

<http://engineering.purdue.edu/~bethel> 1-1

measurements = observations

errors: random variation

Systematic error X

gross errors or blunders X

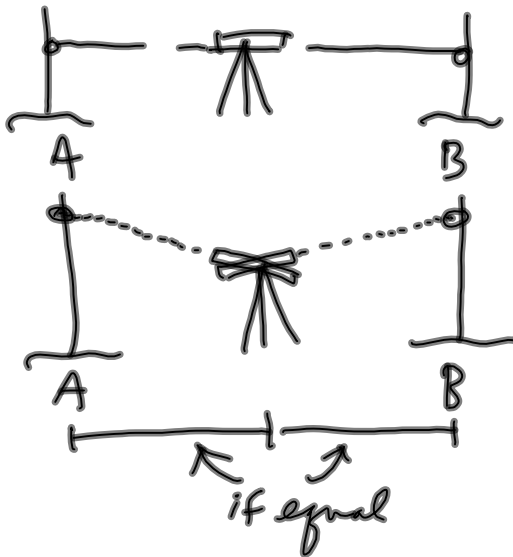
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Systematic errors 1-2

- compensate by correction
- add parameters to model (self calibration)
- design instrument or measurement plan
to eliminate sys. errors



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adjustment optimization or minimization
 we will minimize objective function
 observation correction v_i , residual

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Vector Norm = measurement of length
 Euclidean Length

$$L_2 = \left[v_1^2 + v_2^2 + v_3^2 + \dots + v_n^2 \right]^{1/2}$$

$$L_p = \|v\|_p = \left[|v_1|^p + |v_2|^p + \dots + |v_n|^p \right]^{1/p}$$

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$$L_1 = \|V\|_1 = |V_1| + |V_2| + \dots + |V_n|$$

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L_2 : euclidean length

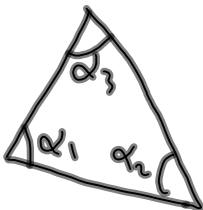
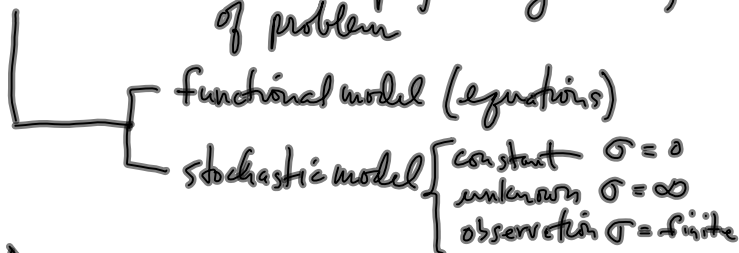
measurements:

- (a) explicitly measure quantities of interest
- (b) measurements are related to quantities of interest by math model

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math model: describe physics or geometry of problem

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$$\begin{aligned}
 n &= \# \text{ obs, } 3 \\
 - n_0 &= \text{min. \# obs. nec. to fix model} = 2 \\
 \hline
 &1 = \text{redundancy}
 \end{aligned}$$

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