https://github.com/aasensio/estes_park18

https://github.com/aasensio/hazel2

A. ASENSIO RAMOS

WHAT AM I DOING WHEN I DO AN INVERSION?

LEAST SQUARES

$$\chi^2 = \sum_{i=1}^{N} \frac{(I_i - O_i)^2}{\sigma^2}$$

FOLLOW THESE RULES

▸ You have to understand your problem

▸ Understand the model that 'generates' your data

▸ If you understand your generative model, a merit function is uniquely defined

▸ The 'best' fit is the one that minimizes the merit function

UNDERSTAND YOUR PROBLEM

▸Understand your instrument

▸Your model will surely not explain your observations

▸You are surely not understanding your errors

▸Systematic effects

GENERATIVE MODEL

$$y_i = mx_i + b + \epsilon_i$$

$$\epsilon_i \sim N(0, \sigma^2)$$

LIKELIHOOD

$$\mathcal{L} = p(D|m, b) = \prod_{i=1}^{N} N(y_i|mx_i + b, \sigma^2)$$

WHERE DOES LEAST SQUARES COME FROM?

$$\mathcal{L} = p(D|m, b) = \prod_{i=1}^{N} N(y_i|mx_i + b, \sigma^2)$$

$$\log \mathcal{L} = c - \sum_{i=1}^{N} \frac{[y_i - (mx_i + b)]^2}{\sigma^2}$$