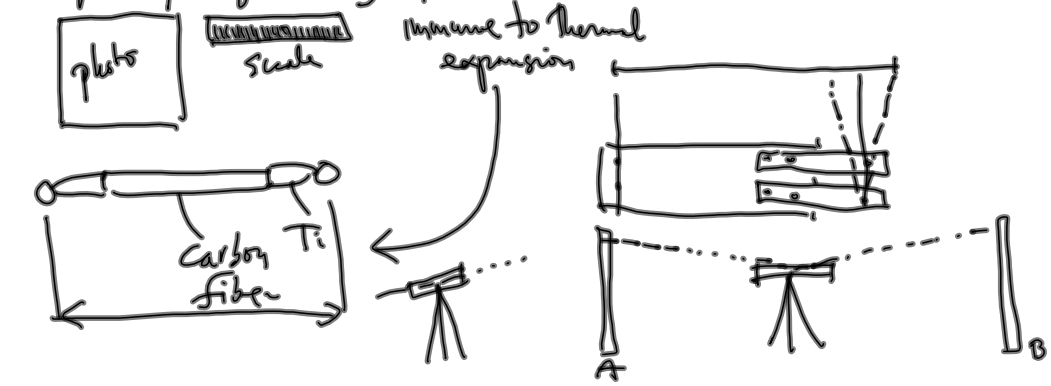
http://engineering.purdue.edu/~bethel

1-1

measurements (observations)
- always contain errors
  - random errors
  - systematic errors
  - blunders or gross errors

systematic errors
1. Compensate by correction
2. add parameters to model (self calibration)
3. design instrument or measurement plan to eliminate

examples: photogrammetry



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measurements

1-2

will be inconsistent
correct them to become consistent

$$\hat{l} = l + v$$

$\hat{l}$: adjusted obs. l: original obs. v: residual. want v's to be small

$\Phi = v_1^2 + v_2^2 + \cdots + v_n^2 \rightarrow$ small as possible

Least squares criterion

$\Phi = w_1 v_1^2 + w_2 v_2^2 + \cdots + w_n v_n^2$

$\vec{v} = \begin{bmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{bmatrix}$ Φ: min $\|\vec{v}\|$, min $\vec{v}^T\vec{v}$

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