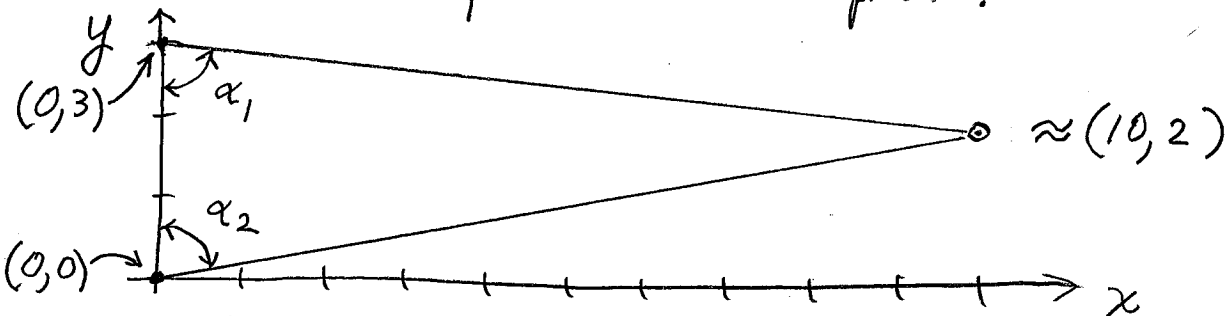
Homework 1, Adj. of Geospatial Observations
assigned Mon, 29 Aug. 2011, Due Tues., 6 Sep.

1. Practice with Matlab and Error Propagation/Simulation
For the following figure, take the nominal α_1, α_2, perturb them with normally distributed random errors ($\mu = 0, \sigma = 0.1''$) solve for the intersection point, and plot it. Do this 1000 times to generate "scatter plot". What do you think about the shape of the scatter plot?

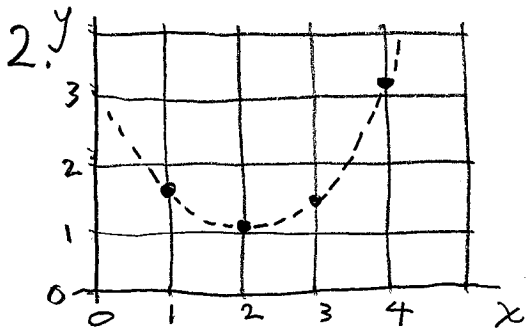


nominal $\alpha_1 = 84^\circ.289406862$
nominal $\alpha_2 = 78^\circ.690067526$

(note: this one is not a least squares problem)

y = random('norm', mean, std, m, n)
$Ax = b$
$x = A^{-1}b$, inv(A) * b
plot(x, y, '*')
hold on

2.



x	y
1	1.52
2	1.05
3	1.46
4	3.11

Fit a parabola to the 4 data points shown at left, by least squares. Use the scalar variable approach shown in lecture 3. X's constant, y's observations. Use model $y = a_0 + a_1 x + a_2 x^2$, n_0 will be 3. Observations have equal precision and are uncorrelated. Use indirect observations, show results for the 3 parameters, the residuals, and the adjusted observations.