

STATISTICS COLLOQUIUM

MONDAY, OCTOBER 24, 2011

TALK: 4:00 PM — SCIENCE CENTER RM. 309

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

“Confidence Distribution, the Frequentist Distribution Estimator of a Parameter”

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ABSTRACT

In frequentist inference, we commonly use a single point (point estimator) or an interval (confidence interval/“interval estimator”) to estimate a parameter of interest. A very simple question is: *Can we also use a distribution function (“distribution estimator”) to estimate a parameter of interest in frequentist inference, in the style of a Bayesian posterior?* The answer is affirmative, and confidence distribution (CD) is one such a “distribution estimator,” that can be defined and interpreted in a frequentist (repetition) framework. The concept of CD has a long history, especially with its early interpretation associated with fiducial reasoning. Historically, it has been misconstrued as a fiducial concept, and has not been fully developed in the frequentist framework. In recent years, CDs have attracted a surge of renewed attention, and several developments have highlighted their promising potential as an effective inferential tool. The goal of these new developments is not to derive any new paradox free fiducial theory. Rather, it is on providing a useful statistical inference tool for problems where frequentist methods with good properties were previously unavailable or could not be easily obtained.

In this talk, we present a modern definition of a CD, and develop a general framework of combining information based on CDs. Several examples of new methodology developments, which otherwise may not be possible or difficult to get within the conventional frequentist domain, are provided. The discussion will draw attention to comparisons among frequentist, fiducial and Bayesian approaches. It is hoped that the developments of CDs, along with a recent surge of publications on fiducial inference, belief functions and objective Bayes, will help bridge the gaps between these different statistical procedures.