Propagation of error for second data

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1 Finding propagating Errors in the slope and intercepts parameters from the plot

Note: We need to find the propagating errors only in the final parameters. For our case, finding the propagating errors in the slope and intercept parameters of the calculated energy vs true energy plot
The standard formula used for the propagation of errors is as follows:

for $q = f(x, ..., z)$

$$\delta q = \sqrt{\left(\frac{\partial q}{\partial x}\delta x\right)^2 + ... + \left(\frac{\partial q}{\partial z}\delta z\right)^2} \tag{1}$$

If q is the a power, $q = x^n$, then

$$\frac{\delta q}{|q|} = |n|\frac{\delta x}{|x|} \tag{2}$$

The relation between different parameters for our calculations:

$$b_{new} = -\frac{b_2}{m_2} + b_1 \tag{3}$$

$$m_{new} = \frac{m_1}{m_2} \tag{4}$$

In above equations b_1 and m_1 are the intercept and slope parameters from the calibration function of previous file.
Moreover, b_2 and m_2 are the intercept and slope from the calculated energy vs true energy plot

$$\delta b_{new} = \sqrt{\left(\frac{\delta b_2}{b_2}\right)^2 + \left(\frac{\delta m_2}{m_2}\right)^2} \times b_{new} \tag{5}$$

In above equation b_1 is assumed constant.

$$\begin{aligned}
\delta m_{new} &= \sqrt{\left(\frac{\partial m_{new}}{\partial m_2}.\delta m_2\right)^2} \\
&= \sqrt{(-m_1.m_2^{-2}\delta m_2)^2} \\
&= \frac{m_1}{m_2}\frac{\delta m_2}{m_2} \\
&= \frac{\delta m_2}{m_2} \times m_{new}
\end{aligned} \tag{6}$$

In above equation m_1 is assumed constant Thus equations 4 and 6 are used to calculate the propagated errors.