April 5, 2002

Colorado-Wyoming Chapter

Previous Up Next

CO WYO ASA Spring Meeting
Friday, April 5, 2002
NCAR Mesa Lab, Boulder, CO (MAP)

9:00 Registration and informal chats (coffee/tea/muffins/rolls)

9:15 Election of New Officers

Pres-Elect

Newsletter Editor

9:30 Presentation of Maurice Davies Awards

9:35 Presentation of Outstanding High School AP Statistics Students Awards

9:45 Major Scott Frickenstein, USAF Academy

"Estimating Optimal Age Replacement Policies"

Abstract: We develop and estimate optimal age replacement policies for devices whose age is measured in two time scales. For example, the age of a jet engine can be measured in the number of flight hours and the number of landings. Under a single-scale age replacement policy, a device is replaced at age t or upon failure, whichever occurs first. We show that a natural generalization to two scales is to replace non-failed devices when their usage path crosses the boundary of a two-dimensional region M, where M is a lower set with respect to the matrix partial order. For lifetimes measured in two scales, we consider devices that age along linear usage paths. We generalize the single-scale long-run average cost, estimate optimal two-scale policies and give an example. We note that these policies are strongly consistent estimators of the true optimal policies under mild conditions, and study small-sample behavior using simulation.

10:30 Jim Luhring and **Johanna Lewis,** Cherry Creek High School

" Trout Streams, Slot Limits, and A Generalized Geometric Probability Distribution"

Abstract: High school Advanced Placement statistics students were invited to solve a wait-time simulation problem on the Free Response part of the 1998 AP Statistics Exam. A natural extension for this problem was to modify the geometric probability distribution for the second success on the nth trial, then generalize to the kth success on the nth trial. Students were asked to investigate this through tactile simulation, technical simulation, theory, and experimentation. Once these distributions were confirmed, the students were required to apply the expected value to solve the original problem.

11:00 Lunch

1:00 Tressa Fowler, University of Colorado- Denver

"Bootstrap Conficence Intervals for the Binomial Parameter: How Good is Their Coverage When the Sample Size is a Poisson Random Variable"

Abstract: Certain measures of forecast quality (e.g. probability of detection) are essentially binomial probabilities. However, lack of systematic observations for forecasts may cause forecast/observation data to violate the assumptions of the binomial model. In these cases, not only are the numbers of successes random, so are the numbers of observations.

Interval estimates of measures of forecast quality are more useful than point estimates for comparing different forecasts. Traditional interval estimates based on the binomial distribution may underestimate the true variability in the forecast/observation data, yielding a narrower interval than appropriate. This additional variability can be addressed through the use of conditional models, propagation of error formulas, and computer resampling methods. Interval estimates based on these methods are computed and compared for simulated data where the conditional distribution of the number of successes X given the sample size N is binomial and the sample size N is distributed as Poisson. Simulated data include both large and small samples.

Additionally, counts of observations may not fit the Poisson model well. The parameter of the Poisson distribution may vary with the weather conditions, seasons, availability of observers, etc. This may cause counts of observations of weather hazards to appear to be over dispersed. Using the same methods, interval estimates are constructed using a second set of simulated data similar to the first, but with over dispersed Poisson counts.

Single simulations of the intervals for each set of data are compared to each other. Additionally, the correlation between X and N is estimated and the effect of this correlation on the intervals is discussed. Finally, the nominal coverage of each method is estimated via multiple simulations.

1:45 Adjourn

2:00 Organizational/Planning Meeting for New Officers

Registration: $5