

Generalized Confidence Intervals and Tolerance Intervals With Bioassay Applications

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Abstract. Tolerance intervals are intervals that capture a specified proportion of a population, with a given confidence level. In the talk, I will address the problem of computing an upper or lower tolerance limit for the ratio X_1/X_2 when $(X_1, X_2)'$ follows a bivariate normal distribution. The problem is motivated by a bioassay application. The construction of an upper tolerance limit can be accomplished by first computing a lower confidence limit for the cdf of X_1/X_2 . We address the latter problem using the concept of a generalized confidence interval (GCI). The GCI itself will be introduced in the context of the interval estimation of a lognormal mean, and will also be applied for the interval estimation of the ratio of regression coefficients in a linear regression model. For the latter problem, the solution based on the GCI idea appears to have some advantages over the well known solution based on Fieller's theorem. All of the results will be illustrated using examples.