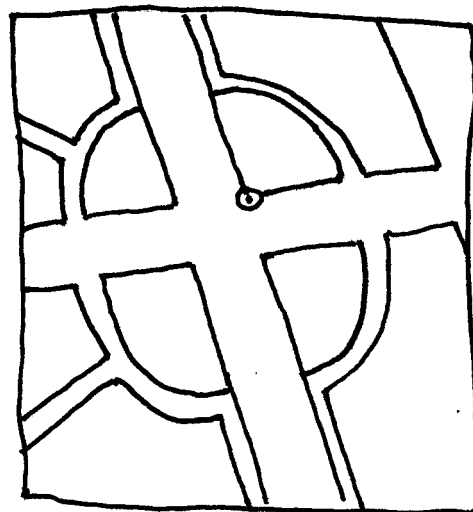
1016
sidewalk corner



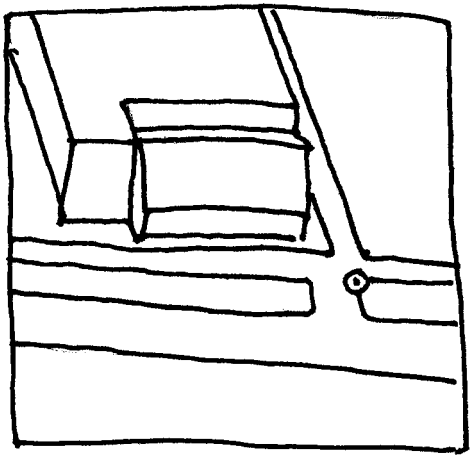
1014
side walk corner



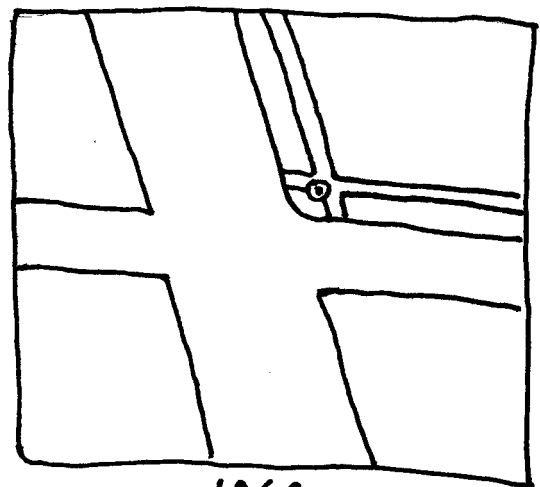
1025
side walk corner



1043
brick paving corner



1053
sidewalk corner



1069
side walk corner