



# Signal Processing and Analysis

## **Homework 5**

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# Derivations of parameters and their uncertainties

Please follow pp. 146-147 of the book, *Bevington, P. R. and D. K. Robinson, Data Reduction and Error Analysis for the Physical Sciences, 3/E, McGraw-Hill Higher Education, 2003*, to derive the value  $a'_j$  of the parameter at the minimum of the parabola is given by

$$a'_j = a_{j3} - \Delta a_j \left[ \frac{\chi_3^2 - \chi_2^2}{\chi_1^2 - 2\chi_2^2 + \chi_3^2} + \frac{1}{2} \right]$$

The variation  $\sigma_j$  in the parameter  $a'_j$ , which will increase  $\chi^2$  by 1 from its value at the minimum of the parabola, is given by

$$\sigma_j = \Delta a_j \sqrt{\frac{2}{\chi_1^2 - 2\chi_2^2 + \chi_3^2}}$$



