You are interested in determining the concentration of an unknown solution C by fluorescence using the method of standard addition. Let's assume that you've made five solutions $C + n\Delta$ where $n= 0-4$, and measure five fluorescence values, $F_0 - F_4$. This leads to five $(x,y)$ data points:

$$(C, F_0), (C + \Delta, F_1), (C + 2\Delta, F_2), (C + 3\Delta, F_3), (C + 4\Delta, F_4).$$

If we graph the following five $(x,y)$ data points:

$$(0, F_0), (\Delta, F_1), (2\Delta, F_2), (3\Delta, F_3), (4\Delta, F_4).$$

We will get a straight line that can be fit with the linear equation

$$y = mx + b$$

This line is the same line as a standard calibration curve, but shifted to the left by an amount equal to $-C$. To get the value of $C$, we set $y=0$ and calculate the value for the $x$ intercept $x_0 = x$ at $y=0$:

$$x_0 = -b/m = -C$$

therefore:

$C = b/m$ in units of $\Delta$.

Here's a picture from Wikipedia:
Error analysis for the method of standard addition:

\[ C = \frac{b}{m} \]

95% C.L. = \( \pm t_{N-2} s_c \)

We need to calculate \( s_c \). Here's the result of the statistical derivation:

\[
s_c = \frac{s_r}{m} \sqrt{\frac{1}{N} \left( \frac{1}{m^2 S_{xx}} \right) + \frac{(\bar{y})^2}{m^2 S_{xx}}}\]

This equation is similar to the equation we use for the linear calibration curve from Skoog with \( y_c = 0 \) and no \( 1/C \) term.