Figure 6.3. QUANTIFYING UNCERTAINTY: Confidence Intervals

Section headings and subheadings to provide a content overview

1. An Illustration of a Measuring Process – the Mass of NB10
2. A Confidence Interval for μ Representing the Mass of NB10
3. Understanding Confidence Intervals for a Model Mean Representing a Population Average
    1. Interpretation of a CI
    2. The value used for the confidence level
    3. Interpretation of the confidence level
    4. Factors affecting the width of a CI for the model mean μ representing the population average $\overline{\mathbf{Y}}$
    5. CI numerical coefficients from the t_ν instead of the $N(0,1)$ distribution
    6. Modelling assumptions underlying the CI derivation
        Assumption 1
        Assumption 2 – sampling
        Assumption 2 – measuring
        Assumption 3

    Example 6.3.1
    Example 6.3.2
4. Modelling a Measuring Process which *has* Inaccuracy
    1. Calibrating a measuring process to quantify measuring inaccuracy.
    2. A CI for the mean μ representing the population average $\overline{\mathbf{Y}}$ calculated from inaccurate measurements
5. Calculating a Sample Size in the Plan for an Investigation to Estimate $\overline{\mathbf{Y}}$
    Specifying imprecision by *interval width*
    Specifying imprecision by *interval half-width*
    Specifying imprecision by the *standard deviation of* $\overline{Y}$
6. Appendix 1: t_ν Distribution History
7. Appendix 2: Least Squares Estimating
8. Appendix 3: t_ν Distribution Theory
    The χ^2_ν distribution
    The K_ν distribution
    The distribution of $\tilde{\sigma}$
    The t_ν distribution
    The distribution of $\tilde{\mu}$
9. Appendix 4: A Confidence Interval for σ representing $\mathbf{S}$ (and for σ^2 representing $\mathbf{S}^2$)
    Example 6.3.3
10. Appendix 5: The International Reference Kilogram

Ten tables
Twenty-one diagrams
Forty-five equations