2/13/22

Exam 1 Review

Exam details

- 1 page notes (back & front)
- bring your calculator!
- 10 - 12 problems
- Full course period 1 hr 50 min.

CH2: How to report Uncertainty

- Standard form: $x = x_{best} \pm \delta x$

  x_{best} ← best estimate

  δx ← uncertainty

- Significant Figures: SF of best estimate should be same order of magnitude as uncertainty.

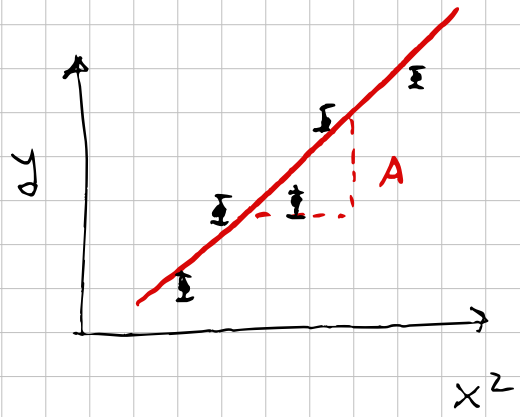
- Discrepancy

- True Error

- Comparing Quantities

- Graphical Methods

$y = A x^2$



- Fractional Uncertainty

CH. 3 Propogation of Uncertainties

- Counting experiments :
  "square root rule"

- Quadratic forms for uncertainty propogation:

$$b = x + \cdots + y - \cdots - z$$

$$\delta b = \sqrt{(\delta x)^2 + (\delta y)^2 \cdots + (\delta z)^2}$$

$$b = \frac{x \cdot y \cdot \cdots \cdot z}{w \cdot u \cdot \cdots}$$

$$\delta b = \sqrt{\left(\frac{\delta x}{x}\right)^2 + \left(\frac{\delta y}{y}\right)^2 \cdots \left(\frac{\delta u}{u}\right)^2}$$

- Uncertainty of function of one variable:

$$\delta_b = \left| \frac{db}{dx} \right| \delta x$$

- General Formula

$$q = f(x, \ldots, z)$$

$$\delta_q = \sqrt{\left(\frac{\partial b}{\partial x}\delta x\right)^2 + \cdots + \left(\frac{\partial b}{\partial z}\delta z\right)^2}$$

CH.4 Statistical Analysis of Uncertainties

- random error
- systematic error

- mean

- standard Deviation σ_x

- standard Deviation of the mean $\sigma_{\bar{x}}$

Ch. 5 The Normal Distribution

- Histograms