Applications of the Fractionally-Random-Weight Bootstrap

William Q. Meeker

Department of Statistics

Iowa State University

Abstract

The bootstrap, based on resampling, has, for several decades, been a widely used method for computing trustworthy confidence intervals for applications where no exact method is available and when sample sizes are not large enough to be able to rely on easy-to-compute large-sample approximate methods, such a Wald (normal-approximation) confidence intervals. There are, however many applications where the resampling bootstrap method cannot be used. These include situations where the data are heavily censored, logistic regression when the "success" response is a rare event or where there is limited mixing of successes and failures across the explanatory variable(s), and designed experiments where the number of parameters is close to the number of observations. The thing that these three situations have in common is that there may be a substantial proportion of the resamples where is not possible to estimate all of the parameters in the model. This talk will show how the non-integer random weight bootstrap method can avoid these problems and provide trustworthy confidence intervals.

This is joint work with Chris Gotwalt and Yili Hong.