

1046-Z1-2109

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How precise is your calibration? Multiple linear regression and prediction error in Excel. Preliminary report.

Calibration curves are typically used to determine the unknown concentrations of known compounds in a mixture. In this talk we introduce the calibration problem and compare precision estimates associated with calibration curves involving one or more components. As expected, these problems become much more difficult for mixtures containing more than two components since multiple factors are contributing to the uncertainty. Many chemometric methods used to solve these types of problems require expensive specialized software that is not readily available or familiar to chemistry students. Instead, we compute multiple linear regressions and calculate associated errors using Excel, thus making the topic accessible to undergraduate students. (Received September 17, 2008)