CE697 Adv. Data Adj. HW2

assigned 2 June 2016, Due ~~1 week~~. Thur. 16 June.

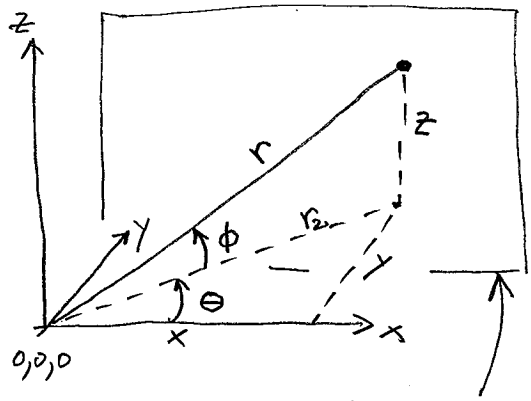
1. We obtain raw observations of horizontal angle, θ, vertical angle, ϕ, and 3D range, r, from a fixed laser scanner. These observations are obtained for 7 points. Solve the LS problem for the XYZ point coordinates, while constraining points to a plane, using <u>added parameters</u>.

condition equations for a point:

$$\theta = \tan^{-1} y/x$$

$$\phi = \tan^{-1} z/r_z$$

$$r = [x^2 + y^2 + z^2]^{1/2}$$



plane approximately parallel to XZ plane ~10m from origin

observations:

pt.	θ°	ϕ°	r (m)
1	84.385	5.684	10.224
2	73.625	5.327	10.712
3	89.979	13.812	10.506
4	84.457	16.209	10.761
5	78.986	10.835	10.647
6	79.173	25.019	11.810
7	73.972	20.176	11.596

$\sigma_\theta = .035^\circ$ $\sigma_\phi = .035^\circ$ $\sigma_r = .006$ m

2. Redo problem #2 from HW1 with the usual <u>inner constraints</u> rather than the fixed coordinate constraints.

Compute & plot the 50% confidence ellipses for the 4 points. Scale "up" the ellipse plots so they can be easily seen and interpreted.