SEMINARIO DEL DEPARTAMENTO DE PROBABILIDAD Y ESTADÍSTICA

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Dr. Luis G. León Novelo
Department of Biostatistics and Data Science
University of Texas Health Science Center at Houston
School of Public Health

FULLY BAYESIAN ESTIMATION UNDER INFORMATIVE SAMPLING

Bayesian estimation is increasingly popular for performing model based inference to support policymaking. These data are often collected from surveys under informative sampling designs (as opposed to under simple random sampling) where subject inclusion probabilities are designed to be correlated with the response variable of interest. Sampling weights constructed from marginal inclusion probabilities are typically used to form an exponentiated pseudo likelihood that adjusts the population likelihood for estimation. We propose an alternative adjustment based on a Bayes rule construction that simultaneously performs weight smoothing and estimates the population model parameters in a fully Bayesian construction. We compare performances between the two approaches, pseudolikelihood vs Bayesian, on synthetic data, which reveals that our fully Bayesian approach better estimates posterior uncertainty. We demonstrate our method on an application concerning the National Health and Nutrition Examination Survey exploring the relationship between caffeine consumption and systolic blood pressure. This is joint work with: Terrance D. Savitsky from the US Bureau of Labor Statistics.

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