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New ways to report counting measurement results

Guthrie Miller and Tom T. Little, Los Alamos National Laboratory

This workshop involves demonstration of supplied software (hands-on if possible) to preprocess counting data, using actual plutonium alpha-spec measurement data as an example. In addition to reporting the measurement result, uncertainty standard deviation, decision level, MDA, etc., the exact likelihood function in interpolation table form can also be reported. The advantage of this approach is that the exact likelihood function can be made available for subsequent use without sacrificing computation speed relative to the usual Gaussian approximation formulas. For this technique to be widely used would require development of a standard approach (perhaps an ANSI standard). One of the techniques covered would be the use of distributions of background count data to empirically determine prior probability distributions of the background count rate. This type of analysis of background count rates, in addition to providing a Bayesian prior, could be useful in providing quality control metrics for the background. This method also nicely resolves the "zero count" problems that occasionally occur in alpha-spec measurements (with zero counts and zero background counts the usual formulas imply a measurement result of zero with zero uncertainty).