

Adj. Geospa. Obs. HW3

assigned 25 Sep; due Monday 5 Oct.

1. Redo the coordinate transformation problem from HW2 but carry $\Theta \equiv \lambda$ explicitly as parameters (this makes it nonlinear!). Result should be same as before! (indirect observations)

2. Redo the 2D ranging problem given in lecture as an observations only solution, CP's are fixed, unknown point is observed with $X = 19 : \sigma = 0.1$, $Y = 12.6 : \sigma = 0.1$.
 σ for distance observations is 0.5

3. Solve the 7 parameter LS problem using indirect observations

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \lambda M \begin{pmatrix} X \\ Y \\ Z \end{pmatrix} + \begin{pmatrix} t_x \\ t_y \\ t_z \end{pmatrix}$$

initial approx:

$$\lambda = 1, \omega, \phi, k = 0, t_x, t_y, t_z = 0$$

$$\begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 5 \\ 2 \\ 1 \end{pmatrix}, \begin{pmatrix} 4 \\ 5 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 4 \\ 0 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \\ 2 \end{pmatrix} \quad \text{constant}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \underbrace{\begin{pmatrix} 1.235 \\ 1.372 \\ 1.430 \end{pmatrix}, \begin{pmatrix} 5.460 \\ 2.100 \\ 1.567 \end{pmatrix}}_{\sigma = 0.05}, \underbrace{\begin{pmatrix} 4.554 \\ 5.377 \\ 2.538 \end{pmatrix}, \begin{pmatrix} 2.565 \\ 4.315 \\ 0.464 \end{pmatrix}, \begin{pmatrix} 2.271 \\ 3.446 \\ 2.497 \end{pmatrix}}_{\sigma = 0.08}$$

$$\sigma = 0.05$$

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