University of Puerto Rico Mayagüez Campus
Faculty of Arts and Sciences
Department of Mathematical Sciences
call box 9000, Mayagüez, P.R. 00681

THE DEPARTMENT OF MATHEMATICAL SCIENCES PROUDLY PRESENTS

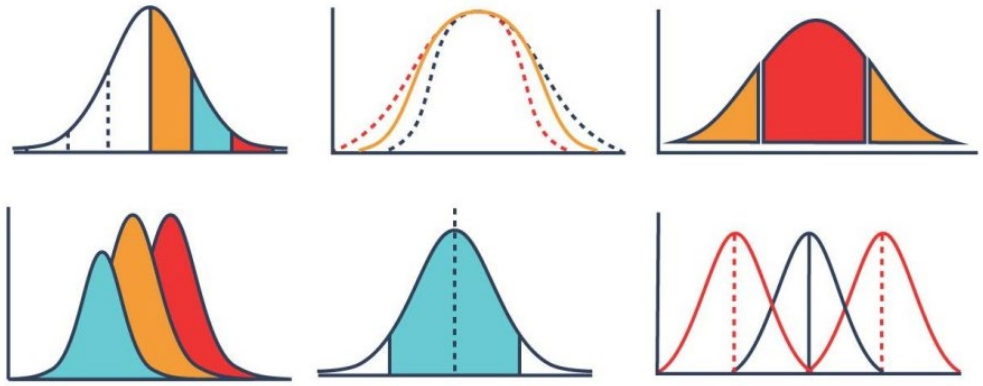
COLLOQUIUM

January-May, 2025

Estimating Counts Through an Average Rounded to the Nearest Non-negative Integer and its Theoretical & Practical Effects

Dr. Roberto Rivera

Marzo 25, 2025
10:45 am, Monzon 201



In practice, the use of rounding is ubiquitous. Although researchers have looked at the implications of rounding continuous random variables, rounding may also be applied to functions of discrete random variables. For example, to infer the number of excess deaths due to falls after a national emergency, authorities may only provide a rounded average of deaths before and after the emergency started. Deaths from falling tend to be relatively low in most places, and such rounding may seriously affect inference on the change of rate of deaths. In this talk, we study the scenario when the rounded-to-nearest integer average is used as a proxy for a non-negative discrete random variable. Specifically, our interest is in drawing inference on a parameter from the probability mass function of Y, when we get U=n[Y/n] as a proxy for Y. We show that properties of U capture the effect of the coarsening of the support of Y. Moreover, we introduce two relative risk of rounding metrics to aid the numerical assessment of how sensitive the results may be to rounding. Under certain conditions, rounding has little impact. However, we also find scenarios where rounding can significantly affect statistical inference. The methods are applied to inferring the probability of success of a binomial distribution, and estimating excess deaths due to falls after Hurricane Maria. The simple methods we propose are able to partially counter rounding error effects.

Ph.D. in CISE
University of Puerto Rico